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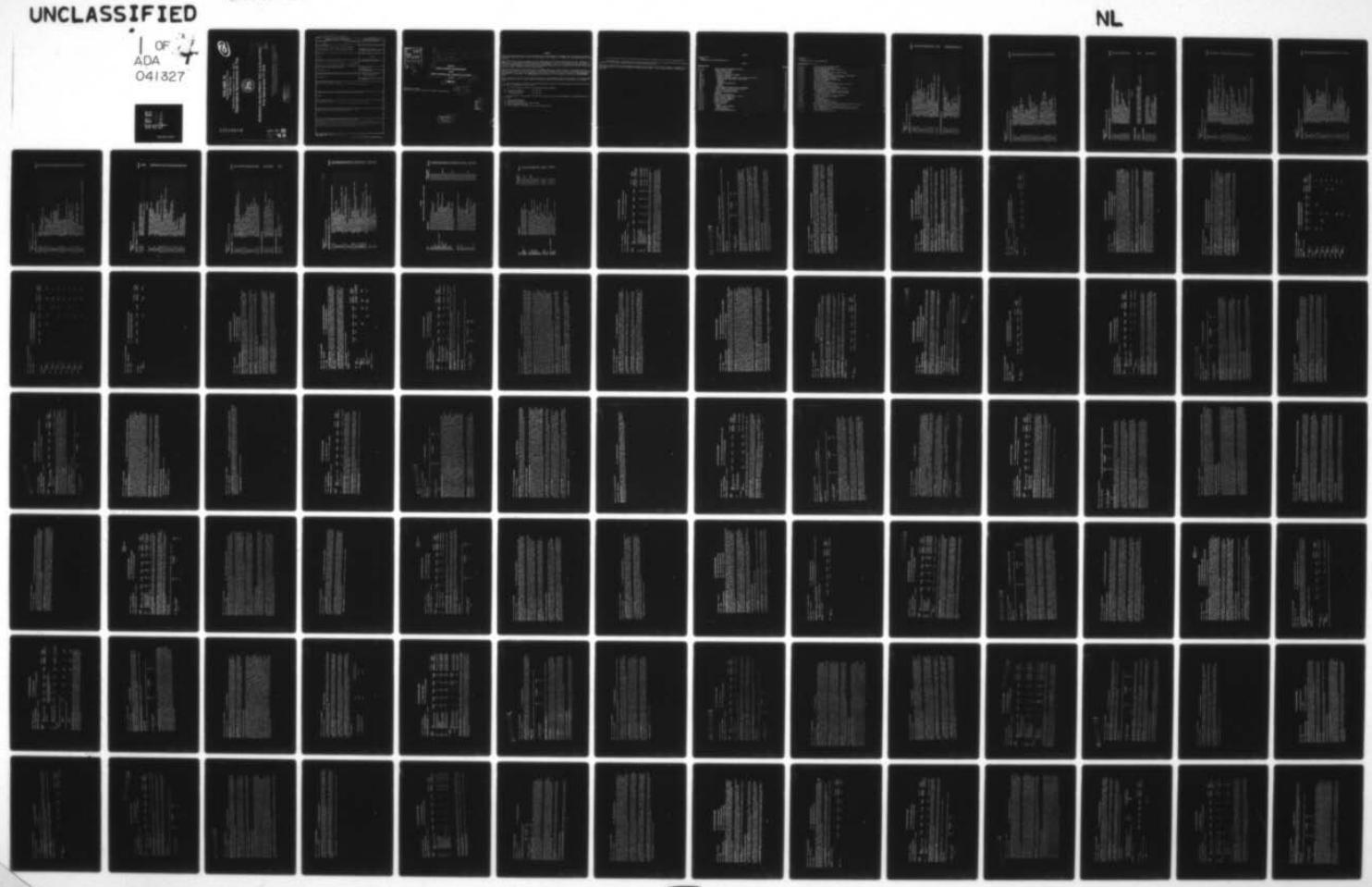

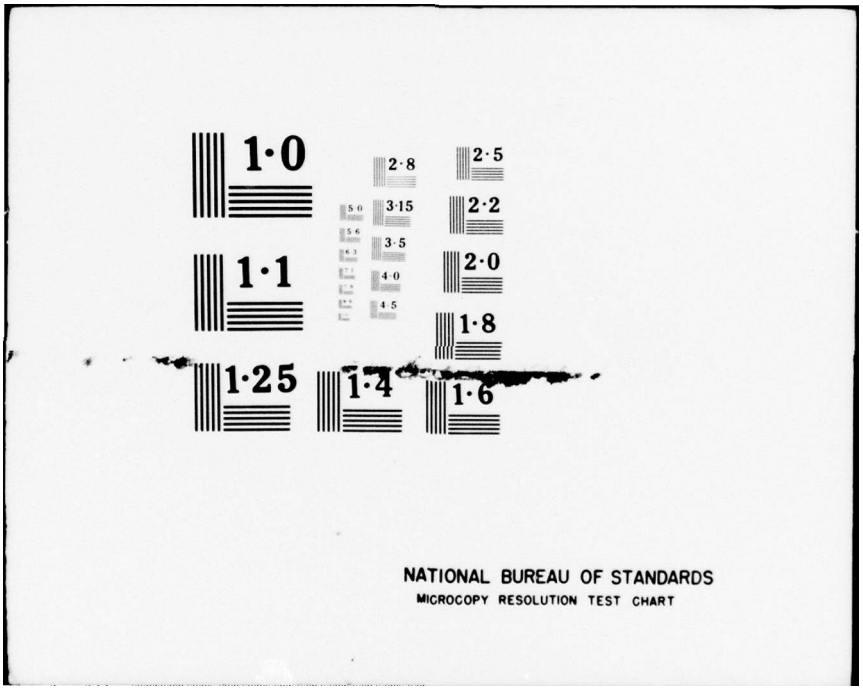
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# VOLUME III

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# RESEARCH DEVELOPMENT TEST & EVALUATION
## Army Appropriation FY 1978

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# VOLUME III

## DESCRIPTIVE SUMMARIES FOR PROGRAM ELEMENTS

## OF THE

## RESEARCH, DEVELOPMENT, TEST, AND EVALUATION, ARMY PROGRAM

FY 1978, Volume III.

(11) JANUARY 1977

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

(12) 293p.

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## FOREWORD

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 1978 hearings. This information is in addition to the testimony given by US Army witnesses.

These volumes contain a descriptive summary for each program element to be financed during FY 1978 or FY 1979. Descriptive summaries for projects within the program elements to be financed during FY 1978 or FY 1979 for $3.0 million or more appear on buff colored pages 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 $3.0 million during FY 1978 or FY 1979. A Test and Evaluation Section is provided for all major weapon systems.

There are thirty-nine major weapon systems descriptive summaries appearing in Volumes II and III. Major weapon systems are identified by an asterisk in the Table of Contents. The formats and contents of these volumes are in accordance with guidelines and requirements of the Congressional Committees insofar as possible. Information previously provided in the SAC Data Book is consolidated into these volumes. The SAC Data Book information appears at the beginning of each program element descriptive summary.

A direct comparison of FY 1976, FY 197T, and FY 1977 data in this Program Element Listing with data shown in the Program Element Listing dated January 1976 will reveal significant differences. Many of the differences are attributable to the following factors:

a. A FY 1976 increase of $4.691 million representing additional recoupments from RDTE surcharges on Foreign Military Sales and transfer of reimbursements from prior years.

b. A FY 1977 net reduction of $81.1 million resulting from the following:

(1) Congressional reduction - $-95.5 million
(2) Proposed supplemental for civilian pay raises - +14.4 million

c. Reclassification to provide greater visibility and contribute to the effective management of the RDTE program such as the following:

(1) The Medical RDTE Program
(2) Combat Support Munitions
(3) Field Artillery Weapons Ammunition Development
(4) Mobility Equipment Technology
(5) Further extension of the Single Program Element Funding Concept.

d. Restructuring of the FY 1976, FY 197T, and FY 1977 programs for comparability to the FY 1978 program structure.

e. Planned RDTE effort to be accomplished at installations operating under the Army Industrial Fund (AIF) will require supplemental funds to cover civilian pay raises included in AIF stabilized rates.

The funding information used in these volumes corresponds to that contained in the President's Budget. Procurement data is shown where applicable for items in engineering or operational development. Military construction data is shown where applicable.

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| DE93 | WHITE SANDS MISSILE RANGE | 1155 |
| DE94 | US ARMY ELECTRONIC PROVING GROUND | 1159 |
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## GLOSSARY

### PROGRAM ABBREVIATIONS, ACRONYMS, AND POPULAR NAMES

| TERM | EXPLANATION | PROGRAM ELEMENT/ PROJECT | PAGE NO. |
|---|---|---|---|
| AAH | Advanced Attack Helicopter | 6.42.07.A | 724 |
| AFAADS | Advanced Forward Area Air Defense System | 6.33.01.A | 562 |
| AMPM | Advanced Multipurpose Missile System | 6.36.12.A | 587 |
| AN/TPQ-37 | Artillery Locating Radar | 6.47.31.A | 984 |
| ARTADS | Army Tactical Data Systems | 6.37.23.A | 399 |
| BMDSTP | Ballistic Missile Defense Systems Technology Program | 6.33.08.A | 450 |
| BUSHMASTER (also VRFWS) | Vehicle Rapid Fire Weapon System | 6.46.17.A | 858 |
| CAAM | Conventional Airfield Attack Missile | 6.33.19.A | 584 |
| CEFIRE TIGER | Airborne Electronic Countermeasure System AN/ALQ-150 | 6.47.11.A D906-55 | 922 |
| CHAPARRAL | Low Altitude Air Defense System | 2.37.30.A | 482 |
| COMSEC | Communications Security Equipment | 3.34.01.A | 1040 |
| COPPERHEAD | Cannon Launched Guided Projectile | 6.46.21.A | 877 |
| CSTA | Combat Surveillance, Target Acquisition | 6.27.03.A | 137 |
| DARPA | Defense Advanced Research Project Agency | 6.27.26.A | 206 |
| DRAGON | Medium Antitank Assault Weapon | 2.37.27.A | 473 |
| DSCS | Defense Satellite Communications System | 3.31.42.A D253 | 545 |
| EW | Electronic Warfare | 6.27.15.A | 160 |
| | | 6.37.11.A | 623 |
| | | 6.47.11.A | 922 |
| FAMECE | Family of Military Engineering Construction Equipment | 6.47.28.A | 974 |
| HAWK/HIP | Surface-to-Air Missile (Improved) | 2.37.31.A | 492 |
| HEL | High Energy Laser Components | 6.33.14.A | 325 |
| HELLFIRE | Heliborne Missile, Laser Guided | 6.43.10.A | 781 |
| IFF | Identification Friend or Foe | 6.37.06.A | 384 |
| ILAW | Improved Light Antitank Weapon | 6.46.23.A | 883 |
| ILIR | In-House Laboratory Independent Research | 6.11.01.A | 1 |
| JTIDS | Joint Tactical Information Distribution System | 6.37.07.A D137 | 619 |
| KMR | Kwajalein Missile Range | 6.53.01.A | 1070 |
| LANCE | Surface to Surface Ballistic Missile System | 2.37.33.A | 507 |
| MICV | Mechanized Infantry Combat Vehicle | 6.46.16.A | 852 |
| M60A1 PIP | M60A1 Tank Product Improvement Program | 2.37.35.A | 516 |
| NSTD | Non-Systems Training Devices Technology | 6.27.27.A | 209 |

| TERM | EXPLANATION | PROGRAM ELEMENT/ PROJECT | PAGE NO. |
|---|---|---|---|
| OTEA | Operational Test and Evaluation Agency | 6.57.12.A | 1117 |
| PERSHING II | Surface-to-Surface Nuclear Missile | 6.33.11.A | 571 |
| REMBASS | Remotely Monitored Battlefield Sensor System | 6.37.04.A DK73 | 609 |
| RPV | Remotely Piloted Vehicles and Drones | 6.27.32.A | 218 |
| | | 6.37.25.A | 402 |
| SAM-D | Surface-to-Air Missile Development | 6.43.07.A | 760 |
| SFTS | Synthetic Flight Training System | 6.42.04.A D275 | 704 |
| SHF TDMA | Super High Frequency Time Division Multiple Access | 2.80.10.A D113 | 538 |
| SOTAS | Stand-Off Target Acquisition System | 6.47.48.A | 1024 |
| STINGER | Shoulder Fired, Forward Area Air Defense Missile | 6.43.06.A | 753 |
| TACFIRE | Tactical Fire Direction System | 2.37.26.A | 465 |
| TDME | Test Measurement and Diagnostic Equipment | 6.27.79.A | 272 |
| TOS | Tactical Operations System | 6.37.22.A | 690 |
| TOW | Tube Launched, Optically Tracked, Wire Guided (Heavy) Antitank Assault Weapon | 2.37.24.A | 457 |
| TRADOC | Training and Doctrine Command | 6.51.02.A | 1066 |
| TRI-TAC | Tri-Service Tactical Communications Program | 2.80.10.A | 524 |
| UGS | Unattended Ground Sensors | 6.47.04.A | 905 |
| UTTAS | Utility Tactical Transport Aircraft System (Infantry Squad Carrying Helicopter) | 6.42.06.A | 711 |
| VRFWS (also BUSHMASTER) | Vehicle Rapid Fire Weapon System | 6.46.17.A | 858 |
| VTOL | Vertical Take-Off and Landing | 6.32.11.A | 303 |
| VULCAN | Air Defense Gun Systems | 2.37.32.A | 502 |
| WWMCCS | Worldwide Military Command and Control Systems | 6.37.35.A | 453 |

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.01.A Title Communications Engineering Development

Category Engineering Development Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 6861 | 1785 | 5687 | 11674 | 13853 | Continuing | Not Applicable |
| | Quantities | | | | | | Not Applicable | Not Applicable |
| D149 | Army Support of Defense Communications Syste | 1087 | 324 | 951 | 6044 | 4074 | Continuing | Not Applicable |
| D481 | Strategic Communications | 510 | 60 | 45 | 299 | 1154 | Continuing | Not Applicable |
| D487 | Tactical Multichannel Communications | 4740 | 563 | 2811 | 3753 | 3850 | Continuing | Not Applicable |
| D488 | Tactical Net Radio Communications | 524 | 838 | 1880 | 1578 | 4775 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: Engineering Development of all Army Strategic and Tactical Communications is conducted exclusive of Satellite Communications Ground Environment (Program Element 3.31.42.A) and Joint Tactical Communications Program (TRI-TAC) (Program Element 2.80.10.A).

BASIS FOR FY 1978 RDTE REQUEST: Completion of testing program for Adaptive Antenna Control, High Power Amplifier, and MD-918 Modulator/Demodulator for potential application to the planned Defense Communication System (DCS) Digital Tropospheric Scatter Radio Development. Continuation of in-house effort for new High Frequency (HF) Radio Control, Technical Control Van, and Voice Switch Facility for Joint Chiefs of Staff (JCS) contingency station. Provide engineering support through first procurement for Band IV AN/GRC-103 Radio, TD-1065 Data Buffer, TD-1069 Multiplexer, and upgrading components for AN/TSQ-84 Transportable Technical Control Facility. Continue acquisition of Automated Tactical Record Traffic System (TRTS).

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Budget Activity #4 - Tactical Programs

Program Element #6.47.01.A Title Communications Engineering Development

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: Increase is required to support the initiation of the Automatic Secure Voice Network II (AUTOSEVDCOM II), Advanced Digital Tropospheric Scatter Radio, and Local Distribution System.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ Employees | 63 | 0 | 63 |
| (2) Contractor Employees | 29 | 0 | 29 |
| Total | 92 | 0 | 92 |

DETAILED BACKGROUND AND DESCRIPTION: The objective of this program is the Engineering Development of all Army strategic and tactical communications equipment except those in the Satellite Communications Ground Environment and Joint Tactical Communications Program (TRI-TAC). Included are projects to support the Army Tactical Communications System (ATACS), the Defense Communications System (DCS), the non-DCS system operated by the US Army Communications Command (USACC), and the Army divisional communications systems. These developments are projected to improve the communications capability and reliability of all Army communications.

RELATED ACTIVITIES: Program Element 6.27.01.A, Communications Electronics, and Program Element 6.37.07.A, Communications Development, provide the Exploratory and Advanced Developments that are continued by the effort into Engineering Development. This project also supports Program Element 6.37.46.A, Single Channel Ground and Airborne Radio System (SINCGARS). Duplication of effort is avoided through Service coordination and coordination with the TRI-TAC Office and Defense Communications Agency.

WORK PERFORMED BY: The Army developing organizations are the US Army Electronics Research and Development Command and the US Army Communications Systems Agency, both of Fort Monmouth, NJ. Contractors include: Martin Marietta Corporation, Orlando, FL; Canadian Commerical Corporation, Montreal Canada; Stelma, Inc., Stamford, CT; ITT Defense Communications Division, Nutley, NJ; GTE Sylvania, Needham, MA; Cincinnati Electronics Corporation, Cincinnati, OH; Collins Radio, Cedar Rapids, ID.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: Development of the Megabit Digital Tropo System was completed. In-house support was provided for testing. AN/GRC-122(V)2 high power radio teletypewriter sets were completed. Reliability tests were conducted on advanced production models of the AN/PRC-70 Extended Frequency Manpack Radio. Developmental Testing (DT II) was completed for AN/GRC-103 Radio Band IV tuning head, TD-1065 Data Buffer and TD-1069 Multiplexer. Continued support of the National and International Standards effort.

Budget Activity #4 - Tactical Programs

Program Element #6.47.01.A Title Communications Engineering Development

2. FY 1977 Program: Megabit Digital Tropospheric Scatter System will be tested under operational conditions in Europe. Award development contract for Small Unit Transceiver. Monitor production contracts for Broadband Omnidirectional Antenna System and Compact Very High Frequency (VHF) Vehicular Antenna. Award production contract for AN/PRC-70 Radio and High Frequency Single-Sideband (HF SSB) Radio Set AN/URC-92. Type classify Band IV for AN/GRC-103 Radio, TD-1065 Data Buffer, and TD-1069 Multiplexer.

3. FY 1978 Planned Program: Initiate Automatic Secure Voice Network II (AUTOSEVOCOM II), Advanced Digital Tropospheric Scatter Radio and Local Digital Distribution System. Continue production support of the Small Unit Transceiver. Evaluate first article test models of the AN/PRC-70 radio. Continue development of the Tactical Record Traffic System (TRTS). Increase in funds in FY 1978 is required to support contractual efforts for programs mentioned above.

4. FY 1979 Planned Program: Initiate contract efforts for Joint Chiefs of Staff (JCS) Contingency Station. Support second procurement of the Small Unit Transceiver. Begin Developmental Testing/Operational Testing III (DT/OT III) on the AN/PRC-70. Continue operational and technical evaluations of the TRTS. Continue engineering support of the AN/TSQ-85. Increase of FY 1979 over FY 1978 is due to higher level of effort on the Small Unit Transceiver, plus the initiation of the JCS Contingency Station.

5. Program to Completion: This is a continuing program.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.01.A Title Communication Engineering Development

Project #D149 Title Army Support of Defense Communications System

Category Engineering Development Budget Activity #4 - Tactical Programs

DETAILED BACKGROUND AND DESCRIPTION: The primary emphasis on this project is in the development of those communication systems and equipments for the Defense Communications System (DCS) which are assigned to the Army by the Defense Communications Agency (DCA) Five Year Plan (FYP). The major thrust of the program effort is for equipments and systems for the conversion of the DSC to an all digital network. The four tasks in the project cover Digital Transmission, Type Classification, Project Management, and Automatic Secure Voice, Phase II (AUTOSEVOCOM II).

RELATED ACTIVITIES: Program Element 6.37.07.A, Communications Development, provides the advanced development effort which precedes this engineering development effort.

WORK PERFORMED BY: Project Management by US Army Communications Systems Agency, Fort Monmouth, NJ, inhouse work by US Army Electronics Research and *Development* Command, Fort Monmouth, NJ. Present contractor is GTE Sylvania, Needham, Massachusetts.

PROGRAM ACCOMPLISHMENT AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: The MD918, Modulator/Demodulator, previously designated as the Megabit Digital Tropospheric Scatter (TROPOSCATTER) System, has been completed as have type classification and nomenclature actions for a wide variety of equipments. Developed a Washington Area High Speed Facsimile System.

2. FY 1977 Program: The MD918 will be tested and evaluated under field conditions in Europe. Project management and type classification efforts will continue.

3. FY 1978 Planned Program: Testing will be conducted on the newly developed Adaptive Antenna Control, High Power Amplifier, and MD918 for potential application to future Digital TROPOSCATTER Radio applications, and effort will be initiated for the development of this radio. The AUTOSEVOCOM II program will start with the development of a modified TTC-39 Switch. Contract development effort will start for the Local Digital Distribution System. Project management and type classification will continue. Increased costs of FY 1978 over FY 1977 are due to modification of the AN/TTC-39 Switch and is part of the full scale development of the Switch under project 2.80.10.A, D222.

4. FY 1979 Planned Program: Continue development contracts and inhouse support for the Digital TROPOSCATTER Radio, the Local Digital Distribution System and AUTOSEVOCOM II. Project management and type classification will continue. Decrease in FY 1979 funds from FY 1978 is due to less contractual effort in the AUTOSEVOCOM II program.

Budget Activity #4 - Tactical Programs

Program Element #6.47.01.A Title Communication Engineering Development

Project #D149 Title Army Support of Defense Communications System

5. Program to Completion: This is a continuing program.

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 1087 | 324 | 951 | 6044 | 4074 | Continuing | Not Applicable |

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.01.A Title Communications Engineering Development

Project #D487 Title Tactical Multichannel Communications

Category Engineering Development Budget Activity #4 - Tactical Programs

DETAILED BACKGROUND AND DESCRIPTION: The objective of this project is to develop military communications equipment and systems that will be used by Army units within the Army and Corps Area of operation. The approach is to utilize the latest state-of-the-art advances for which tactical feasibility has been proven in the design of equipment to fulfill Corps/Army Area Communications requirements in order to achieve significant improvements with respect to size, weight, power consumption, quality of performance, reliability and life cycle cost over equipment now in use. Specific tasks include International and US System Standards, Communications Systems Design Facility, Corps Electronic Switching Communications System, and development of an Automated Tactical Record Traffic System (TRTS). The TRTS requirement is included in the integrated Tactical Communications System (INTACS) Objective System. The TRTS is intended to efficiently satisfy the Army's post-1980 record traffic needs, which cannot be provided by the current system because it is highly unreliable, will not satisfy communications support requirements with an acceptable grade of service and it is difficult to maintain. The TRTS will consist of a variety of new mobile assemblages capable of providing narrative, graphic and data support at required field locations.

RELATED ACTIVITIES: Program Element 6.37.07.A, Communications Development, provides input to this program from Advanced Development.

WORK PERFORMED BY: Contractors include: Martin Marietta Corporation, Orlando, Florida; Canadian Commercial Corporation, Montreal, Canada; Stelma, Inc., Stamford, Connecticut; and ITT Defense Communications Division, Nutley, New Jersey. US Army Communications Research and Development Command, Ft. Monmouth, New Jersey, is the in-house developing organization.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: All development actions for the Technical Control Facility AN/TSQ-84 and Automatic Switch AN/TTC-38 were completed. Development efforts on Forward Area Tactical Teletypewriter (FATT) program (Communications Terminal AN/UGC-74( ) (V) 4) were completed. Engineering development contracts were completed for the Band IV Tuning Head for AN/GRC-103 Radio Set, Pulse Form Restorers TD-982 and TD-206, High Speed Serial Data Buffer TD-1065, Time Division Digital Multiplexer TD-1069, and Asynchronous Digital Combiner TD-976. The components required to upgrade the AN/TSQ-84 with an automated record-keeping capability were also developed. Developmental Test II (DT II) was initiated for Band IV for AN/GRC-103, TD-1065, TD-206, and TD-1069. Developmental/Operational testing (DT/OT) was completed for the TD-976, TD 982 and TD-206 and followed by type classification of their units. Provided support to National and International Standards efforts. In FY 197T, DT II was

Budget Activity #4 - Tactical Programs

Program Element #6.47.01.A Title Communications Engineering Development

Project #D487 Title Tactical Multichannel Communications

completed for the Radio Set AN/GRC-103 Band IV tuning head, TD-1065 and TD-1069. Engineering support through the first procurement was provided for TD-206 and Band IV, AN/GRC-103. Continue support for the National and International Standards efforts.

2. FY 1977 Program. Complete development of procurement data packages and type classify the Band IV for AN/GRC-103, TD-1065 and TD-1069. Complete the development contract for components to upgrade AN/TSQ-84 and accomplish all Developmental Testing/Operational Testing II (DT/OT II. Provide engineering support required through the first procurement for TD-976, TD-982 and TD-206. Initiate work in support of the Tactical Record Traffic System (TRTS) to include preparation of TRTS systems engineering specifications for the integration of available and proposed Joint Tactical Communications (TRI-TAC) equipments (including all necessary technical control requirements and system software), and the necessary coordination with TRI-TAC and the user. Acquire required test-bed equipments from Army Depots, other Services, or from commercial sources and incorporate same into test facilities.

3. FY 1978 Planned Program: Provide engineering support through first procurement for Band IV AN/GRC-103,TD-1065, TD-1069 and upgrading components for AN/TSQ-84. Continue acquisition of TRTS equipments. Establish an operable model of the TRTS in test facilities, and expand to a functional TRTS for operational and technical evaluations. These evaluations will identify assemblage needs from single subscriber level up through the communication center. Increase in FY 1978 funds over FY 1977 due to establishment of TRTS operable model and accomplishment of operational and technical evaluations.

4. FY 1979 Planned Program: Continue operational and technical evaluations of the TRTS by initiating work on technical specifications and communications center assemblage layouts. Continue engineering support of the AN/TSQ-85, upgraded AN/TSQ-84, TD-1069 and Transportable Radio Systems AN/TRC-151/152.

5. Program to Completion: This is a continuing program.

Budget Activity #4 - Tactical Programs

Program Element #6.47.01.A Title Communications Engineering Development

Project #D437 Title Tactical Multichannel Communications

RESOURCES: ($ in thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 474C | 563 | 2811 | 3753 | 3850 | Continuing | Not Applicable |
| Quantities | | | | | | Not Applicable | Not Applicable |
| Procurement: | | | | | | | |
| AN/TSQ-84 | | | | | | | |
| Funds | 1000 | | | 2000 | | | 7400 |
| Quantities | 8 | | | 14 | | | |
| SB-3614 | | | | | | | |
| Funds | 3200 | 19200 | 3000 | | | | 25400 |
| Quantities | | 682 | | | | | |
| AN/TSQ-85 | | | | | | | |
| Funds | | | 2600 | | | 1500 | 4100 |
| Quantities | | | 6 | | | 4 | |
| TD-982 | | | | | | | |
| Funds | | | | | | 1200 | 1200 |
| Quantities | | | | | | 700 | |
| AN/GRC-103 (Band IV) | | | | | | | |
| Funds | | | 10900 | | | | 10900 |
| Quantities | | | 325 | | | | |
| TD-1065 | | | | | | | |
| Funds | | | 10200 | | | | 10200 |
| Quantities | | | 570 | | | | |

Budget Activity #4 - Tactical Programs

Program Element #6.47.01.A Title Communications Engineering Development

Project #D487 Title Tactical Multichannel Communications

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| **Procurement:** | | | | | | | |
| **TD-206** | | | | | | | |
| **Funds** | | | 2000 | 4100 | | 2800 | 8900 |
| **Quantities** | | | 1500 | 3600 | | 2611 | |
| TD-1069 | | | | | | | |
| Funds | | | | | 1300 | 3100 | 4400 |
| Quantities | | | | | 11 | 108 | |
| AN/TRC-151 | | | | | | | |
| Funds | | | | 3400 | 2500 | 27600 | 33500 |
| Quantities | | | | 30 | 30 | 204 | |
| AN/UGC-74( ) (V) 4 | | | | | | | |
| Funds | | | | 800 | | 96800 | 127100 |
| Quantities | | | | | | 7535 | |
| AN/TRC-152 | | | | | | | |
| Funds | | | | 1500 | 1200 | 16400 | 19100 |
| Quantities | | | | 29 | 29 | 106 | |
| AN/TCC-73 | | | | | | | |
| Funds | | | | 11000 | | 9000 | 20000 |
| Quantities | | | | 60 | | 70 | |
| AN/TRC-145 | | | | | | | |
| Funds | | | | 7000 | | 35000 | 42000 |
| Quantities | | | | 47 | | 150 | |

Budget Activity #4 - Tactical Programs

Program Element #6.47.01.A Title Communications Engineering Development

Project #D487 Title Tactical Multichannel Communications

| Procurement: | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| AN/TRC-138 | | | | | | | |
| Funds | | | | 4900 | | 33900 | 38800 |
| Quantities | | | | 31 | | 96 | |

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.01.A Title Communications Engineering Development

Project #D488 Title Tactical Net Radio Communication

Category Engineering Development Budget Activity #4 - Tactical Programs

DETAILED BACKGROUND AND DESCRIPTION: The objective of this project is the engineering development and fielding of improved single channel net radio and associated equipment other than that equipment being developed as a portion of the new family of single channel net radio equipment, the Single Channel Ground and Airborne Radio Subsystem Very High Frequency (SINCGARS-V). Equipment developed or being developed includes items for special purpose use, such as: support of Special Forces, interim small unit transceiver, various Very High Frequency (VHF) antennas and Army marinecraft radios.

RELATED ACTIVITIES: Program Element 6.27.01.A, Communications Electronics, and Program Element 6.37.07.A, Communications Development, provide the exploratory and advanced development effort that is continued into engineering development in this project. This project also supports development taking place in Program Element 6.37.46.A, Single Channel Ground and Airborne Radio System.

WORK PERFORMED BY: The in-house developing organizations are the US Army Electronics Research and Development Command, Fort Monmouth, New Jersey. Contractors include: Cincinnati Electronics Corporation, Cincinnati, Ohio; Analytics Incorporated, Willow Grove, Pennsylvania; and Collins Radio, Cedar Rapids, Iowa.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 76, and Prior Accomplishments: In-house support was provided during FY 1976 for performing tests on AN/GRC-122(V)2 high power radio teletypewriter sets and the AN/PRC-70 extended frequency manpack radio sets. Reliability tests were conducted on advanced production engineering models of the AN/PRC-70. Models of high frequency single sideband radio set AN/URC-92 were given on operational evaluation aboard Army marinecraft. In FY 197T, Developmental Tests/Operational Tests II were completed for the AN/GRC-122(V)2 radio teletypewriter set and Radio Set AN/PRC-70. Operational tests on the AN/URC-92 were completed.

2. FY 1977 Program: Contracts for models of a multi-input transceiver coupler and small unit transceiver will be awarded. The increased funds support the above contracts and system design for communication installations under the Army Marinecraft Electronics Modernization Program. Monitor production contracts for broadband Omnidirectional Antenna System, OE-254 ( )/GRC and Compact VHF Vehicular Antenna, AS-2731( )/GRC. A production contract for the AN/PRC-70 will be awarded. Type classification of the URC-92 radio will be accomplished and a production contract awarded.

Budget Activity #4 - Tactical Programs

Program Element #6.47.01.A Title Communications Engineering Development

Project #D488 Title Tactical Net Radio Communication

3. FY 1978 Planned Program: Continue the transceiver multicoupler engineering development started in FY 1977, a superior noise canceling microphone for use in high ambient noise environments, and a frequency independent antenna for point to point communications. Continue production support of the small unit transceiver and the AN/PRC-70 Extended Frequency Range Radio Set; evaluate first article test models of the AN/PRC-70 radio. Initiate engineering development of steerable null antenna processor (anti-jamming antenna for combat net radios). Decrease in FY 1978 funds over FY 1977 is due to less contractual effort to support the above programs.

4. FY 1979 Planned Program: Support follow-on second procurement of the Small Unit Transceiver. Begin Developmental Tests/Operational Tests III for the AN/PRC-70 radio and Developmental Tests/Operational Tests II for the transceiver multicoupler. Continue noise-canceling microphone, frequency-independent antenna and steerable null antenna processor development. Initiate engineering development of a low profile tactical antenna for armored vehicles. Increase in FY 1979 funds over FY 1978 is due to initiation of ED of a Burst Communication System and increased incremental funding of the Steerable Null Antenna Processor.

5. Program to Completion: This is a continuing program.

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 1977T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 524 | 838 | 1880 | 1578 | 4775 | Continuing | Not Applicable |
| Quantities | * | * | * | * | * | Continuing | Not Applicable |
| Procurement: | | | | | | | |
| AN/PRC-70 | | | | | | | |
| Funds | | | 3900 | | 7700 | 6400 | 18000 |
| Quantities | | | 150 | | 310 | 240 | |
| Small Unit Transceiver: | | | | | | | |
| Funds | | | | 2000 | 1800 | 28700 | 32500 |
| Quantities | | | | 700 | 8 | 10500 | |

*Number of diverse items.

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.04.A Title Unattended Ground Sensors (UGS)

Category Engineering Development Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 2548 | 600 | 7200 | 7109 | 11958 | Continuing | Not Applicable |
| DL73 | Remotely Monitored Battlefield Sensor System | 2133 | 600 | 7000 | 7109 | 8540 | Continuing | Not Applicable |
| DL76 | Field Artillery Acoustic Locating System | 415 | 0 | 200 | 0 | 3418 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: The Program Element consists of two projects: the Remotely Monitored Battlefield Sensor System (REMBASS), and beginning in FY 1979, the Field Artillery Acoustic Locating System (FAALS).

BASIS FOR FY 1978 RDTE REQUEST: Continuation of hardware fabrication contract for configuration end items which will comprise the basic REMBASS.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: Minor decrease due to FAALS program adjustments.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 75 | 0 | 75 |
| (2) Contractor Employees | 160 | 0 | 160 |
| Total | 235 | 0 | 235 |

Budget Activity #4 - Tactical Programs

Program Element #6.47.04.A Title Unattended Ground Sensors (UGS)

DETAILED BACKGROUND AND DESCRIPTION: The objective of this program is to conduct engineering development (ED) of unattended ground sensor (UGS) equipment capable of remote operation anywhere in the world by the Army in the field. This equipment will improve the Army's capability for early warning alert, ground surveillance, and target acquisition during all conditions of weather and visibility. Included projects are Field Artillery Acoustic Locating System (FAALS) and Remotely Monitored Battlefield Sensor System (REMBASS). Each system employs UGS, data transmission devices, necessary relays, logic devices and read-out/output devices. The grouping of REMBASS and FAALS under a single program element, 6.47.04.A, provides for close coordination within related programs.

RELATED ACTIVITIES: Related technological work was performed by the Defense Special Projects Group (DSPG). Prior to DSPG disestablishment in June 1972, the Army, in coordination with the other services, accepted the management of a large number of the ongoing DSPG research and development (R&D) projects. Appropriate projects have been integrated into ongoing Army programs. 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. This joint agreement establishes a Joint Service Coordination Committee (JSCC) that 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. In addition, the Navy, Marines, and Air Force participate with the Army in a system analysis group to identify the final UGS system configuration. There is extensive international interest in the UGS program. Information has been provided to NATO panels and other international forums. Many countries have or are preparing UGS requirements documents in line with the US program and have requested to be kept informed of the US development. Commander, European Command, has initiated a combined (United Kingdom, Germany, United States) program, AVID GUARDIAN, to study the application of sensors to the Central European environment. This program element is the ED effort corresponding to UGS 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 in UGS is reported under program element 6.37.04.A.

WORK PERFORMED BY: Responsibility for management of the REMBASS and FAALS projects is assigned to Project Manager (PM), REMBASS, US Army Electronics Research and Development Command (ERADCOM), Fort Monmouth, New Jersey. In-house work is performed by the US Army Electronics Research and Development Command (ERADCOM), Fort Monmouth, New Jersey. Contractors include: DELCO, Kokomo, Indiana; Power Conversion, Inc., Tarrytown, New York; and Sippican Oceanographic, Marion, Massachusetts.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: PEW: Fabrication of ED hardware for the Platoon Early Warning System (PEWS) AN/TRS-2 was completed. PEWS will fulfill the small unit package (SUP) requirement of the REMBASS. Development test II (DT II) and operational test II (OT II) were started for PEWS. REMBASS: Validation In-Process Review (IPR) for basic components of the REMBASS to enter ED was approved by Department of the Army (DA). Three design plan contracts were awarded.

Budget Activity #4 - Tactical Programs

Program Element #6.47.04.A Title Unattended Ground Sensors (UGS)

2. FY 1977 Program: PEWS: Complete development test II (DT II) and operational test II (OT II) testing; conduct Development Acceptance (DEVA) In-Process Review (IPR); award production contract. REMBASS: Complete three design plan contracts; conduct Government evaluation; conduct special IPR to address high-risk technical areas and to provide more detailed cost assessment; award one hardware fabrication contract for engineering development (ED) hardware for basic REMBASS system.

3. FY 1978 Planned Program: Continue ED contract for basic REMBASS hardware. In FY 1978, final design review will be held and approval given for fabrication of configuration end items. The cost of initiation of hardware fabrication is the basis for increase.

4. FY 1979 Planned Program: Complete fabrication of configuration end items; conduct DT II. The peak in hardware fabrication and the conduct of extensive DT II testing is the basis for increase. All necessary experimental work on FAALS will have been performed and the proposed system will be ready for full scale development.

5. Program to Completion: Conduct OT II in FY 1980; complete hardware fabrication contract for basic REMBASS hardware in FY 1980; conduct DEVA IPR for basic REMBASS in FY 1980 and award production contract; initiate ED of hardware for full REMBASS system. FAALS will complete documentation for entry into full-blown ED phase in FY 1980 with approximate completion of ED in FY 1982 at the end of DT/OT II. Entry during FY 1982 into the production phase based on the approved model completed and tested during ED; Initial Operational Capability (IOC) probable in FY 1985.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.04.A Title Unattended Ground Sensors (UGS)

Project #DL73 Title Remotely Monitored Battlefield Sensor System (REMBASS)

Category Engineering Development Budget Activity #4 - Tactical Programs

DETAILED BACKGROUND AND DESCRIPTION: The objective of this project is to conduct engineering development (ED) of REMBASS equipment capable of remote operation anywhere in the world by the Army in the field. This equipment will improve the Army's capability for early warning alert, ground surveillance, and target acquisition during all conditions of weather and visibility. The system employs unattended ground sensors (UGS), data transmission devices, necessary relays and logic devices, and read-out devices.

RELATED ACTIVITIES: Related technological work was performed by the Defense Special Projects Group (DSPG). Prior to DSPG disestablishment in June 1972, the Army, in coordination with the other services, accepted the management of a large number of the ongoing DSPG research and development (R&D) projects. Appropriate projects have been integrated into ongoing Army programs. 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. This joint agreement establishes a Joint Service Coordination Committee (JSCC) that 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 services' systems and cooperative and coordinated RDTE efforts. In addition, the Navy, Marines, and Air Force participate with the Army in a system analysis group to identify the final UGS system configuration. There is extensive international interest in the UGS program. Information has been provided to NATO panels and other international forums. Many countries have or are preparing UGS requirements documents in line with the US program and have requested to be kept informed of the US development. Commander, European Command, has initiated a combined (United Kingdom, Germany, United States) program, AVID GUARDIAN, to study the application of sensors to the Central European environment. This project is a continuation of advanced development (AD) work under program element 6.37.19.A, Surveillance, Target Acquisition, and Night Observation (STANO) Systems, program element 6.47.23.A, STANO Systems through FY 1975, and program element 6.37.04.A, Unattended Ground Sensors beginning in FY 1976.

WORK PERFORMED BY: Responsibility for management of the REMBASS project is assigned to Project Manager (PM), REMBASS, U.S. Army Electronics Research and Development Command (ERADCOM), Fort Monmouth, New Jersey. In-house work is performed by the U.S. Army Electronics Research and Development Command, Fort Monmouth, New Jersey, and U.S. Army Mobility Equipment Research and Development Command, Fort Belvoir, Virginia. Contractors include: DELCO, Kokomo, Indiana; Power Conversion, Inc., Tarrytown, New York; SIPPICAN Oceanographic, Marion, Massachusetts; RCA, Camden, New Jersey; American Electronic Laboratories, Lansdale, Pennsylvania; and GTE Sylvania, Mountain View, California.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: PEWS: Fabrication of ED hardware for the Platoon Early Warning System (PEWS) AN/TRS-2 was completed. PEWS will fulfill the small unit package (SUP) requirements of the REMBASS. Development Test II

Budget Activity #4 - Tactical Programs

Program Element #6.47.04.A Title Unattended Ground Sensors (UGS)

Project #DL73 Title Remotely Monitored Battlefield Sensor System (REMBASS)

and operational test II (OT II) were started for PEWS. REMBASS: Validation In-Process Review (IPR) for basic components of the Remotely Monitored Battlefield Sensor System (REMBASS) to enter engineering development (ED) was approved by DA. Three design plan contracts were awarded.

2. FY 1977 Program: PEWS: Complete development test II (DT II) and operational test II (OT II) testing; conduct Development Acceptance (DEVA) IPR; award production contract. REMBASS: Complete three design plan contracts; conduct Government evaluation; conduct special IPR to address high-risk technical areas and to provide more detailed cost assessment; award one hardware fabrication contract for ED hardware for basic REMBASS system.

3. FY 1978 Planned Program: Continue ED contract for basic REMBASS hardware. In FY 1978, final design review will be held and approval given for fabrication of configuration end items. The cost of initiation of hardware fabrication is the basis for increase.

4. FY 1979 Planned Program: Complete fabrication of configuration end items; conduct DT II. The peak in hardware fabrication and the conduct of extensive DT II testing is the basis for increase.

5. Program to Completion: Conduct OT II in FY 1980; complete hardware fabrication contract for basic REMBASS hardware in FY 1980; conduct DEVA IPR for basic REMBASS in FY 1980 and award production contract; initiate ED of hardware for full REMBASS system.

RESOURCES: ($ in Thousands)

| | | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| RDTE: | Funds | 2133 | 600 | 7000 | 7109 | 8540 | Continuing | Not Applicable |
| | Quantities | Not feasible to list due to multitude of items within this program element. | | | | | | |

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## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.04.A Title Unattended Ground Sensors (UGS)

Project #DL76 Title Field Artillery Acoustic Locating System (FAALS)

Category Engineering Development Budget Activity #4 - Tactical Programs

DETAILED BACKGROUND AND DESCRIPTION: The objective of this project is to accomplish the engineering development (ED) of the FAALS commencing in FY 1979. The system will include sensors, data transmission hardware (to include relays), and input/output devices in a processing center.

RELATED ACTIVITIES: The U.S. Marine Corps monitors certain developments and is interested in FAALS, though not providing development funds as originally planned. Program element 6.37.04.A includes the advanced development (AD) aspects of FAALS, and program element 6.47.04.A includes the ED aspects of FAALS and the completion of radio set AN/GRA-114 for use with earlier sound ranging equipment. Program office maintains close liason with Marine Corps.

WORK PERFORMED BY: Responsibility for management of the FAALS project is assigned to Project Manager (PM), REMBASS USA Electronics Research & Development Command (ERADCOM), Fort Monmouth, New Jersey. In-house work and contractors will be identified as the project enters the ED phase.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: No ED work performed.

2. FY 1977 Program: Engineering development testing and documentation for Radio set AN/GRA-114.

3. FY 1978 Planned Program: ED will start in FY 79 after completion of AD in 6.37.04.A, Unattended Ground Sensors.

4. FY 1979 Planned Program: Preparation of documentation for approval to enter ED in FY 1979. Finalization of Required Operational Capability (ROC) document. Funding will increase because due to initial engineering development of progessive center and sensors.

5. Program to Completion: Continue ED phase of FAALS project; complete ED in FY 1982; enter production phase in FY 1982; Initial Operational Capability (IOC) in FY 1984.

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Budget Activity #4 - Tactical Programs

Program Element #6.47.04.A Title Unattended Ground Sensors (UGS)

Project #DL76 Title Field Artillery Acoustic Locating System (FAALS)

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 415 | 0 | 200 | 0 | 3418 | Continuing | Not Applicable |
| Quantities | Not feasible to list due to multitude of items within this project. | | | | | | |

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.06.A Title Radiological Defense Equipment

Category Engineering Development Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 1977 | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 1202 | 305 | 508 | 810 | 1092 | Continuing | Not Applicable |
| | Quantities * | | | | | | | |
| D517 | Radiological Detection and Measurement Equipment | 1202 | 305 | 508 | 810 | 1092 | Continuing | Not Applicable |
| Procurement: | | | | | | | | |
| | Funds | | | 0 | 3500 | 7000 | Continuing | Not Applicable |
| | Quantities * | | | | | | | |

* Not feasible to list.

BRIEF DESCRIPTION OF ELEMENT: Engineering development of a family of radiological detection and measuring equipment and systems to enable troops and equipment to function on a nuclear battlefield. Principal items of equipment under development include a vehicular radiac system, an aerial radiac system, tactical and individual dosimeters, and a fixed installation fallout monitor and alarm system.

BASIS FOR FY 1978 RDTE REQUEST: The Producibility Engineering and Planning packages for the vehicular radiac and the tactical dosimeters will be initiated. The Development and Operational Tests on the tactical dosimeter will continue in FY 1978. Funds will be transfered to the United Kingdom (UK) for completion of the Engineering Development models of the individual dosimeter and reader. The Engineering Development models of the fixed installation monitor and the field alpha survey meter will be completed.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: The radiac budget was reduced in FY 1977 causing the deferral of some of the effort planned for that year. The FY 1978 increase over FY 1977 represents a modest effort to catch-up on the development of a number of radiac equipments.

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Budget Activity #4 - Tactical Programs

Program Element #6.47.06.A Title Radiological Defense Equipment

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 5 | 0 | 5 |
| (2) Contractor Employees | 7 | 22 | 29 |
| Total | 12 | 22 | 34 |

DETAILED BACKGROUND AND DESCRIPTION: The objective of this program is the development of a family of radiological detection and measuring equipment to provide the Army with a capability to detect a nuclear environment which might incapacitate personnel or render equipment inoperative. Equipment will be developed to provide aerial, vehicular, and ground capabilities to measure the gamma radiation dose rate produced by nuclear fallout. Individual and tactical dosimeters will be developed to measure the gamma and neutron radiation received by personnel. Other developments will provide capabilities to monitor fallout at military installations and measure alpha radiation. New technology is being exploited to provide needed new capabilities and replace the existing generation of radiac equipment developed in the 1950's.

RELATED ACTIVITIES: This effort is related to exploratory development conducted in program element (PE) 6.27.03.A, Combat Surveillance/Target Acquisition and Identification; and to advance development conducted in PE 6.36.04.A, Nuclear Munitions and Radiacs. 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 is being jointly developed with the Canadian Department of Defense Production and an individual dosimeter is being developed jointly with the United Kingdom Ministry of Defense. Liaison with other services is maintained to preclude duplication.

WORK PERFORMED BY: US Army Electronics Research and Development Command (ERADCOM), Fort Monmouth, NJ. Contractors include Nuclear Corporation of America, Denville, NJ; Rockwell International Corporation, Los Angeles, CA; Electrometer Corporation, Glendale, CA; and Canadian Admiral Corporation, Toronto, Canada.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: Engineering testing on the individual dosimeter and reader began in FY 1975. Engineering development of the fixed installation fallout monitor began, and type classification of the alpha meter was completed, in FY 1976. Operational and developmental testing was also completed for the aerial and vehicular radiacs in FY 1976. In FY 197T, type classification began for the aerial radiac and engineering testing was completed on the tactical dosimeter.

Budget Activity #4 - Tactical Programs

Program Element #6.47.06.A Title Radiological Defense Equipment

2. FY 1977 Program: The vehicular radiac will be type classified and a procurement data package initiated. Producibility Engineering and Planning will be initiated for the aerial radiac. Developmental and operational testing will start for the tactical dosimeter. Testing of the individual dosimeter and refinement of a British design for US use will continue on an advanced development model. Engineering development models of the fixed installation fallout monitor will be fabricated. An x-ray probe for the AN/PDR-56 Alpha Survey Meter and a data annotating interface for the aerial radiac will transition to engineering developmental if additional funds become available.

3. FY 1978 Planned Program: The aerial radiac and the vehicular radiac low rate initial production will begin. The tactical dosimeter will be type classified. The fixed installation fallout monitor and the individual dosimeter engineering development models will undergo engineering tests. Engineering development of the digital radiac will be started. The increased funding represents a modest effort to catch up on the development of items deferred in FY 1977.

4. FY 1979 Planned Program: The Producibility Engineering and Planning for the vehicular radiac and the aerial radiac will be completed. The tactical dosimeter, individual dosimeter and the fixed installation fallout monitor will be type classified. The x-ray probe for the alpha survey meter will be type classified. The digital radiac will complete engineering development. The nuclear burst detection system will begin engineering development (resources presently carried in PE 6.36.04.A, Nuclear Munitions and Radiacs, Project D089).

5. Program to Completion: This is a continuing program. Additional items will be considered for development when new requirements are validated and/or new technology offers significant capability or cost advantages.

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FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.09.A Title Identification Friend or Foe (IFF)/MARK XII Systems (AIMS)

Category Engineering Development Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 0 | 0 | 0 | 0 | 2000 | Continuing | Not Applicable |
| | Quantities (Not Applicable) | | | | | | | |
| D-530 | IFF Equipment | 0 | 0 | 0 | 0 | 2000 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: This program will be used to accomplish the Engineering Development (ED) of new Battlefield Identification Friend or Foe (IFF) systems that can be used to satisfy Army requirements. The technical approaches to be followed will be developed and initially tested in 6.37.06.A D243, Identification Friend or Foe (IFF) Developments. The first systems to enter ED will be cooperative systems for use by ground-by-ground and ground-by-air applications. There will also be effort devoted to the evolutionary improvement of the Army's air defense IFF system Air Traffic Control Radar Beacon Systems (ATCRBS)/ Identification Friend or Foe (IFF)/MARK XII/Systems (AIMS) to improve its effectiveness. The work will stress the reduction in its vulnerability to exploitation and jamming as well as improve the reliability (confidence) of identification. The work will enable the timely implementation of improvements to the MARK XII interrogator and transponder to meet the NATO requirement presently being staffed at the Conference of National Armaments Directors.

BASIS FOR FY 1978 RDTE REQUEST: Not Applicable.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: Not Applicable.

PERSONNEL IMPACT: The average number of employees supported with requested FY 1978 funds (RDTE and Procurement) is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civilian Employees | 0 | 0 | 0 |
| (2) Contractor Employees | 0 | 0 | 0 |
| Total | 0 | 0 | 0 |

Budget Activity #4 - Tactical Programs

Program Element #6.47.09.A Title Identification Friend or Foe (IFF)/MARK XII Systems (AIMS)

DETAILED BACKGROUND AND DESCRIPTION: The need for a rapid, reliable and secure identification systems to discriminate between friends, enemies and neutrals has long been recognized within the US and by our allies. The need has become more important as the ranges at which targets can be effectively engaged extends beyond the ranges at which they can be positively indentified. US military forces and some of our allies have adopted the MARK XII system, which is oriented mainly to air control/defense and provides a crypto secure electronic means for identification of friends equipped with that system. While the MARK (MK) XII represents a significant capability, it is not suited for ground-by-ground application. This program will provide for both the development of a ground-by-ground identification system, and the evolutionary development of the MK XII interrogator transponder to meet NATO operational criteria. In the ground-by-ground mode, there is presently no Identification Friend or Foe (IFF) equipment in use. Two forms of IFF equipment (laser/radio and microwave/Very High Frequency) are being developed to satisfy the ground-by-ground need. Both systems are in development in program 6.37.06.A D243, Identification Friend or Foe (IFF) Developments, and will undergo side by side developmental tests to determine which system, or combination of these systems, should move into Engineering Development. The procurement of ground-by-ground Engineering Development models represents the major effort in this program in FY 79. The MK XII improvement program is following an evolutionary course so that investments previously made by all services in the MK XII are safeguarded while increased operational requirements are met. The compatability of all MK XII improvements with the existing equipment will be assured through the configuration management of the Air Force.

RELATED ACTIVITIES: The Navy and Air Force have the principal developments in the non-cooperative IFF which are being monitored for possible use in the air defense role. The advanced development work leading up to this program is being accomplished in program 6.37.06.A D243, Identification Friend or Foe (IFF) Development.

WORK PERFORMED BY: In-house work is being performed by the US Army Electronics Research and Development Command, Fort Monmouth, New Jersey. Contractors that are expected to actively participate in the battlefield IFF development are Hazeltine Corporation, Greenlawn, New York; General Electric Company, Syracuse, New York; Teledyne Electronics, San Diego, California; Motorola, Inc., Scottsdale, Arizona; Texas Instruments, Dallas, Texas; and RCA Corporation, Camden, New Jersey.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishments: Not Applicable.

2. FY 1977 Program: Not Applicable

3. FY 1978 Planned Program: Not Applicable.

Budget Activity #4 - Tactical Programs

Program Element #6.47.09.A Title Identification Friend or Foe (IFF)/MARK XII Systems (AIMS)

4. FY 1979 Planned Program: The best ground-by-ground system will have completed its testing and will be moved into Engineering Development. It is expected that 16 tank interrogator/transponders, 8 interrogators for ground antitank weapons, and 8 interrogators for airborne antitank weapon systems will be procured with FY 1979 funds. Since Identification of Friend or Foe (IFF) equipment does not now exist that will fill the need for ground target identification systems, it is essential that efforts be applied to satisfy this need.

5. Program to Completion: This is a continuing program.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.10.A Title Night Vision Devices

Category Engineering Development Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 5640 | 488 | 2504 | 3838 | 5042 | Continuing | Not Applicable |
| | Quantities | | | | | | | |
| DL70 | Night Vision Devices | 5640 | 488 | 2504 | 3838 | 5042 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: The objective of this program is to conduct the Full Scale Development of night vision devices which will provide the Army with an improved capability to locate, identify and engage targets during periods of darkness or reduced visibility. Items covered in this program element include tactical illumination systems, observation devices and night sights for use with a variety of weapon systems. Prior to FY 1978, this element was project DL70 in 6.47.23.A, Surveillance, Target Acquisition and Night Observation (STANO) Systems.

BASIS FOR FY 1978 RDTE REQUEST: Specific tasks within the program element include the engineering development effort for items of night vision equipment AN/TAS-6 (Night Observation Device, Long Range), TIRE (Tank Infrared Elbow), AN/PAQ-4 (Infrared Aiming Light), AN/VSS-4 (Armored Illuminator), which will contribute to providing the Army with a greatly enhanced capability to fight during periods of darkness and/or reduced visibility.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: The increase in FY 1978 funding over FY 1977 is required for Full Scale Development of the Tank Infrared Elbow (TIRE).

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Budget Activity #4 - Tactical Programs

Program Element #6.47.10.A Title Night Vision Devices

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 91 | 0 | 91 |
| (2) Contractor Employees | 109 | 0 | 109 |
| Total | 200 | 0 | 200 |

DETAILED BACKGROUND AND DESCRIPTION: The object of this program element is to develop specific items of night vision equipment in response to Army requirements. Descriptions of the specific projects are as follows: (1) Night Observation Device, Long Range (NODLR), AN/TAS-6. The NODLR is a passive thermal imaging system which will provide artillery forward observers and intelligence units with a night observation capability. Life cycle cost of this system will be minimized by maintaining a high degree of commonality between this system and the night sights for the Heavy (TOW) and medium (DRAGON) Antitank Weapon Systems; (2) Tank Infrared Elbow (TIRE). TIRE is a thermal imaging system which uses the same modules as the manportable class of night sights (NODLR, TOW, DRAGON, and Ground Laser Locator-Designator (GLLD)). TIRE is compatible with the M-32 and M-36 periscopes currently used in several combat vehicles (M48A5, M60). TIRE will enhance the ability of the vehicles to perform their mission under reduced visibility conditions by increasing target acquisition range and by operating in a totally passive mode; (3) Infrared Aiming Light (AN/PAQ-4). The Aiming Light is designed to mount on the individual weapon (M-16 rifle) of the soldier. The Aiming Light produces an invisible beam of light which is bore-sighted with the weapon. The spot of light produced by this item can be seen by the soldier wearing Night Vision Goggles (AN/PVS-5), and provides a means for accurate and effective delivery of fire on selected targets at night; (4) Armored Illuminator (AN/VSS-4). The Armored Illuminator is a small sealed beam type searchlight which is protected within the armor of a combat vehicle. The survivability of this illuminator will be improved, since the armor will protect it from damage by fragmentation rounds. Current searchlights are highly vulnerable to such damage; (5) Split-cycle Sterling Cooler. This item is a light-weight, high reliability refrigerator which provides for cooling necessary for efficient operation of an infrared detector. It will replace the present refrigerator in those manportable night vision systems (TOW-Under-Armor program and NODLR), which require continuous operation of long duration.

RELATED ACTIVITIES: The US Navy and US Air Force utilize the same general technologies in their target acquisition and fire control systems. The US Air Force and US Marine Corps are procuring Army developed high performance thermal imaging sensors. Service and Department of Defense programs are closely coordinated through a Tri-Service agreement. This agreement guarantees a free exchange of technology to avoid duplication of effort. Multi-service use of the same devices and facilities is common. Active international programs are maintained with NATO and Quadrapartite countries. This program is a follow-on to #6.37.10.A Night Vision Advanced Development.

Budget Activity #4 - Tactical Programs

Program Element #6.47.10.A Title Night Vision Devices

WORK PERFORMED BY: In-house work is performed by the US Army Night Vision Laboratory, Fort Belvoir, VA; and the US Army Missile Research and Development Command, Redstone Arsenal, AL. Major contractors are: Varo, Inc., Garland, TX; International Telephone and Telegraph Coporation, Roanoke, VA; Phillips Broadcast Equipment Corporation, Montvale, NJ; Texas Instruments Corporation, Dallas, TX; Martin-Marietta Corporation, Orlanda, FL; Magnavox, Mahwah, NJ; and Varian Corporation, Palo Alto, CA.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAM:

1. FY 197T, FY 1976, 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), the Crew Served Weapon Sight (AN/TVS-5), and the Handheld Thermal Viewer (AN/PAS-7). Engineering Development was initiated for the Night Observation Device, Long Range (NODLR), AN/TAS-6. This development effort included the fabrication and test of competitive prototypes. Evaluation of these prototypes indicated that both systems met all Army requirements as to performance, reliability and weight. The winning system, produced by Texas Instruments, Inc., was therefore selected on the basis of the reduced cost of ownership afforded. Full Scale Development models of the Night Observation device, Long Range, AN/TAS-6 were fabricated and Development Tests (DT II) and Operational Tests (OT II) initiated. A letter requirement for the Infrared Aiming Light (AN/PAQ-4) was approved, based on evaluations conducted by Army Rangers. Environmental Service Tests were completed on the Individual Served Weapon Sight (AN/PVS-4), Crew Served Weapon Sight (AN/TVS-5), the Handheld Thermal Viewer (AN/PAS-7), and the Driver's Viewer (AN/VVS-2).

2. FY 1977 Program: Engineering Development work will be initiated on the following items: Infrared Aiming Light (AN/PAQ-4), Armored Illuminator (AN/VSS-4), and Tank Infrared Elbow (TIRE). Development Tests (DT II) and Operational Tests (OT II) on the Night Observation Device, Long Range (NODLR), AN/TAS-6, will be completed and the system type classified.

3. FY 1978 Planned Program: Qualification testing of Engineering Development models of the Tank Infrared Elbow (TIRE) will be conducted, and a Low Rate Initial Production contract awarded. The TIRE effort accounts for the increase in FY 1978 funding over FY 1977. The Infrared Aiming Light (AN/PAQ-4) will complete both Development Test II and Operational Test II. Qualification tests will be completed, and reliability tests initiated on the Armored Illuminator, AN/VSS-4. The Split-cycle Sterling Cooler will be incorporated into the night sight for the Tube Launched Optically Tracked Wire Command Link Guided Missile (TOW) weapon system, and field evaluation with the TOW-Under-Armor system performed.

4. FY 1979 Planned Program: Development Test II/Operational Test II will be conducted on the Armored Illuminator, AN/VSS-4. A Development Acceptance (DEVA) In-Process Review will be conducted on the Infrared Aiming Light, AN/PAQ-4, to initiate low rate procurement. Engineering Development of Night Vision Goggles utilizing Third Generation image tube technology will be initiated. The increase in FY 1979 funding over FY 1978 is required for the development of low cost night vision aids.

5. Program to Completion: This is a continuing program.

Budget Activity #4 - Tactical Program

Program Element #6.47.10.A Title Night Vision Devices

TEST AND EVALUATION DATA: This program is primarily the Engineering Development of components and several small systems, which when taken collectively, provide a night vision capability to the Army. The test and evaluation of these items is carried out either as a portion of the weapon system test e.g., TOW or by the normal Development Test/Operational Test (DT/OT) procedure for the individual system e.g., Infrared Aiming Light (AN/PAQ-4), Night Observation Device, Long Range (AN/TAS-6).

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.11.A Title Tactical Self-Protection Electronic Warfare Systems

Category Engineering Development Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | | | | | | Continuing | Not Applicable |
| | Quantities | | | | | | | Not Applicable |
| D665 | Tactical Self-Protection Electronic Warfare Systems | | | | | | Continuing | Not Applicable |
| Procurement: | | | | | | | | |
| | Funds | 3016 | 1150 | 14937 | 16078 | 16500 | Continuing | Not Applicable |
| | Quantities* | 296 | | 863 | 834 | 316 | | |

* Procurement total quantities include up to five different aircraft electronic warfare self-protection (AEWSP) systems. The funds are contained in eleven different aircraft modification lines.

BRIEF DESCRIPTION OF ELEMENT: Beginning in FY 1978 this program element consists of a single project, D665, Tactical Self-Protection Electronic Warfare Systems. The objective of this project is to develop airborne aircraft self-protection electronic warfare equipment to deny or degrade enemy use of electromagnetic anti-aircraft weapon directing devices. This project includes measures against the radar, infrared (IR), optical and laser electromagnetic devices associated with anti-aircraft threat systems.

BASIS FOR FY 1978 RDTE REQUEST: The program supports the following on-going contracts: The AN/ALQ-136, a lightweight radar jammer designed primarily for helicopter operations and the AN/ALQ-156, a missile detector system that detects the approach of an IR missile and automatically dispenses an IR flare decoy. The AN/APR-39(V)2, a replacement processor for the AN/APR-39(V)1 radar warning receiver, will complete contractual The AN/ALQ-144 Infrared Countermeasures Set will complete in FY 1978.

Budget Activity #4 - Tactical Programs

Program Element #6.47.11.A Title Electronic Warfare

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: Project D665 supports incrementally funded, on-going contracts.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 33 | 0 | 33 |
| (2) Contractor Employees | 111 | 87 | 198 |
| Total | 144 | 87 | 231 |

DETAILED BACKGROUND AND DESCRIPTION: The objective of this program is the development, test, and type classification for production of required aircraft survivability systems composed of selected aircraft survivability equipments/aircraft electronic warfare self-protection equipment (ASE/AEWSP) which have demonstrated feasibility in Program Element #6.37.11.A, D653, Tactical Self-Protection Electronic Warfare Equipment. Emphasis is placed on equipment integration for a particular aircraft as a part of its survivability suit and associated system reliability and availability, maintainability, configuration and automatic data management, personnel development, logistic support, and facilities requirements. This project interfaces with Program Element #6.42.09.A, Aircraft Survivability Equipment, the passive engineering development project also managed by the Project Manager for Aircraft Survivability Equipment.

RELATED ACTIVITIES: Related electronic warfare developments are conducted by the Air Force and Navy. Coordination is effected between the Services to minimize duplication of effort and insure the interchange of technical data. Coordination is effected by reviews conducted by the Office of the Secretary of Defense (Defense Research and Engineering), on subgroups and working panels of The Technical Cooperation Program and by the Joint Tri-Service Electronic Warfare Panel. In addition, formal requirements documents of each Service are reviewed and commented upon by other Services.

WORK PERFORMED BY: US Army Aviation Research and Development Command (AVRADCOM), St. Louis, MO; US Army Electronics Research and Development Command (ERADCOM), Electronic Warfare Laboratory, Ft. Monmouth, NJ; US Army Armament Research and Development Command (ARRADCOM) Dover, NJ. Contractors: Sanders Associates Incorporated, Nashua, NH; ITT Corporation, Nutley, NJ; TRACOR Incorporated, Austin, TX; Hughes Helicopter, Culver City, CA; Aerojet Electrosystems Company, Azusa, CA; Cincinnati Electronics Company, Cincinnati, OH; Riverside Research Institute, New York, NY; CALSPAN Corporation, Buffalo, NY; Stanford Research Institute, Palo Alto, CA.

Budget Activity #4 - Tactical Programs

Program Element #6.47.11.A Title Electronic Warfare

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: The AN/ALQ-147 Infrared (IR) Jammer for the OV/RV-1D Fixed wing aircraft was initiated in FY 1973 and completed development test/operational test (DT/OT) II in FY 1975 with a production contract award in FY 1975. Expanded flight envelope qualifications were initiated for the AN/ALQ-147 to cover the RV-1 and high-speed emergency maneuvers in FY 1976. Test and Evaluation Command independent evaluations of the AN/ALQ-147 and the AN/ALM-166 Test Fixture were conducted at White Sands Missile Range in FY 1976-FY 197T. The AN/APR-39(V)1 helicopter radar warning receiver was tested and qualified for Army use in FY 1975. The AN/ALR-46, a US Air Force fixed wing radar warning receiver, was tested and adopted for US Army use in FY 1974 with The AN/ALQ-144 helicopter Infrared (IR) Jammer entered in FY 1975. Efforts to integrate the AN/ALQ-144 into OH, UH, AH helicopters were conducted in FY 1976-FY 197T. Army Missile Test and Evaluation Command participated in contractor testing of the AN/ALQ-144 at Sanders Associates plant during FY 1976. The XM-130 General Purpose Dispenser for all Army aircraft entered in FY 1975. Integration efforts to qualify the XM-130 chaff/flare dispenser on aircraft began in

2. FY 1977 Program: for the AN/APR-39(V)1 Radar Warning Receiver and the AN/ALQ-147 IR Jammer will be completed. AN/ALQ-144 IR Jammer will undergo with field services support provided by contractor. contracts will be awarded IQ FY 1977 for the AN/ALQ-156, Missile Detector System, the AN/ALQ-136 Radar Jammer, and the AN/APR-39(V)2 Radar Warning Receiver. Integration efforts for the XM-130 Chaff/Flare Dispenser to qualify the system on selected aircraft will continue with US Army Armament Research and Development Command (ARRADCOM) program monitorship. Systems Engineering support by US Army Electronics Research and Development Command (ERADCOM) will continue for all on-going tasks.

3. FY 1978 Planned Program: on the AN/APR-39(V)2 Radar Warning Receiver and the AN/ALQ-136 Radar Jammer with initiation of The Missile Detector System, AN/ALQ-156, will continue in The funding level applies to funding both the AN/ALQ-136 and AN/ALQ-156 contracts for a full year; both efforts were initiated in FY 1977.

4. FY 1979 Planned Program:

5. Program to Completion: This is a continuing program. Developments will continue to be transferred from advanced development Program Element #6.37.11.A, Tactical Self-Protection Electronic Warfare Equipment. Weapons technology is moving at a rapid pace and the countermeasure program must be able to keep pace. The development of countermeasures against threat weapons requires constant change and updating.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.12.A Title Joint Advanced Tactical Command, Control and Communications Program

Category Engineering Development Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 4550 | 1723 | 4327 | 2362 | 2559 | Continuing | Not Applicable |
| D321 | Joint Advanced Tactical Command, Control and Communications Program | 4550 | 1723 | 4327 | 2362 | 2559 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: This program has been composed of two separate joint programs; (1) Army Element of the Tactical Air Control Systems/Tactical Air Defense Systems (TACS/TADS) Interface Program, and (2) Ground and Amphibious Military Operations (GAMO) Interface Program. Both joint programs have as their specific objective the demonstration of compatibility, interoperability and operational effectiveness of the Service's Automated Command and Control systems. Beginning with FY 1978, the joint portion (Executive Agent's Representative) of GAMO will be in a separate program element 6.47.47.A (D228). D321 as shown contains TACS/TADS and the total Army only portion of the GAMO program. Withdrawn funds appear under program element 6.47.47.A.

BASIS FOR FY 1978 RDTE REQUEST: TACS/TADS will continue Post OED Support and will update system hardware, software and associated documentation. GAMO effort will continue on development and update of the various Joint and Army plans, proposals and concepts. Continue support of Army Test Unit to include emulation of Army systems participating in GAMO and test only modifications.

BASIS FOR CHANGE IN FY 1978 OVER 1977: Decrease in funding level due to lesser procurements required for TACS/TADS.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

**Budget Activity** #4 - Tactical Programs

**Program Element** #6.47.12.A **Title** Joint Advanced Tactical Command, Control and Communications Program

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 18 | 0 | 18 |
| (2) Contractor Employees | 22 | 0 | 22 |
| Total | 40 | 0 | 40 |

DETAILED BACKGROUND AND DESCRIPTION: This program element contains a single project, #D321 (Joint Tactical Command, Control and Communications), which in turn is composed of two separate programs: the first being the Army Element of the Tactical Air Control Systems/Tactical Air Defense Systems (TACS/TADS) Interface Program, and the second being the Total Army portion of the Joint Ground and Amphibious Military Operations (GAMO) Interface Program.

a. The TACS/TADS Interface Program has as its specific objectives to achieve and demonstrate the compatibility, interoperability, and operational effectiveness of the Army Air Defense Command and Control System, AN/TSQ-73, the Navy Tactical Data System (NTDS), the Airborne Tactical Data System (ATDS), the Air Force Tactical Air Control Systems Control and Reporting Center, AN/TSQ-91, Airborne Warning and Control System (AWACS) E3-B, and the Marine Air Command and Control System (MACCS), in their exchange of secure digital data on a real-time or near real-time basis in support of joint military operations.

b. The GAMO Interface Program objective is to achieve and test compatibility and interoperability and to demonstrate operational effectiveness of tactical command and control systems used in support of ground and amphibious military operations in the 1980's. Actual systems will be selected from the Army, Navy, Air Force, Marine Corps and Intelligence agencies. Thhe GAMO Program will be accomplished in three phases: Phase I is the conceptual phase, Phase II is the planning phase, and Phase III is the test and demonstration phase. Beginning in FY 1978, this program element will encompass only the Army portion of GAMO interoperability which includes TACS/TADS.

RELATED ACTIVITIES: The TACS/TADS Interface Program utilized as its Army hardware candidate the AN/TSQ-73 (Missile Minder). This interface program was established by Joint Chief of Staff (JCS) Memo SM 92-69, dated 13 February 1969 to insure interoperability of equipment for joint operations. The GAMO Interface Program was established by JCS Memo SM-205-1, dated 1 April 1971 and has as its Executive Agent, the Chief of Staff, US Army. Efforts in this program element also have application to efforts in Project D101, Program Element 6.37.23.A, Integration of Army Tactical Data Systems, and Project 6.37.03.A D654, Automatic Data Systems, Field Army. This project was previously funded in Program Element 6.57.01.A, Communications-Electronics Testing Activities, in portions of FY 1972 and FY 1973.

Budget Activity #4 - Tactical Programs

Program Element #6.47.12.A Title Joint Advanced Tactical Command, Control and Communications Program

WORK PERFORMED BY: Overall, coordination and management for the Army effort in this program is provided by the Project Manager for Army Tactical Data Systems, US Army Electronics Research and Development Command (ERADCOM) located at Fort Monmouth, NJ. The Army also provides members for the Tactical Air Control Systems/Tactical Air Defense Systems (TACS/TADS) Joint Interface Test Force at San Diego, CA, the TACS/TADS Support Group, Fort MacArthur, CA, the Ground and Amphibious Military Operations (GAMO) Joint Planning Group, and the Joint Technical Interface Coordinating Committees. The contractor supporting TACS/TADS is Data Systems Division, Litton Systems Incorporated, Van Nuys, CA, and the Command Control Communications Corporation, Lomita, CA; while GAMO is supported by Systems Development Corporation of Santa Monica, CA.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments:

a. TACS/TADS developed plans and documentation to fulfill the directives of the Joint Chiefs of Staff Memorandum SM 92-69. These efforts included initial preparation of the Interface Management Plan, Technical Interface Concept, Technical Interface Design Plan, and the Joint Interface Test Proposal. Documentation developed was used to run scenarios and simulations to refine tests for the TACS/TADS test bed. Documentation completed in FY 72 included the Interface Management Plan, the Technical Interface Concepts, the Army Implementation Plan, the Interface Design Plan, the Simulation and Data Reduction Plan and the Joint Interface Test Proposal. The Test Plan, the Communications Plan, and revision of the Army Implementation Plan were completed. An AN/TSQ-73 Battalion System was delivered to the test site at Fort MacArthur, California in October 1973. Formal testing was initiated in January 1974. TACS/TADS participated in requalification testing of the Navy systems and the Air Force systems. Formal tests were completed during FY 76. TACS/TADS participated in the West Coast procedural exercise, finalized software programs and documentation, completed refurbishment of the TACS/TADS AN/TSQ-73 Missile Minder, and prepared for the CINCLANT operational effectiveness demonstration during FY 197T.

b. GAMO accomplishments consisted of establishment of the Joint Management Committee and Interface Coordinating Committee. GAMO effort included establishment of the Joint Planning Group and initiation of effort for preparation of the Joint Tactical Interface Concepts and the GAMO Army Implementation Plan. The Joint Interface Implementation Plan was completed. The Interface Management Plan was updated and published and Program Memorandum 99 was approved by JCS/OSD. A redirection of the GAMO program was initiated in Feb 76 to provide for five functional areas (Intelligence, Air Operations, Amphibious and Fire Support, Operations Control and Signal Intelligence). Working group meetings were held to develop the Technical Interface Design Plan Test Edition (TIDP-TE) for Intelligence. The Initial GAMO Joint Interface Test Force (JITF) has been activated.

Budget Activity #4 - Tactical Programs

Program Element #6.47.12.A Title Joint Advanced Tactical Command, Control and Communications Program

2. FY 1977 Planned Program:

a. Tactical Air Control Systems/Tactical Air Defense Systems (TACS/TADS): Troop training will be completed at Fort Bliss, Texas. The AN/TSQ-73, HAWK SAM batteries and supporting communications used in the AN/TSQ-73 Operational Test III on the East Coast will be used for OED. Following pre-exercise tests, Army elements will participate in the Commander in Chief, Atlantic (CINCLANT) operational effectiveness demonstration scheduled for May 1977. At the completion of the Operational Effectiveness Demonstration (OED), the AN/TSQ-73 will be returned to Fort Bliss.

b. Ground and Amphibious Military Operations (GAMO): Establishment of the Joint Interface Test Center (JITC). Expand staffing of the Joint Interface Test Force (JITF), and relocate to the JITC. Initiate procurement, installation and checkout of equipment for the JITC. Sponsor working group meetings to establish Technical Interface Design Plans - Test Edition (TIDP-TE) for functional areas on a phased basis. Determine the Army participating test unit, its test site, and total resource needs. Additional personnel added to GAMO Army Management Office. Initiate emulation of Army Systems participating in GAMO.

3. FY 1978 Planned Program:

a. Tactical Air Control Systems/Tactical Air Defense Systems (TACS/TADS): Will provide for the evaluation of the test program and CINCLANT operational effectiveness demonstration (OED) and initiate Post OED Configuration Management. If further Joint Service tests are required, these will be performed from Fort Bliss. Documentation will be finalized and the Technical Interface Design Plan will be submitted to JCS as the baseline standard for maintaining interoperability of TACS/TADS systems.

b. GAMO: Continued development and refinement of Joint and Army concepts, plans and proposals. Complete Army Test Site preparation and activation. Establish full staffing of the Army Test Unit. Continue emulation of Army systems participating in GAMO. Participate in working groups to establish TIDP-TE for the functional areas of GAMO. Decrease in funding over FY 1977 level due to requirement to support higher priority programs.

4. FY 1979 Planned Program:

a. Funding for TACS/TADS will decrease as the program phases down. The Post OED TACS/TADS Program will continue to test additional requirements in TACS/TADS Systems as they are submitted by operational commands. Interface testing of new tactical systems will be accomplished. Control of and continued test of Configuration Management for deployed systems will be accomplished thru FY 79 as directed by the JCS.

b. Continue development and refinement of Joint and Army Concepts, plans and proposals for GAMO. Perform emulation of and test only modification to Army systems participating in Gamo. Increase in funding over FY 1978 level is due to expansion of the GAMO test program to accomodate new system tests including Tactical Operations System (TOS)/Position Locating and Reporting System (PLRS), Tactical Fire Control System (TACFIRE)/Remotely Piloted Vehicle, TACFIRE/Control and Analysis Center, and TOS/ Remotely Monitored Battlefield Surveillance System (REMBASS).

5. Program to Completion: Tactical Air Control Systems/Tactical Air Defense Systems TACS/TADS will continue to test additional requirements in TACS/TADS systems as they are submitted by operational commands. Interface testing of new TACS/TADS systems will be accomplished. Configuration management responsibility for TACS/TADS will pass to the GAMO Executive Agent upon termination of the TACS/TADS program. GAMO effort will continue on update of the various Joint and Army plans, proposals and concepts. Procurement of and installation of test equipment will be completed. Compatibility and Interopability Interface testing will be conducted with results designed to establish joint standards for tactical command and control systems that have joint interface.

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## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element # 6.47.13.A

Title Combat Feeding, Clothing and Equipment

Category Engineering Development

Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 19.T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 5,426 | 976 | 5,274 | 3,903 | 5,349 | Continuing | Not Applicable |
| DL40 | Clothing and Equipment | 1,141 | 360 | 489 | 397 | 2,214 | Continuing | Not Applicable |
| DL42 | Personnel Armor System | 740 | 125 | 581 | 388 | 250 | Continuing | Not Applicable |
| DL47 | Wholesomeness Testing of Irradiated Foods | 2,817 | 295 | 4,033 | 2,910 | 2,057 | 1,204 | 18,262 |
| D548 | Military Subsistence Systems | 728 | 196 | 171 | 208 | 828 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: Conduct engineering development of individual combat protective clothing and equipment; improved field service equipment and fabric field shelters; food service equipment; and conduct the wholesomeness feeding testing of irradiated foods.

BASIS FOR FY 1978 RDTE REQUEST: Begin engineering development on infantry combat boot; continue engineering development on snowshoe bindings, mountain crampons; surface swimming equipment, and cold weather petroleum, oils, and lubricants (POL) protective handwear (LINCLOE); continue engineering development on the personnel armor system for ground troops (PASGT); continue wholesomeness testing of three irradiated meat items; and continue development of modular refrigerators for the Marine Corps.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: Primary reason for reduced funding level in FY 1978 is the reduced costs involved with the engineering development of PASGT, coupled with reductions in cost of wholesomeness testing costs and clothing/equipment engineering development efforts.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement ), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 28 | 0 | 28 |
| (2) Contractor Employees | 70 | 0 | 70 |
| Total | 98 | 0 | 98 |

Budget Activity #4 - Tactical Programs

Program Element # 6.47.13.A Title Combat Feeding, Clothing and Equipment

DETAILED BACKGROUND AND DESCRIPTION: This program provides for the development of individual combat protective clothing and equipment to increase combat efficiency and provide protection for the combat soldier against battlefield hazards and the natural environment. It includes the development of operational rations, and food service equipment; wholesomeness feeding of irradiated foods; and develops improved field shelters. There are four projects within this program element which directly affect the soldier's safety, effectiveness, comfort, survivability.

RELATED ACTIVITIES: Each of the military Services performs work to develop their Service-peculiar items of clothing and equipment; however, close coordination is maintained, and many of the items developed under this program are used by all other military Services. Department of Defense Directive 1338.10-M assigns the Army overall responsibility for the Department of Defense (DOD) Food Research, Development, Testing and Engineering Program, which includes specific efforts to respond to DOD and other Services' requirements. Work in clothing and equipment is also performed in 6.27.23.A, Clothing, Equipment, and Packaging Technology, and in Project D669, Clothing and Equipment of 6.37.26.A, Combat Support Equipment. Work in food is conducted in Project AH52, Research in Support Equipment of Individual Soldier of 6.11.02.A, Defense Research Sciences, in 6.27.24.A, Food Technology, and in Project D610, Food Advance Development of 6.37.47.A, Soldier Support/Survivability.

WORK PERFORMED BY: The U.S. Army Natick Research and Development Command at Natick, Massachusetts, performs the majority of in-house efforts. The U.S. Army Medical Research and Development Command administers the wholesomeness feeding test contracts which currently include the irradiated beef and ham contracts with Industrial BioTest, Incorporated, Northbrook, Illinois, and the irradiated chicken contract with Ralston/Purina, St. Louis, Missouri. Additional contractors for other elements of the program element are Ro-Search, Incorporated, Waynesville, North Carolina; Sherpa Design, Incorporated, Tacoma, Washington, and SVEN Industries, Duluth, Minnesota.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: A large number of items of clothing, equipment, operational rations, subsistence items, recipes and food service equipment in use today were developed under this program element and adopted as standard. Completed the animal feeding tests of irradiated beef and continued with the preparation of the test reports. Initiated feeding tests of three additional irradiated meat items. Development Test II/Operational Test II (DT II/OT II) was initiated on the ski/mountain boot and on the personnel armor system for ground troops.

2. FY 1977 Program: Continue modernization of food service refrigeration for Marine Corps; development of an insulated plastic beverage container; development of a telescoping stovepipe for immersion heater; evaluation of food service equipment for DOD agencies and continue animal feeding tests of two irradiated meat items. Contract to fabricate mountain crampon for testing; conduct feasibility testing at Cold Region Test Center of snowshoe bindings; hold special in-process review (IPR) on surface swimming equipment; conduct physiological study on petroleum, oils, and lubricants (POL) protective handwear; continue contract on prototype mission related footware to expand sizes; continue DT II/OT II for personal armor for ground troops; and complete ballistic evaluation for establishment of acceptance criteria.

Budget Activity #4 - Tactical Programs

Program Element # 6.47.13.A Title Combat Feeding, Clothing and Equipment

3. FY 1978 Planned Program: Continue food service refrigeration efforts for the Marine Corps, the evaluation of new food service equipment for Department of Defense (DOD) agencies; and the animal feeding tests of two irradiated meat items. Submit petition on irradiated beef to the Food and Drug Administration. Conduct Developmental Testing II/Operational Testing II (DT II/OT II) on mountain crampons; contract for fabrication of snowshoe bindings; type classify surface swimming equipment; procurement of prototypes of mission related footwear for DT II; complete personnel armor for ground troops DT II/OT II and complete ballistic firing of test items.

4. FY 1979 Planned Program: Continue animal feeding tests of two irradiated meat items; initiate engineering design of a cold-wet boot; conduct DT II/OT II and type classify cold/dry weather uniform, snowshoe bindings and vapor permeable/water impermeable rainwear; contract for engineering design and evaluation of an artillery safety shoe; type classify mountain crampons; initiate development of a survival kit; conduct physiological and thermographic studies on hot weather coveralls; initiate engineering design of extreme cold footwear and handgear for Army aviators; hold Development Acceptance In-Process Review (DEVA IPR) and type classify the personnel armor for ground troops.

5. Program to Completion: With the exception of wholesomeness testing, this is a continuing program.

DAMA-CSS
Mr. Kozan/56048
Tape #1

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element # 6.47.14.A

Title Tactical Electric Power Sources

Category Engineering Development

Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 2,782 | 672 | 3,452 | 1,150 | 5,314 | Continuing | Not Applicable |
| D194 | Engine Driven Generators | 2,782 | 672 | 1,852 | 832 | 1,514 | Continuing | Not Applicable |
| D196 | Silent Power Generating Sources | 0 | 0 | 1,600 | 318 | 3,800 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: Conduct engineering development (ED) of an advanced family of tactical power sources to provide quieter, more reliable, highly efficient power sources for the field Army.

BASIS FOR FY 1978 RDTE REQUEST: Complete development and type classify 10 kilowatt (KW) gas turbine power plant. Conduct major project improvement effort on a 60 KW, 400 Hertz (Hz) gas turbine generator. Continue development of 1.5 KW methanol fuel cell.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: This program element was restructured from Program Element 6.47.17, Project D589, Power Plants, Portable. Funding in FY 1978 is decreased as a result of completing ED of 10 KW gas turbine generator and reducing 1.5 KW fuel cell effort to minimum sustaining level.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 13 | 0 | 13 |
| (2) Contractor Employees | 8 | 0 | 8 |
| Total | 21 | 0 | 21 |

Budget Activity #4 - Tactical Programs

Program Element # 6.47.14.A Title Tactical Electric Power Sources

DETAILED BACKGROUND AND DESCRIPTION: This project is designed to develop items to satisfy the Army's need in portable electric power sources. These items are considered individual systems within the Army and require individual type classification and thus an engineering development program. Included in this project is the Army's development effort on the Department of Defense family of generators (gasoline, diesel, gas turbine, and other advanced cycle engine driven sets), fuel cells and power conditioners. Objectives are to develop generator sets which are lower in weight (more mobile), lower in life cycle costs, quieter, longer in life and higher in reliability.

RELATED ACTIVITIES: The Army maintains continuing coordination with the US Air Force, US Navy and the Department of Defense Project Manager for Mobile Electric Power as well as civilian agencies such as the Energy Research and Development Administration. Related basic research is conducted in Program Element 6.11.02.A, Project AH47, Electronics Devices Research, and Project AH51, Combat Support Research. Exploratory development is conducted in Program Element 6.27.05.A, Project AH94, Electronics and Electronic Devices, and Program Element 6.27.33.A, Mobility Equipment Technology. Advanced development is conducted in Program Element 6.37.02.A, Electric Power Sources. This Program Element was previously funded and reported under Program Element 6.47.17.A, Project D589, Power Plants Portable.

WORK PERFORMED BY: In-house laboratory work and contract monitoring is performed by US Army Mobility Equipment Research and Development Command, Fort Belvoir, VA. Contractors include AiResearch Manufacturing Company, Phoenix, AR; Solar Division of International Harvester Corporation, San Diego, CA; Delco Electronics, Santa Barbara, CA; Energy Research Corporation, Danbury, CT; Englehard Industries, Newark, NJ; Illinois Institute of Technology Research Institute, Chicago, IL; and United Technologies, Hartford, CT.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: Under prior Project D589, Power Plants Portable, the Army's research and development efforts on the family Department of Defense diesel engine driven generator sets in 5, 10, 15, 30, 60, 100 and 200 kilowatt (KW) sizes were completed. The development of advanced design of the 10 KW and 30 KW, 60 Hertz (Hz) gas turbine engine driven generator sets was initiated. Engineer Design Test began on the 10 KW units as part of the Army's new single integrated test program. The 30 KW turbine generator program was terminated prior to initiation of the engineer test program.

2. FY 1977 Program: Continue the development of the 10 KW, 60 Hz gas turbine driven generator set. The engineer design tests, configuration audits, drawings and other software items will be completed. Single integrated testing of the Operational Test II/ Development Test II models will be accomplished. Major improvement of an existing 60 KW and 400 Hz gas turbine generator set to reduce fuel consumption and meantime-between-overhaul will be initiated. Engineering development of a 1.5 KW methanol fuel cell power plant and 1.5 KW power inverter will be initiated.

Budget Activity #4 - Tactical Programs

Program Element # 6.47.14.A Title Tactical Electric Power Sources

3. FY 1978 Planned Program: A development acceptance in-process review on the 10 kilowatt (KW), 60 Hertz (Hz) turbine set will be conducted and the item type classified. A technical data package for procurement of the 10 KW, 60 Hz set will be completed. Efforts will be continued to accomplish major improvements to the 60 KW, 400 Hz gas turbine generator set. Contract efforts to design and fabricate test prototypes of the 1.5 KW methanol fuel cell and inverter will be continued. Decrease in funding for FY 1978 over FY 1977 is the result of completing development on the 10 KW, 60 Hz generator, and maintaining minimum sustaining level for 1.5 KW fuel cell effort.

4. FY 1979 Planned Program: Initiate engineering development on advanced concept turbine generator set utilizing ceramic components. Initiate engineering development on silenced 10 KW turbine generator set to meet Silent Lightweight Electrical Energy Plants requirements. Complete product improvement on 60 KW, 400 Hz gas turbine generator set. Continue engineering development of 1.5 KW methanol fuel cell power plant and 1.5 KW power inverter. Initiate engineering development of 3.0 KW fuel cell power plant and 3.0 KW power inverter. Increase in funding over FY 1978 is required to begin engineering development of ceramic component generator, a silenced 10 KW generator, and 3.0 KW fuel cells.

5. Program to Completion: This is a continuing program.

**FY 1978 RDTE DESCRIPTIVE SUMMARY**

**Program Element #** 6.47.14.A **Title** Tactical Electric Power Sources

**Project #** D196 **Title** Silent Power Generating Sources

**Category** Engineering Development **Budget Activity** #4 - Tactical Programs

DETAILED BACKGROUND AND DESCRIPTION: This project is designed to develop a family of silent, portable power sources to satisfy the Army requirements for SLEEP (Silent Lightweight Electric Energy Plants). These items are considered individual systems within the Army, require individual type classification, and thus, an engineering development program. At the present time, the SLEEP requirement can be satisfied only by the fuel cell technology which employs steam-reformed methanol as the fuel. This has been selected as the best technical approach. The SLEEP family includes power sources of 0.5, 1.5, 3.0, 5.0 and 10 kilowatts (KW). The initial member of the SLEEP family to be developed is the 1.5 KW unit. Objectives are to supply a silent, lightweight, efficient means of generating electric power which has a longer life, higher reliability, and reduced maintenance resulting in lower life-cycle cost.

RELATED ACTIVITIES: The Army maintains continuing coordination with the US Air Force, US Navy, and the Department of Defense Project Manager for Mobile Electric Power as well as civilian agencies such as the Energy Research and Development Administration. Basic research for this project is conducted in Program Element 6.11.02.A, Project AH51, Research in Combat Support; Exploratory Development in Program Element 6.27.33.A, Mobility Equipment Technology; and Advanced Development in Program Element 6.37.02.A, Project DG10, Electrochemical Power Sources, and Project DG11, Electro-Mechanical Power Sources Systems. This project was previously funded and report as a task under Program Element 6.47.17.A, Project D589, Power Plants Portable.

WORK PERFORMED BY: In-house laboratory work and contract monitoring is performed by US Army Mobility Equipment Research and Development Command, Fort Belvoir, VA. Contractors include Energy Research Corporation, Danbury, CT; Englehard Industries, Newark, NJ; Illinois Institute of Technology Research Institute, Chicago, IL; and United Technologies, Hartford, CT.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: Not applicable.

2. FY 1977 Program: Under prior Project D589, Power Plants Portable, a contractual effort for engineering design test models of the 1.5 KW methanol fuel cell and 1.5 KW inverter will be initiated.

3. FY 1978 Planned Program: Monitor contract for design and fabrication of engineering design test models of 1.5 KW methanol fuel cell and 1.5 KW inverter. Funding for FY 1978 is decreased to minimum sustaining level required for contract monitorship.

4. FY 1979 Planned Program: Complete fabrication of 1.5 KW methanol fuel cell and inverter engineering design test models, and initiate Development Test II/Operational Test II. Initiate engineering development of the 3 KW fuel cell member of the silent

Budget Activity #4 - Tactical Programs

Program Element # 6.47.14.A Title Tactical Electric Power Sources

Project # D196 Title Silent Power Generating Sources

power generation family. Increase in FY 1979 funds is required to complete fabrication of 1.5 KW fuel cell system, conduct tests, and begin effort to develop 3 KW methanol fuel cell.

5. Program to Completion: This is a continuing program.

RESOURCES: ($ in Thousands)

| | | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| RDTE: | Funds | 0 | 0 | 1,600 | 318 | 3,800 | Continuing | Not Applicable |
| | Quantities | | | | | | | |

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FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.15.A

Title Non-Systems Training Devices Engineering (NSTD)

Category Engineering Development

Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 4,524 | 790 | 7,855 | 8,192 | 8,706 | Continuing | Not Applicable |
| D237 | NSTD Arty/AD/Engr | 0 | 0 | 0 | 726 | 950 | Continuing | Not Applicable |
| D239 | NSTD Infantry | 0 | 0 | 0 | 2,989 | 1,506 | Continuing | Not Applicable |
| D241 | NSTD Comb Arms | 0 | 0 | 0 | 3,244 | 3,600 | Continuing | Not Applicable |
| D572 | NSTD Armor/Anti-Armor | 3,824 | 615 | 7,155 | 439 | 1,800 | Continuing | Not Applicable |
| D573 | Army Support NTEC | 700 | 175 | 700 | 794 | 850 | Continuing | Not Applicable |
| Procurement: | | | | | | | | |
| | Funds | 14,200 | 2,300 | 12,300 | 12,600 | 48,700 | Continuing | Not Applicable |
| | Quantities* | | | | | | | |

*It is not feasible to list the quantities because of the diversity of type and quantity of the different training devices.

BRIEF DESCRIPTION OF ELEMENT: Program develops and tests training devices that will provide: optimum training for both operating and maintenance personnel; cost effective training; conservation of fuel and maintenance; reduced consumption of ammunition in practice firing. Program provides engineering development effort on a continuing basis and provides the Army with a unique capability to develop cost effective simulators as training devices. The Army utilizes the resources of the Naval Training Equipment Center (NTEC) in accordance with a joint agreement.

BASIS FOR FY 1978 RDTE REQUEST: Complete Engineering Development on the Multiple Integrated Laser Engagement System (MILES), Infantry Remoted Target System (IRETS), Marksmanship Gunnery Laser Devices (MAGLAD I) for infantry training, and Blank Firing Adapters for the M-2 and M-85 machine guns. Continue development on the MILES Air Ground Engagement Simulator (AGES) and MILES Air Defense Engagement Simulator (ADES). Initiate development of a Mine Casualty Producing Simulator (MICAPS) and the Command Group Training Support System (CGTSS). Continue funding support for the Naval Training Equipment Center (NTEC) and Project Manager for Training Devices (PM TRADE).

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: Modest increase reflects the Army's major emphasis on means of achieving effective, realistic training for both active and reserve forces at reduced cost, reduced use of real estate and reduced use of ammunition and fuel.

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Budget Activity #4 - Tactical Programs

Program Element #6.47.15.A Title Non-Systems Training Devices Engineering (NSTD)

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 58 | 0 | 58 |
| (2) Contractor Employees | 159 | 181 | 340 |
| Total | 217 | 181 | 398 |

DETAILED BACKGROUND AND DESCRIPTION: The objective of this program is to design, develop and test training devices which will provide optimum training for both operating and maintenance personnel. This program provides for engineering development effort on a continuing basis for training devices which are not related to specific Army systems. The major thrust of this program is geared toward developing training simulation devices that provide cost effective training and increased proficiency. The Army utilizes the resources of the Naval Training Equipment Center (NTEC) in accordance with a joint agreement. This program element provides the Army's proportionate share of NTEC operations cost. This arrangement makes available all NTEC resources for Army use, including personnel, extensive simulation facilities, and laboratories in areas such as physical sciences, electronics, visual simulation, computer, and human factors.

RELATED ACTIVITIES: The program of development is closely coordinated with the other Services through joint use of NTEC, joint Department of Defense/National Aeroantucis and Space Administration Aeronautical Research and Development Coordinating Board, and worldwide staffing of Training Devices Requirements. Related P.E.'s are 6.27.27.A, Non-Systems Training Devices Technology; 6.37.38.A, Non-Systems Training Devices Development; 6.42.27.F, Flight Simulator Development; 6.47.03.N, Training Devices Prototype Development. Effective FY 1978, this program element will be restructured along more functional lines as shown in project listing above.

WORK PERFORMED BY: Primary contractors: Xerox Electro-Optical Systems, Inc., Pasadena, CA; MB Associates, San Ramon, CA. Additional potential bidders or anticipated bidders include: Singer Co., Silver Springs, MD; American Airlines, Fort Worth, TX; Hughes Aircraft Co., Fullerton, CA; Martin-Marietta Aerospace, Orlando, FL; Thompson Ramo Wooldridge, Inc., Redondo Beach, CA; Education Computer Corporation, Stafford, PA; and TRW, Redondo Beach, CA. The above list of potential bidders is not complete and many other contractors may respond when actual competitive bids are released. A total of $4.0M is programmed for competitive bid contracts. In-house activities are performed by the U.S. Naval Training Equipment Center, Orlando, FL, and by U.S. Army Development and Readiness Command subordinate agencies as tasked by the Project Manager for Training Devices (PM TRADE).

Budget Activity #4 - Tactical Programs

Program Element # 6.47.15.A Title Non-Systems Training Devices Engineering (NSTD)

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 1977, FY 1976, and Prior Accomplishments: Completed Engineering Development (ED) of the M31 Artillery Trainer, the Artillery Direct Fire Trainer, the Combined Arms Tactical Training Simulator (CATTS), the .22 Caliber Rimfire Adapter for the M16A1 Rifle and the Cal .50 Subcaliber training devices for the 90mm and 105mm Tank Main Guns. All of the above are currently in production or in the process of being procured. Initiated Engineering Development (ED) effort on the Multiple Integrated Laser Engagement System (MILES), the Observed Fire Trainer and the Command and Control Training Vehicle, all of which are projected for completion during the FY 1977/FY 1978 time frame.

2. FY 1977 Program: Continue the major ED effort on the Multiple Integrated Laser Engagement System (MILES) for unit tactical training devices. Complete development of the Observed Fire Trainer (OFT). Development Test II/Operational Test II (DT II/OT II) scheduled for 3Q77, program scheduled for procurement during FY 1978. Complete development of the Combat and Control Training Vehicle with DT II/OT II tests scheduled for 2Q77. Initiate development effort of an Air-to-Ground Engagement Simulator (AGES) and an Air Defense Engagement Simulator (ADES) which are compatible with the basic MILES system. Initiate ED effort of Blank Firing Adapters for the M-2 and M-85 Machine Guns and Mine Casualty Producing Simulator (MICAPS) to provide a realistic combat unit training environment.

3. FY 1978 Planned Program: Complete ED effort on the basic MILES system and conduct DT II/OT II - currently scheduled for 3Q78. Continue development effort on AGES, ADES, MICAPS and Blank Firing Adapters (BFA) initiated during FY 1977. Initiate ED effort on the Command Group Training Support System (CGTSS) with the capability of exporting computer-based combat exercises to Active and Reserve Component Units worldwide. Continue providing Army share of funding for the Naval Training Equipment Center (NTEC).

4. FY 1979 Planned Program: Complete development of AGES, ADES, MICAPS and BFA's and complete DT II/OT II tests for these programs. Continue development of the Command Group Training System. Complete development and testing of the Infantry Remoted Target System (IRETS) and the Marksmanship Gunnery Laser Devices (MAGLAD I) by the 2Q79; both programs currently scheduled to complete Advanced Development phase by 1Q79 and proceed into Engineering Development. Initiate ED effort for the Electronic Warfare (EW) Simulator having completed Advanced Development, and continue support for NTEC.

5. Program to Completion: This is a continuing program.

DAMA-CSS
MAJ Velezis/74319
Tape #11

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.15.A

Title Non-Systems Training Devices (NSTD)

Project #D241

Title Non-Systems Training Devices (NSTD) Combined Arms

Category Engineering Development

Budget Activity #4 - Tactical Programs

DETAILED BACKGROUND AND DESCRIPTION: In the past, the Army performed all Engineering Development (ED) within Project Element 6.47.15.A-D572, NSTD, Armor/Anti-Armor. The overall scope and content of the current program have increased considerably. Therefore, in order to provide better management and direction, P.E. 6.47.15.A has been restructured along functional lines (Project Elements D237, NSTD Artillery/Air Defense/Engineer; D239, NSTD Infantry; D241, NSTD Combined Arms; D572, NSTD Armor/Anti-Armor; and D573, Army Support for Naval Training Equipment Center). This program effort provides for development of training devices and simulators to support Combined Arms Training in the tactical environment. Major program effort will be directed towards Command Group Training, Electronic Warfare (EW) Simulation, maintenance training devices and simulators, and casualty assessment simulators. Additionally, program provides support for the Project Manager for Training Devices (PM TRADE) and for tests and evaluations of the various devices and simulators being developed by PM TRADE.

RELATED ACTIVITIES: The program of development is closely coordinated with the other Services through worldwide staffing of Training Device Requirements, joint use of the Naval Training Equipment Center. Related P.E.'s are 6.27.27.A, NSTD Technology; 6.37.38.A, NSTD Development; 6.42.27.F, Flight Simulator Development; 6.47.03.N, Training Devices Prototype Development.

WORK PERFORMED BY: All programs are currently scheduled to be released on a competitive basis. Potential or anticipated bidders include: MB Associates, San Ramon, CA; Applied Devices Corporation, Hauppauge, Long Island, NY; Computer Science Corporation, Huntsville, AL; AAI Corporation, Baltimore, MD; American Airlines, Fort Worth, TX; Hughes Aircraft Company, Fullerton, CA; General Electric Company, Pittsfield, MA; TRW, CA. The above list is not considered all inclusive of contractors that may bid for approximately $2.3M. In-house development is performed by the Project Manager for Training Devices and the Naval Training Equipment Center, Orlando, FL.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: Not Applicable. All program efforts were incorporated within Project Element 6.47.15.A-D572.

2. FY 1977 Program: Not Applicable. All program efforts were incorporated within Project Element 6.47.15.A-D572.

3. FY 1978 Planned Program: Major program effort will be applied towards the development of a Command Group Training Support System (CGTSS), a computer-based, real time, free-play battle simulation system (to be used with or without troops), designed to improve the ability of commanders and their staff to lead their units in combat and "win the first battle of the next war". Continue support for the Project Manager for Training Devices (PM TRADE) and provide for tests and evaluations.

Budget Activity #4 - Tactical Programs

Program Element #6.47.15.A Title Non-Systems Training Devices (NSTD)

Project #D241 Title Non-Systems Training Devices (NSTD) Combined Arms

4. FY 1979 Planned Program: Complete development of the Command Group Training Support System and conduct Development Test II/Operational Test II (DT II/OT II) by 4Q79. Initiate Engineering Development for Electronic Warfare (EW) Simulators, and a major effort for maintenance training devices and simulators in areas of high cost and potential cost reduction. Continue support for Project Manager for Training Devices, as well as support for tests and evaluations of the various devices and simulators under development.

5. Program to Completion: This is a continuing program.

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 0 | 0 | 0 | 3,244 | 3,600 | Continuing | Not Applicable |
| Quantities* | | | | | | | |
| Procurement: | | | | | | | |
| Funds | 0 | 0 | 0 | 3,500 | 12,000 | Continuing | Not Applicable |
| Quantities* | | | | | | | |

*It is not feasible to list the quantities because of the diversity of type and quantity of the different training devices.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.16.A Title Mapping and Geodesy

Category Engineering Development Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 2900 | 279 | 2141 | 2542 | 3485 | Continuing | Not Applicable |
| | Quantities | Position and Azimuth Determining System (5)<br>Analytical Photogrammetric Positioning System (1)<br>Topographic Support System (1) | | | | | | |
| D578 | Field Army Surveying Equipment | 2660 | 200 | 1233 | 1646 | 1700 | Continuing | Not Applicable |
| D579 | Field Army Mapping Systems | 240 | 79 | 908 | 896 | 1785 | Continuing | Not Applicable |
| | Procurement: | | | | | | | |
| | a. Surveying Instrument, Azimuth, Gyro, Lightweight | | | | | | | |
| | Quantity | 50 | 0 | 100 | 64 | 64 | 0 | 680 |
| | Funds | 6100 | 0 | 4434 | 3300 | 3400 | 0 | 26385 |
| | b. Position and Azimuth Determining System | | | | | | | |
| | Quantity | 0 | 0 | 0 | 0 | 32 | 129 | 161 |
| | Funds | 0 | 0 | 0 | 0 | 10200 | 34400 | 44600 |

BRIEF DESCRIPTION OF ELEMENT: This program element addresses the engineering development and testing of materiel for rapid acquisition, processing and dissemination of topographic map and position location data in the field Army in direct support of tactical deployment of forces and weapon system operation. This program element provides the necessary follow-on engineering development of the systems and equipments originating in program element 6.37.12.A, Mapping and Geodesy, including the Position and Azimuth Determining System, and Field Army Topographic Support System. It addresses present deficiencies in the Army's ability to provide topographic data and field artillery fire control positioning in a timely manner consistent with rapid and effective combat operations.

Budget Activity #4 - Tactical Programs

Program Element #6.47.16.A Title Mapping and Geodesy

BASIS FOR FY 1978 RDTE REQUEST: The Position and Azimuth Determining System (PADS), a palletized inertial survey platform suitable for jeep or helicopter operation with mobile artillery and missile systems to give real time survey control will be type classified. Environmental testing will be completed and the prototype models will be refurbished for issue. Development of Topographic Support System, which will modernize the World War II vintage field army topographic equipment, will continue with procurement and testing of systems components and documentation of procedures.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: The funding increase is needed to fund last elements of the Position and Azimuth Determining System development program prior to procurement in FY 1979.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 41 | 0 | 41 |
| (2) Contractor Employees | 55 | 74 | 129 |
| Total | 96 | 74 | 170 |

DETAILED BACKGROUND AND DESCRIPTION: The objectives of this program are the engineering development and testing of materiel for field Army survey and map compilation, revision, reproduction and distribution. These developments will be used in direct support of the tactical deployment of forces and the operation of weapon systems. This program element provides the necessary engineering development of the systems and equipments originating in Program Element 6.37.12.A, Mapping and Geodesy. As a result of the formation of the Defense Mapping Agency (DMA) on 1 July 1972, this program element now only addresses the general areas of field Army surveying and mapping. The base plant related development efforts were transferred to the DMA on 1 July 1972 and the data on these efforts is now included in the DMA program submission. The systems retained in this program element include: (1) the Position and Azimuth Determining System (PADS), a palletized inertial survey platform for jeep or helicopter operation with mobile artillery and missile systems to give realtime survey control; (2) the Topographic Support System (TSS) which will modernize the field Army topographic battalions, which presently use World War II vintage equipment, so that they will be effective in a highly mobile tactical environment; and (3) the Advanced Analytical Photogrammetric Positioning System (AAPPS) which will provide the field Army with the capability of determining accurate coordinates of friendly and enemy target positions using photogrammetric techniques and advanced sensor imagery.

Budget Activity #4 - Tactical Programs

Program Element #6.47.16.A Title Mapping and Geodesy

RELATED ACTIVITIES: The Army works directly with 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 6.37.01.B, Mapping, Charting and Geodesy Investigations 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.

WORK PERFORMED BY: Approximately 30 percent of the work is accomplished in-house at the US Army Engineer Topographic Laboratories (USAETL), Fort Belvoir, Virginia; 20 percent by other Army elements, and the remainder is performed by contractors under USAETL direction. The contractors are: Motorola, Inc., Scottsdale, Arizona; Lear Siegler, Inc., Santa Monica, California; Bausch and Lomb, Rochester, New York; and Litton Systems, Inc., Woodland Hills, California. All contracts exceed $25,000.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 1976, FY 197T and Prior Accomplishments: The joint Army/Air Force test of the Rapid Combat Mapping System (RACOMS) was completed in FY 1969, the results analyzed, and modifications made to correct deficiencies. The RACOMS was transferred to the US Army 30th Engineer Battalion in FY 1970 for operational use. In FY 1971, fabrication of the Lightweight Gyro Azimuth Instrument was completed and engineer and service tests initiated. Development of the Long Range Position Determining System was also initiated. In FY 1972, 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 a Digital Input/Output Display Device and a production Flatbed Cartographic Plotter for the Automated Cartographic System, and the Engineer Design Test of the Topographic All-Weather Mapping System were initiated. Development of an experimental Analytical Photogrammetric Positioning System to determine position coordinates of weapons systems and potential targets for missile and tube artillery was also initiated. In FY 1973, the engineering development and testing on the Long Range Position Determining Systems continued. Development and testing of the experimental Analytical Photogrammetric Positioning System were completed and the system was type classified. In FY 1974, testing of the Long Range Position Determining System indicated errors in the system computer program. The system was returned to the contractor for corrective action. Development of the Topographic Support System (TSS) was initiated. In FY 1975, corrective actions on the Long Range Position Determining System were completed and it was tested. System performance was found to be marginal and a decision was made to terminate development. Development of the Position and Azimuth Determining System was initiated. Development of the Topographic Support System continued at a low level. In FY 1976, the incrementally funded contract for development of the Position and Azimuth Determining System continued. Planning for development of the Topographic Support System was accelerated. A decision to buy most of the hardware under Commercial Non-Development Items (CNDI) procedures was reached.

Budget Activity #4 - Tactical Programs

Program Element #6.47.16.A Title Mapping and Geodesy

2. FY 1977 Program: Fabrication of the Position and Azimuth Determining System will be completed and Development Test/Operational Test II (DT/OT II) will be conducted if funds permit. Components for the Topographic Support System will be procured, modules will be fabricated, and procedures guides will be prepared.

3. FY 1978 Planned Program: The Position and Azimuth Determining System will be type classified. Environmental testing of the system will be completed and the test models will be refurbished for issue. Fabrication and testing of Topographic Support System modules will be completed. Procedures guides will also be completed. Increase is to support completion of Position and Azimuth Determining System contract.

4. FY 1979 Planned Program: Topographic Support System integration and software development will be initiated under contract. Development of the Advanced Analytical Photogrammetric Positioning System will be initiated and an incremental contract for design and fabrication of DT/OT II models will be awarded. Increase in funding is required for contractual efforts on the Topographic Support Systems and the Advanced Analytical Photogrammetric Positioning System.

5. Program to Completion: System integration and type classification of the Topographic Support System will be completed in FY 1980. Development of the Analytical Photogrammetric Positioning System will be completed in FY 1982. Development of the Map Illuminator Factor Map Synthesizer, Integrated Survey Instrument, Forward Observer Direction Finder, and Forward Area Survey Equipment will be carried out during this period. The first of these will be completed in FY 1982.

6. Major Milestones:

| | Date | Estimated RDTE Cost to Reach Events (Cumulative) |
|---|---|---|
| a. Type Classify Position and Azimuth Determining System | 1QFY78 | 9103000 |
| b. Type Classify Topographic Support System | 1QFY80 | 2753000 |

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.17.A Title General Combat Support

Category Engineering Development Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 3420 | 1103 | 3036 | 3804 | 10106 | Continuing | Not Applicable |
| DH01 | Combat Engineer Equipment | 877 | 208 | 420 | 422 | 2701 | Continuing | Not Applicable |
| DH14 | Container Distribution Equipment | 0 | 73 | 95 | 436 | 1511 | Continuing | Not Applicable |
| DL17 | Camouflage | 1363 | 150 | 570 | 745 | 2142 | Continuing | Not Applicable |
| DL39 | General Support Equipment | 370 | 260 | 801 | 938 | 1256 | Continuing | Not Applicable |
| DL41 | Fuels Handling Equipment Systems | 233 | 267 | 155 | 271 | 1012 | Continuing | Not Applicable |
| D429 | Tactical Rigid-Wall Shelters | 0 | 0 | 350 | 319 | 725 | Continuing | Not Applicable |
| D832 | Combat Medical Materiel | 577 | 145 | 645 | 673 | 759 | Continuing | Not Applicable |
| Procurement: | | | | | | | | |
| Funds: | (Total) | | | | (14400) | (7000) | | |
| | Ribbon Bridge Erection Boat | 0 | 0 | 0 | 13000 | 7000 | Continuing | Not Applicable |
| | Water Purif Unit 600 Gal/Hr | 0 | 0 | 0 | 1400 | 0 | Continuing | Not Applicable |
| Quantities: | | | | | | | | |
| | Ribbon Bridge Erection Boat | 0 | 0 | 0 | 200 | 100 | Continuing | Not Applicable |
| | Water Purif Unit 600 Gal/Hr | 0 | 0 | 0 | 30 | 0 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: This program develops equipment for combat engineering, improved mobility, camouflage, environmental and medical support under combat conditions, tactical rigid-wall shelters, and container distribution and fuels handling equipment.

BASIS FOR FY 1978 RDTE REQUEST: Work will be performed on bridge erection boat, small special purpose Marine/Army inflatable boat, automated identification and container control system, restraint system for containerized ammunition, camouflage and decoys, heaters, water purification equipment, multipoint helicopter refueling system, tactical rigid-wall shelters, components for the Medical Unit, Self-Contained Transportable (MUST), cold injury treatment device, blood screening device, field optometry set, and field dental sets.

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Budget Activity #4 - Tactical Programs

Program Element #6.47.17.A Title General Combat Support

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: Procure and test prototypes of containerized ammunition restraint system and container identification and control system; apply camouflage to Air Defense unit; procure water treating components for engineer design test (EDT) model 3000 gallons per hour (GPH) reverse osmosis water purification unit (ROWPU); increased funding for development and testing of 250,000 British Thermal Unit/Hour (BTUH) heater; and procure EDT equipment for multipoint helicopter refueling system.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ Employees | 82 | 0 | 82 |
| (2) Contractor Employees | 44 | 78 | 122 |
| Total | 126 | 78 | 204 |

DETAILED BACKGROUND AND DESCRIPTION: Supports development of equipment to meet the Army's needs in countersurveillance, logistics, mobility, and medical welfare.

RELATED ACTIVITIES: Close coordination is maintained with other Services through the Joint Service Civil Engineering Research and Development Coordinating Group, the Logistic Systems Policy Committee, the Joint Medical Research Committee, and the Joint Container Steering Group. The projects of this element contain items and systems that have progressed to engineering development from related advanced development Program Element 6.37.26.A, Combat Support Equipment. Related exploratory development Program Elements include 6.27.23.A, Clothing, Equipment and Packaging Technology, and 6.27.33.A, Mobility Equipment Technology.

WORK PERFORMED BY: In-house work is performed at the US Army Mobility Equipment Research and Development Command, Fort Belvoir, VA; US Army Armament Research and Development Command (ARRADCOM), Edgewood, MD; US Army Natick Research and Development Command, Natick, MA; and the Army Medical Bioengineering Research and Development Laboratory, Fort Detrick, MD. Contracts include ROTORK, United Kingdom; Value Engineering Company, Alexandria, VA; Walcott Water Associates, Columbia, MD; Energy Transformation Corporation, Boyertown, PA; Brunswick Corporation, Deland, FL; Battelle-Columbus Laboratories, Columbus, OH; Technology Service Corporation, Santa Monica, CA; and additional proposed contracts estimated to cost $1,000,000.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: Some items developed, tested, and adopted as standard under this element are: mobile floating assault bridge-ferry; ribbon bridge; cargo pallet for the ribbon bridge transporter; heavy and medium duty landing mats; 25,000 barrel nasty fuel storage reservoir; forware area refueling equipment; fuel tanker mooring system; woodland and

desert blend camouflage screening systems; water quality analysis sets; and field dental compressor-dehydrator and operating and treatment unit. Completed testing of camouflage for M60 tank.

2. FY 1977 Program: Start engineering development (ED) of small inflatable boat, small rigid-wall shelter, and selective blood screening device. Continue development and testing of bridge erection boat; 250,000 British Thermal Unit/Hour (BTUH) heater; decoys; 1,500 gallons per hour (GPH) reverse osmosis water purification unit (ROWPU) and Medical Unit, Self-Contained Transportable (MUST) Sanitation Complex. Complete testing of medium girder bridge reinforcing kit, 600 GPH ROWPU, field optometry set, and field dental light-tray-stool unit. Type classify snow blend camouflage screen and fuel identification kit.

3. FY 1978 Planned Program: Procure and test ED models of ammunition restraint; container control; helicopter refueling; camouflage and decoys, shelters; 250,000 BTUH heater, 1,500 and 3,000 GPH ROWPUs, MUST water recycler and blood screening device. Complete ED of cold injury rapid rewarmer and treatment device, MUST Sanitation Complex, field optometry set, field dental chair, and small inflatable boat. Type classify 600 GPH ROWPU, bridge erection boat, modular cabinetry for field dental sets. Increase over FY 1977 due to procuring and testing of prototypes of ammunition restraint system and container identification and control system; applying camouflage to Air Defense unit; procurement of water treating components for engineer design test (EDT) model 3,000 GPH ROWPU; increased funding for development and testing of 250,000 BTUH heater; and procurement of EDT equipment for multipoint helicopter refueling system.

4. FY 1979 Planned Program: Initiate ED of bridging components selected by US/Britain/Germany committee; expandable flatrack, cargo container insert; infrared attenuators; field medical diagnostic system; sterile water production unit; and total environmental control system. Continue development and testing of restraint system; multi-point helicopter refueling; unit camouflage and decoys; 60,000 BTUH heater; 1,500 and 3,000 GPH ROWPU; and tactical rigid-wall shelters. Complete ED of High Effiency Particulate Air Filter, Laminar Flow Hood. Type classify 250,000 BTUH heater, field dental chair, and field operating unit. Increase over FY 1978 due mainly to new starts in ED.

5. Program to Completion: This is a continuing program.

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FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.18.A Title Physical Security

Category Engineering Development Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 446 | 250 | 774 | 1109 | 2066 | Continuing | Not Applicable |
| | Quantities | | | | | | | * |
| DL82 | Physical Security | 446 | 250 | 774 | 1109 | 2066 | Continuing | Not Applicable |

Procurement: *Infeasible to list due to diversity and quantity of items.

BRIEF DESCRIPTION OF ELEMENT: Objective is to conduct Engineering Development (ED) of a family of physical security sensors and ancillary equipment that will operate worldwide, enabling commanders to tailor physical security systems to protect assets, installations, bases, facilities, and personnel.

BASIS FOR FY 1978 RDTE REQUEST: Accomplish in-house testing and evaluation of Developmental and Operational Test Facility Intrusion Detection System (FIDS) components including sensors; sensor stimuli devices (which will provide the capability to self test a sensor); control, communication, and display subsystem (CC&DS); and other FIDS components that may be available. Modifications will be made as required.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: Funds will be used to carry out an expanded in-house test and evaluation program of models of FIDS Passive Infrared Motion Sensor (PIMS) and CC&DS procured late in June 1976.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 17 | 0 | 17 |
| (2) Contractor Employees | 4 | 0 | 4 |
| Total | 21 | 0 | 21 |

Budget Activity #4 - Tactical Programs

Program Element #6.47.18.A Title Physical Security

DETAILED BACKGROUND AND DESCRIPTION: Objective is to conduct all design, development, test, and evaluation required to field complete, integrated physical security systems to protect materiel, bases, facilities, installations, and personnel against theft, sabotage, and espionage. Developments will be directed towards satisfying the Army's Materiel Need (MN) for a Facility Intrusion Detection System (FIDS) and will fulfill the internal physical security requirements of all Department of Defense (DOD) elements. Approach is to develop, under a number of tasks, (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, readout, and monitoring components; (4) physical or psychological deterrent devices that will respond automatically to an alarm; (5) devices to protect cargo in depots or in transit by truck, rail, or ship; and (6) standardized weapons and key containers.

RELATED ACTIVITIES: This program follows from Advanced Development Program Element 6.37.05.A, Physical Security. Related are the Army's type classified Joint-Services Interior Intrusion Detection System (J-SIIDS), 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 and BISS is being accomplished to assure utilization of related technologies and developments and to prevent duplication of effort. Coordination is accomplished by membership on joint working groups and by attendance at pertinent meetings. The DOD Physical Security Action Group monitors and coordinates the development and acquisition of physical security equipment by all Services. The Department of Army Physical Security Review Board (DAPSRB) directly monitors the development, acquisition, and installation of physical security systems.

WORK PERFORMED BY: The US Army Mobility Equipment Research and Development Command (MERADCOM), Fort Belvoir, Virginia is assigned responsibility for the Army's Physical Security RDTE. Other Government agencies involved are the US Army Test and Evaluation Command, Aberdeen, Maryland, and the US Army Natick Research and Development Command (NARADCOM), Natick, Massachusetts for development of locks and secure containers. Major contractors are LaBarge Electronics Division, Tulsa, Oklahoma; GTE Sylvania, Mountainview, California; and Aerospace Research, Inc., Boston, Massachusetts.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: Full scale development of the Facility Intrusion Detection System (FIDS) was authorized at a Concept Feasibility IPR conducted during June 1974. Contracts for Engineering Development (ED) Models of FIDS sensors and Control, Communication and Display Subsystem (CC&DS) were awarded during July 1974. FIDS components were received in December 1975 and an in-house evaluation was conducted. Contracts were awarded in June 1976 for Development Test II/Operational Test II (DT/OT II) test models of the Passive Infrared Motion Sensor (PIMS) and CC&DS. Development of the Joint Services Interior Intrusion Detection System (J-SIIDS) was initiated in December 1971 under the auspices of the Defense Special Projects Group (DSPG). In April 1972 responsibility was transferred from DSPG to Department of the Army (DA). J-SIIDS components were type classified standard in May 1973 for use in arms rooms. Production contracts were awarded in June 1973. DT III was conducted in 1974. A Special In-Process Review (IPR) was conducted in June 1975 at which the J-SIIDS components were determined suitable for issue provided certain retrofit actions were accomplished. Installation of the J-SIIDS was initiated in August 1976 and is continuing at the present time. Engineering Development (ED) of J-SIIDS add-on components designed to provide additional capabilities and more

application flexibility was initiated in June 1973. A Development Validation (DEVA) In-Process Review (IPR) was conducted in July 1975 at which it was determined that the Commercial Alarm Monitor Interface be type classified standard and the other add-on components be modified and retested. This retest, in FY 1976, also included the already type classified Joint-Service Interior Intrusion Detection System (J-SIIDS) components to determine applicability of the J-SIIDS to areas other than arms rooms. A Special In-Process Review was conducted in July 1976 to type classify (TC) the add-on components and to certify the J-SIIDS for use in areas other than arms rooms. Recommendations to TC the add-ons and to certify J-SIIDS for use in other areas are currently at Department of the Army (DA) for final action.

2. FY 1977 Program: A Developmental Test II (DT II) of certain add-on components (Data Transmission System Type II, Large Area Motion Sensor, Data Transmission System Type I Multiplex and the J-SIIDS Reconfigured for use in hazardous locations) is planned for FY 1977. Technical surveillance will continue for contracts awarded in June 1976 for test models of the Facility Intrusion Detection System (FIDS), Passive Infrared Sensor (PIMS), and Control, Communication and Display Subsystem (CC&DS). Evaluation of models of the FIDS Ultrasonic Motion (UMS), Passive Ultrasonic (PUS), Vibration (VS), and Capacitance Proximity (CPS) Sensors will continue. The effort will concentrate on integrating them with the sensor stimuli and CC&DS. Receipt of the initial FIDS DT II/OT II models and initiation of in-house test and evaluation will be accomplished.

3. FY 1978 Planned Program: The increase in funding is due to the expanded in-house testing and evaluation of the DT II/OT II models of FIDS PIMS and CC&DS delivered in 4th Quarter FY 1977. An in-house operational evaluation of FIDS will emphasize optimizing interfacing between FIDS and J-SIIDS and exterior sensors. Test and Evaluation Command (TECOM) will participate in all tests.

4. FY 1979 Planned Program: Engineering Design testing of the FIDS PIMS and CC&DS will be completed. Contracts will be awarded for DT II/OT II models of the FIDS UMS, PUS, VS, and CPS which could not be procured in FY 1976 due to inadequate funding. These contracts account for the increase of funds over the FY 1978 level and are essential to remaining on the revised schedule. Advanced Development of FIDS will be funded under PE 6.37.05.A, Physical Security, and Engineering Development of FIDS Advanced Concepts will be followed up. Work on response devices will be carried out.

5. Program to Completion: Production quantities of FIDS components Type Classified during FY 1981 will be procured and fielded. Engineering Development of Advanced Development items developed under PE 6.37.05.A, Physical Security, will continue, providing a FIDS with the full range of capabilities delineated in the FIDS Materiel Need. Engineering Development of exterior sensors will be conducted as required and will be interfaced with the FIDS CC&DS providing the Services with completely integrated interior/exterior physical security systems.

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FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.23.A Title Special Purpose Detectors

Category Engineering Development Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 4733 | 884 | 1296 | 1656 | 5500 | Continuing | Not Applicable |
| | Quantities | | | | | | | |
| | AN/GVS-5 Handheld Laser Rangefinder | | | | | | | 20 |
| | AN/AAS-32 Airborne Laser Tracker | | | | | | | 10 |
| | AN/PAQ-1 Laser Target Designator | | | | | | | 12 |
| DL71 | Low Energy Laser Devices | 1503 | 184 | 750 | 0 | 1000 | Continuing | Not Applicable |
| DL72 | Radars | 233 | 0 | 0 | 0 | 0 | Continuing | Not Applicable |
| DL75 | Optical Systems | 0 | 0 | 0 | 0 | 3500 | Continuing | Not Applicable |
| DL79 | Information-Identification-Positioning Devices | 2737 | 600 | 246 | 1656 | 1000 | Continuing | Not Applicable |
| DL84 | Laser Target Designator | 260 | 100 | 300 | 0 | 0 | 0 | 3979 |
| Procurement: | | | | | | | | |
| | AN/GVS-5 Funds | 0 | 0 | 11000 | 0 | 5300 | Continuing | Not Applicable |
| | Quantities | 0 | 0 | 1500 | 0 | 1275 | | |
| | AN/PAQ-1 Funds | 0 | 0 | 3600 | 16800 | 9400 | Continuing | Not Applicable |
| | Quantities | 0 | 0 | 40 | 535 | 290 | Continuing | Not Applicable |
| | AN/USQ-49 Funds | 0 | 0 | 23683 | 0 | 1247 | Continuing | Not Applicable 1/ |

1/ Procurement end item is the radar transmission system. In FY 1977 the Army will buy 9 Airborne sets and 6 ground stations with associated special test equipment and modification kits. In FY 1979 the funds will procure the bill of material to make provisions for the OV-1D Mohawk Fleet to accept the system.

BRIEF DESCRIPTION OF ELEMENT: This program element is to conduct engineering development of surveillance and target acquisition devices to provide the Army with an improved capability to locate and engage targets using both conventional and terminal homing munitions during all conditions of weather and visibility. This program element previously contained DL70, Night Vision Devices, which is now managed under program element 6.47.10.A, Night Vision. Project DL84, Laser Target Designator, was separated from Project DL71, Low Energy Laser Devices, during FY 1977.

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Budget Activity #4 - Tactical Programs

Program Element #6.47.23.A Title Special Purpose Detectors

BASIS FOR 1978 RDTE REQUEST: The requested funds will permit initiation of engineering development of the Mobile Army Ground Imagery Interpretation Center (MAGIIC); initiation of a program to provide the Tactical Imagery Processing Laboratory (TIPL); and completion of preparation for testing of the Army In-Flight Data Transmission System (AIDATS) AN/USQ-49.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: Two new developments as specified above and increase in effort on AN/USQ-49 Army In-Flight Data Transmission System in order to complete preparation for testing.

PERSONNEL IMPACT

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement) is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ Employees | 29 | 0 | 29 |
| (2) Contractor Employees | 18 | 91 | 109 |
| TOTAL | 47 | 91 | 138 |

DETAILED BACKGROUND AND DESCRIPTION: This program element is to conduct Engineering Development of surveillance and target acquisition devices. Specific tasks in FY 78 include the Army In-Flight Data Transmission System, Mobile Army Ground Imagery Interpretation Center, and the Tactical Imagery Processing Laboratory.

RELATED ACTIVITIES: The US Navy and US Air Force utilize the same general technologies. Services and Department of Defense programs are closely coordinated through joint meetings and conferences, and multi-service use of the same devices and facilities is common. This program element is on follow-on to 6.37.19.A, Special Purpose Detectors.

WORK PERFORMED BY: In-house work is performed by the US Army Electronics Research and Development Command, Fort Monmouth, NJ and by US Army Missile Research and Development Command, Huntsville, AL. Contractors include: Texas Instruments, Dallas, TX; EOS-XEROX, Pasadena, CA; RCA, Camden, NJ; Honeywell, Boston, MA; Hughes Aircraft Corporation, Culver City, CA; General Dynamics Corp, San Diego, CA; Northrup Corp, Palos Verdes, CA.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: Developed and fielded AN/PPS-5 Ground Surveillance Radar. Developed models of Very Short Range Surveillance Radar AN/PPS-15. Completed testing of the AN/PPS-15, and secured type classification as standard. Completed fabrication of engineering development models of the Handheld Laser Rangefinder, AN/GVS-5; the Laser Target Designator, AN/PAQ-1; and the Airborne Laser Tracker, AN/AAS-32; initiated Development Test/Operational Test II of these devices.

Budget Activity #4 - Tactical Programs

Program Element #6.47.23.A Title Special Purpose Detectors

2. FY 1977 Program: Development Test/Operational Test (DT/OT) II testing of the AN/GVS-5 and the AN/PAQ-1 will be completed and both items will be type classified thus completing the ED program. DT II testing of the AN/AAS-32 will be completed and OT II testing of the tracker installed in the COBRA-TOW will be initiated and completed by the end of the fiscal year.

3. FY 1978 Planned Program: Initiate engineering development of the Mobile Army Ground Imagery Interpretation Center (MAGIIC); and Tactical Imagery Processing Laboratory (TIPL). Complete preparation for DT/OT III of AN/USQ-49. The increase in FY 1978 is due to the initiation of two new developments and increase in effort on the AN/USQ-49.

4. FY 1979 Planned Program: Continue engineering development of MAGIIC and TIPL; initiate DT/OT III of AN/USQ-49; initiate engineering development of Artillery Launched Television Target Location System, continue engineering and test support for the AN/AAS-32. The increase in FY 1979 funding over FY 1978 is due to initiation of engineering development on the Artillery Launched Television Target Location System.

5. Program to Completion: This is a continuing program.

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.23.A Title Special Purpose Detectors

Project #DL75 Title Optical

Category Engineering Development Budget Activity #4 - Tactical Programs

DETAILED BACKGROUND AND DESCRIPTION: This project was initiated to provide for engineering development of optical and optical augmentation systems for locating and engaging hostile targets. FY 1979 funding is for the Artillery Launched Television Target Location System. This system will provide fast response, real time target identification, location, and battle damage assessment of preselected areas using an artillery launched, parachute deployed television (TV) camera, power supply and data link. These items will replace the Illuminating Canister in the standard artillery Illuminating Projectile. During the parachute descent, TV pictures will be transmitted to a ground station consisting of a TV monitor and videotape recorder.

RELATED ACTIVITIES: Feasibility work prior to FY 1977 was conducted under Program Element/Project 6.26.17.A/AH79 Small Caliber and Fire Control Technology. FY 1977 work was conducted under Program Element/Project 6.37.19.A/DK75 Special Purpose Detectors/ Optical. This project is also closely associated with Program Element 6.27.03.A, Combat Surveillance, Target Acquisition and Identification.

WORK PERFORMED BY: In-house work is performed by the US Army Armaments Research and Development Command, Dover, NJ. Contractual effort is performed by Fairchild Camera and Instrumental Division, Syosset, NY.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: Preliminary feasibility tests were conducted during FY 1974 using a prototype camera utilizing charge-coupled device (CCD) technology. The prototype camera was parachute dropped several times from a helicopter. The system demonstrated its ability to provide usable target identification and location information. FY 1975 effort concentrated on design and development of the data link, battery, antenna, and improved CCD technology applied to the camera. Components were tested under a high gravitational environment to demonstrate the system could withstand the high forces of weapon firing. During FY 1976 and FY 197T, the complete projectile was tested under a high gravitational environment. Work continued on CCD technology. Three rounds were successfully fired from a 155mm Howitzer at Yuma Proving Ground, AZ, in July 1976 which demonstrated that good video data could be obtained under actual weapon firing conditions.

2. FY 1977 Program: Closed system testing will be conducted at Fort Sill, OK, using typical tactical crews to fire six rounds. The information obtained will be used to identify and verify operational employment concepts and optimum system performance requirements. Work will continue on CCD technology and the data link, to include militarization of existing TV monitors and videotape recorders.

Budget Activity #4 - Tactical Programs

Program Element #6.47.23.A Title Special Purpose Detectors

Project #DL75 Title Optical

3. FY 1978 Planned Program: No effort is anticipated during FY 1978.

4. FY 1979 Planned Program: The increase is due to initiation of engineering development of the Artillery Launched Television Target Location System. Complete definition and initiate militarization of ground station; initiate reliability, producibility, and human engineering programs; continue efforts on camera and data link.

5. Program to Completion: This is a continuing program. Further efforts will concentrate on Development/Operational testing, and performing necessary modifications to insure adequacy of system by fielding.

RESOURCES: ($ in Thousands)

| | | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| RDTE: | Funds | 0 | 0 | 0 | 0 | 3500 | Continuing | Not Applicable |
| | Quantities | | | | | | | 9 |

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FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.24.A

Title Biological Defense Materiel

Category Engineering Development

Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 3954 | 810 | 3011 | 3761 | 1696 | Continuing | Not Applicable |
| DF45 | Biological Detection and Warning System | 3954 | 810 | 3011 | 3761 | 1696 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: This element provides for the engineering development (ED) of protective materials and equipment to warn of the presence of and to protect against a biological agent.

BASIS FOR FY 1978 REQUEST: FY 1978 will provide the research, development, test and evaluation (RDTE) effort which will result in the Prototype System configuration of the subject system. Principal activities will be design, fabrication and test of the XM19 Biological Agent Alarm and XM2 Sampler.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: Increased costs are due to requirement to fabricate necessary prototype test items and the conduct of Engineering Design Tests, both contractor and Government, and the preparation of the draft Technical Data Package.

PERSONNEL IMPACT:

The average number of employees support with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 26 | 0 | 26 |
| (2) Contractor Employees | 23 | 0 | 23 |
| Total | 49 | 0 | 49 |

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Budget Activity #4 - Tactical Programs

Program Element #6.47.24.A Title Biological Defense Materiel

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 for use as applicable to division and brigade organizations. The XM19 Alarm automatically detects biological agent aerosols by the chemiluminescent reaction. The XM2 Sampler collects samples of the aerosols for subsequent identification by designated medical laboratories.

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 Program Element 6.47.25.A, Chemical Defense Materiel, and not duplicated here. The Army is responsible for its own chemical defense items and for those that meet joint requirements of the Army and other Services. Work is coordinated 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 and the Technical Cooperation Program organization and with NATO.

WORK PERFORMED BY: In-house efforts at the US Army Armament Research & Development Command, Edgewood, MD. Contracts with Bendix Corporation, Baltimore, MD; Geomet Corporation; Southern Research Institute; Environmental Research Institute; Midwest Research Institute; and Stanford Research Institute.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: This program was initiated in April 1975. The principal development effort was a multi-year contract effort which continues throughout the program. The efforts during this reporting period were principally in-house activities pending award of the prime development contract, coupled with engineering study contracts to examine the current configuration of both the XM2 Sampler and the XM19 alarm so as to provide a firm basis upon which to initiate the larger developmental effort scheduled to being in 3QFY76. From these contractual efforts, a new alternate design concept for the reaction cell has evolved. This latest design employs a cell in which the chemiluminescence reaction is monitored while the reagents are in a static state. Other reaction cell designs monitor the chemiluminescence while the reagents are in a dynamic flow state. The prototype devices have been found to perform well, while also offering the promise of significant reductions in the quantities of liquid reagents consumed. Improved designs of the XM2 have also evolved under this effort. During this period, the collaborative field trials were conducted. During 2QFY76, background measurements are performed with the same test items in Germany at selected US military training areas. The data obtained were evaluated to improve the XM19 alarm logic design, to improve the performance evaluation of the current XM19 and XM2 designs and to evaluate the present performance of the alternate designs of both items which appear to offer further performance improvements. The prime contract for engineering development of both the XM19 and the XM2 neared completion of negotiations.

2. FY 1977 Program: The prime Engineering Development (ED) contract will be initiated, with the bulk of the conceptual design effort completed. The results obtained from a series of other small contracts will be available to apply to the principal contract effort.

Budget Activity #4 - Tactical Programs

Program Element #6.47.24.A Title Biological Defense Materiel

3. FY 1978 Planned Program: Efforts will focus on conducting those activities which will culminate in a Prototype System. Necessary prototype tests items will be fabricated and the Engineering Design Tests, both contractor and government, will be conducted. The draft Technical Data Package (TDP) will also be prepared. Increased costs are due to requirement to fabricate necessary prototoptype test items and the Conduct of Engineering Design Tests.

4. FY 1979 Planned Program: Prototype Qualification Testing (PQT) will be completed. Test items for Developmental Test II/ Operational Test II will be fabricated. Anticipated research, development, test and evaluation (RDTE) cost in FY 1979 will be lower than FY 1978 due to reduced effort on TDP and because long lead items for the PQT items will have been procured in FY 1978.

5. Program to Completion: Type classification of the Biological Detection and Warning System is scheduled for 1QFY81.

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.25.A

Title Chemical Defense Materiel

Category Engineering Development

Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 2177 | 350 | 5037 | 4789 | 6313 | Continuing | Not Applicable |
| | Quantities | | | | | | | Not Applicable |
| D018 | Collective Protection Vehicles and Vans | 507 | 45 | 0 | 0 | 0 | Continuing | Not Applicable |
| D019 | Individual Chemical Protection | 0 | 0 | 3717 | 4331 | 4113 | Continuing | Not Applicable |
| D020 | Chemical Detection & Warning System | 0 | 0 | 0 | 0 | 2200 | Continuing | Not Applicable |
| D022 | Chemical Detection & Sampling Development | 1670 | 305 | 930 | 97 | 0 | Continuing | Not Applicable |
| D138 | Training Systems for Chemical Defense | 0 | 0 | 390 | 361 | 0 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: Engineering Development (ED) of a variety of defensive items including detection and warning systems, individual protective materiel, collective protection materiel and decontamination of individuals, vehicles, and equipment.

BASIS FOR FY 1978 RDTE REQUEST: ED will continue on the new Protective Mask. A new chemical warfare training system is scheduled for Type Classification in FY 1978.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: The small decrease in this Program Element is because the XM256 Chemical Agent Detector will be type classified in FY 1977.

Budget Activity #4 - Tactical Programs

Program Element #6.47.25.A Title Chemical Defense Materiel

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 92 | 0 | 92 |
| (2) Contractor Employees | 68 | 0 | 68 |
| Total | 160 | 0 | 160 |

DETAILED BACKGROUND AND DESCRIPTION: The objective of this element is to develop rapid detection and warning systems, and protective materials and equipment to warn of the presence of and to protect against chemical attack. This element covers engineering development (ED) and type classification of defensive systems and equipment to protect individuals from chemical agents by providing: protection for the respiratory system and all body surfaces; manual and automatic detection and warning devices that respond to toxic agents on all surfaces, in the atmosphere, and in food and water; and means to decontaminate skin, clothing, equipment, terrain, food and water. Collective protection shelters for cetain headquarters and communications functions, for rest and relief and for certain vehicle crews are required to relieve the stresses and restrictions inherent in individual protective equipment.

RELATED ACTIVITIES: Protective clothing is developed under Program Element 6.47.13.A, Combat Food, Clothing, and Equipment, and the effort is closely coordinated among the laboratories concerned. The Army is responsible for its own chemical defensive items and for those that meet joint requirements of the Army and other Services. Work is coordinated 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 and The Technical Cooperation Program organizations, and also with North Atlantic Treaty Organization (NATO). Related advanced development (AD) efforts are conducted in Program Element 6.37.21.A Chemical Defense Materiel Concepts.

WORK PERFORMED BY: In-house effort performed by US Army Armament Research and Development Command (ARRADCOM), Edgewood, MD and Dugway Proving Ground, UT. Contractors are Bendix Corp, Baltimore, MD; D. H. Litter, New York, NY; Calspen Corporation, Buffalo, NY.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: A series of chemical field protective masks, as well as protective masks for air crews and tank crews, have been developed and adopted as standard. A lightweight mask, specifically designed to protect

against riot control agents used in Vietnam, has been developed and fielded. Detector kits to determine contamination on surfaces, and in air, food, and water are available. An automatic point sampling chemical agent alarm for field use has been adopted as standard. A chemical agent identification and training set has been adopted as standard. A collective protection system for the M577 command post vehicle and the expansible van truck (M292) was adopted as a standard item. The chemical-biological pressurized pod shelter system (M51) was type classified standard providing collective protection for personnel. The design of the collective protective equipment (CPE) was upgraded to improve producibility, maintainability, reliability, cost reduction and further modularization. The M56 Gas-Particulate Filter and M10 Protective Entrance were type classified in March 1976. Engineering design testing of the XM256 chemical agent detector kit was completed in FY 1976. Engineering design testing of XM9 Chemical Agent Detector Paper was initiated.

2. FY 1977 Program: Engineering Development (ED) of the selected optimum design of the New Protective Mask will be initiated. Product Qualification of the XM9 Chemical Agent Detector Paper will be conducted and phase II of the Operational and Development Tests will be initiated. The XM256 Chemical Agent Detector Kit development tests will be completed and the item type classified. Work will be initiated on application of Modular Collective Protection Equipment (MCPE) to Improved HAWK if Product Improvement Program is funded and will continue on PATRIOT applications.

3. FY 1978 Planned Program: Test items for the Engineering Design test of the new protective mask will be made. The Prototype Systems Technical Review will be held. Research and Development Acceptance Test (RDAT) and Research and Development Acceptance Review (RDAR) will be made. Work on applications of MCPE to Improved HAWK and PATRIOT will continue. The XM9 Chemical Agent Detector Paper will be type classified. Decrease in funding for FY 1978 is because the XM256 Detector Kit was typed classified in FY 1977.

4. FY 1979 Planned Program: The New Protective Mask will be type classified. Work on the application of MCPE to Improved HAWK and PATRIOT will continue. ED of the Passive Remote Detector will be initiated since all necessary experimental work has been performed and the proposed system is ready for full scale development.

5. Program to Completion: This is a continuing program.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.25.A Title Chemical Defense Materiel

Project #D019 Title Individual Chemical Protection

Category Engineering Development Budget Activity #4 - Tactical Programs

DETAILED BACKGROUND AND DESCRIPTION: The objective is to conduct the engineering development (ED) of the optimum configuration of the New Protective Mask and to type classify the item. The New Protective Mask consists of a transparent facepiece of advanced design and a canister type filter system with component options which provide the means for meeting the respiratory protection requirements of the US Army infantry soldier, aviator, tank crewman and special purpose missions. The mask will offer improved level and duration of protection, ease of filter replacement, and reduced burden to the field soldier physiologically, phychologically and operationally.

RELATED ACTIVITIES: Conversion of the Army approved Required Operational Capability to a Joint Service Operational Requirement is anticipated soon. Discussion at the technical level with Canadian Government have resulted in the preparation of a draft Memorandum of Understanding between the United States and Canada for cooperative Research and Development (RD) of the New Protective Mask. This mask is an advanced development (AD) in Program Element 6.37.21.A.

WORK PERFORMED BY: In-house effort by US Army Armament Research and Development Command (ARRADCOM), Edgewood, MD. Contractors are yet to be determined.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: New mask entered AD on 1 July 1974. The program was accelerated by fifteen months. A design concept was finalized and transparent rubber materials were developed. Models were subjected to tests in the Arctic and Tropic environments. Fitting trials with women were performed.

2. FY 1977 Program: ED will be initiated in 3QFY77 based on the optimum design selected in the AD phase of the New Protective Mask program. An engineering contract will be awarded. The first six months of the contractual effort will provide a design study review of the mask design. Formulation of the final Technical Data Package will be initiated with inputs from all participating agencies. Extensive in-house testing will continue to validate component design.

3. FY 1978 Planned Program: Test items for the Engineering Design test will be fabricated. The Prototype Systems Technical Review will be held. The New Equipment Training Plan will be formulated. Draft Technical Manuals will be written. Test

Budget Activity #4 - Tactical Programs

Program Element #6.47.25.A Title Chemical Defense Materiel

Project #D019 Title Individual Chemical Protection

and inspection equipment will be evaluated. The Research and Development Acceptance Test and Research and Development Acceptance Review will be made. Test items for Development Test II (DT II) and Operational Test II (OT II) will be fabricated under the Engineering Development (ED) contract. Test plans for DT II and OT II will be prepared, reviewed and approved. The Department Plan will be updated. Funding requirements for FY 1977 are not as great as FY 1978 because the program did not enter Engineering Development until the 3rd Quarter of FY 1977.

4. FY 1979 Planned Program: DT II/OT II will be conducted. The Technical Data Package will be completed of a quality suitable for a competitive production contract. The item will be type classified in 4QFY79 (September 1979).

5. Program to Completion: Post type classification activities (completion of tests, report writing) will be accomplished.

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 0 | 0 | 3717 | 4331 | 4113 | 520 | 14195 |

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.26.A Title Meteorological Equipment Systems

Category Engineering Development Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 907 | 198 | 259 | 184 | 1009 | Continuing | Not Applicable |
| | Quantities | | | | | | | Not Applicable |
| D511 | Meteorological Equipment System | 907 | 198 | 259 | 184 | 1009 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: Develop equipment and systems to provide meteorological data essential to the planning and conduct of Army combat operations. This program will specifically address present deficiencies in the Army's ability to rapidly acquire atmospheric temperature, density and winds to 20 km every two hours for effective correction of artillery fire, and winds to 30 km attitude every six hours for nuclear fallout predictions.

BASIS FOR FY 1978 RDTE REQUEST: Complete preparation of the Development Test II (DT II) plan and conduct and complete DT II on the cold Fog Dissipator. Prepare for and complete the development acceptance In-Process Review (IPR) and type classify the Cold Fog Dissipator.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: Reduction is due to completion of hardware developments.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 fund (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 4 | 0 | 4 |
| (2) Contractor Employees | 0 | 0 | 0 |
| Total | 4 | 0 | 4 |

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Budget Activity #4 - Tactical Programs

Program Element #6.47.26.A Title Meteorological Equipment Systems

DETAILED BACKGROUND AND DESCRIPTION: The basic goal of this program is the development of equipment and systems to provide observations and other data of the atmosphere required for effective planning and conduct of Army combat operations. These data are of particular significance for artillery ballistic computations, sound ranging and nuclear fallout prediction. The equipment includes: the Cold Fog/Cloud Modification System which will provide a capability for dissipating supercooled fog at Army airfields, thus extending possibilities for operations otherwise grounded by fog; the Field Artillery Meteorological Acquisition System which will be lightweight and highly mobile and provide artillery with a means of gathering meteorological ballistic data in forward areas; and the Hydrogen Generator which will be capable of being deployed in the forward areas to inflate sounding balloons for gathering ballistic data.

RELATED ACTIVITIES: 6.11.02.A, Project B53A, Atmospheric Sciences, 6.21.11.A, Atmospheric Investigations and 6.37.41.A, Project D533, Meteorlogical Equipments. 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. As a result of the work of the committee, equipment is being developed to meet both Army and Air Force requirements. Coordination on Meteorological equipment development with NATO allies is accomplished through participation in Panel XII (Meteorology), NATO Army Armaments Group. Several NATO nations have expressed an interest in purchasing items of US equipment currently under development. Coordination with the National Weather Service and non-military organizations developing meteorological equipment for civilian use is accomplished through participation in the Interdepartment Committee for Applied Meteorological Research (ICAMR), and the Annual Symposium on Meteorological Observations and Instrumentation, sponsored by the American Meteorological Society.

WORK PERFORMED BY: This program is the responsibility of the US Army Atmospheric Science Laboratory, White Sands Missile Range, NM, with 100% of the work performed by the US Army Electronics Research and Development Command, Ft Monmouth, NJ. A contractual effort by successful bidder on the Hydrogen Generator is anticipated during FY 79.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishments: Meteorological Balloon, ML-537; Balloon Inflation and Launching Device, ML-595; and the Meter Volume, Hydrogen-Helium were developed, type classified, and procured for field use. The meteorological Measuring Set, AN/TMQ-22 was developed and type classified as standard equipment. Service testing of the Mobile Weather Radar was completed and a Development Acceptance In-Process Review Package was prepared. Meteorological Balloon, ML-635, was developed for use in Southeast Asia for low altitude soundings of the atmosphere. Cost savings in worldwide use under conditions existing in 1971 are estimated at $800,000 per year. Components of the Meteorological Data Sounding System AN/UMQ-7 to replace the Rawinsonde System, AN/GMD-1 (used since World War II), for upper air soundings to support artillery were developed and development test II was initiated in FY 75. In FY 1976 a special In-Process Review (IPR) was conducted in which the Field Artillery requested that the development of AN/UMQ-7 be terminated due to a change in artillery doctrine. This change in doctrine requires Artillery support closer in the forward area than the AN/UMQ-7 was capable of providing. The Field Artillery further requested that the development of Field Artillery Metrorological Acquisition System (FAMAS) to meet this new doctrine, be expedited as much as possible. The engineering development phase was initiated in FY 76 on the AN/TMQ-27 Cold Fog Dissipator to provide a means of clearing supercooled fog to locally improve visibility which will permit air and ground operations.

Budget Activity #4 - Tactical Programs

Program Element #6.47.26.A Title Meteorological Equipment Systems

2. FY 1977 Program: Continue the engineering development phase on the AN/TMQ-27 Cold Fog Dissipator. Preparation of the development plan will be completed. The validation In-Process Review (IPR) package will be completed and the IPR conducted. User and design test will be conducted in conjunction with US Army Cold Regions Research and Engineering Laboratory. Engineering Development Models of the AN/TMQ-27 will be fabricated, drawings package and draft technical manuals will be prepared. Preparation of Development Test II test plans will be initiated by Test and Evaluation Command.

3. FY 1978 Planned Program: AN/TMQ-27, the Development Test II test plan will be completed and Development Test/Operational Test II will be conducted. Development Validation IPR and type classification action will be completed. Decrease in funds is due to competion of hardware fabrication.

4. FY 1979 Planned Program: Initiate production and initial operational capability (IOC) on the AN/TMQ-27. Funding will be increased to permit the initiation of the engineering development phase on the hydrogen generator to provide a means of inflating ballistic sounding balloons in support of the development of the Field Artillery Meteorological Acquisistion System (FAMAS).

5. Program to Completion: Continue development of the Field Artillery Meteorological Acquisition System.

6. Major Milestones:

| | Date | Estimated RDTE Cost to Reach Events (Cumulative) |
|---|---|---|
| a. Complete Engineering Development AN/TMQ-27 | 4Q FY 77 | 2500 |
| b. Conduct DT/OT II, AN/TMQ-27 | 2Q FY 78 | 2700 |
| c. Initiate Production/IOC, AN/TMQ-27 | 1Q FY 79 | 3100 |
| d. Initiate Engineering Development-Hydrogen Generator | 1Q FY 79 | 500 |

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 907 | 195 | 268 | 190 | 1009 | Continuing | Not Applicable |
| Quantities | | | | 1 | | | |

Procurement: AN/TMQ-27 Cold Fog Disspator

| | |
|---|---|
| Funds | 75 (est) |
| Quantities | 50 |

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.27.A

Title Command and Control

Category Engineering Development

Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 2634 | 1930 | 6497 | 8608 | 6772 | Continuing | Not Applicable |
| | Quantities | | | | | | | PLRS-1 1/ |
| | | | | | | | | BLC-10 |
| DC98 | Position Location Reporting System | 674 | 1430 | 2288 | 6569 | 5241 | Continuing | Not Applicable |
| DC99 | Long Range Navigation MANPACK | 360 | 0 | 0 | 0 | 0 | Continuing | Not Applicable |
| D284 | Battery Level Computer | 1600 | 500 | 4209 | 2039 | 1531 | 1042 | 10988 |
| Procurement: | | | | | | | | |
| | Funds LORAN M/P AN/PSN-6 | 5500 | 0 | 0 | 0 | 0 | 0 | 5500 |
| | Quantities | 118 | 0 | 0 | 0 | 0 | 0 | 118 |
| | Funds BATT LVL CMPTR | 0 | 0 | 0 | 0 | 9900 | 93800 | 103700 |
| | Quantities | 0 | 0 | 0 | 0 | 62 | 750 | 812 |

1/ The system consists of 64 user units and 2 master units.

BRIEF DESCRIPTION OF ELEMENT: Position Location Reporting System (PLRS) is a Time Division Multiple Access System consisting of a master unit and many (hundreds) of user units containing receiver/transmitters capable of providing position location. User units can report back to the master unit range data on other user units. The system also provides for transmission and reception of Digital Data/Messages between the master unit and user units. The Battery Level Computer (BLC) will replace the obsolescent Field Artillery Digital Automatic Computer (FADAC) and the TACFIRE Battery Display Unit and provide an enhanced technical fire control capability for field artillery batteries.

BASIS FOR FY 1978 RDTE REQUEST: Continuation of the tests and analysis of the PLRS Master Unit (Master Unit provides centralized system control and network management) and the user units (User Unit performs all transceiver, reporter, and relay functions necessary for all ranging and communications operations with the Master Unit). Battery Level Computer (BLC): Continuation of Engineering Development, including completion of prototypes and initial contractor and Government testing.

Budget Activity #4 - Tactical Programs

Program Element #6.47.27.A Title Command and Control

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: The increase in funds for Position Location Reporting System (PLRS) is in accordance with the increase in contractual commitments to meet approved schedules. The primary engineering development efforts for the Battery Level Computer (BLC) will be completed in FY 1977 permitting a decrease in project funding.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 8 | 0 | 8 |
| (2) Contractor Employees | 278 | 0 | 278 |
| Total | 286 | 0 | 286 |

DETAILED BACKGROUND AND DESCRIPTION: The objective of PLRS is to utilize available technology to significantly improve the Positioning/Navigation methodology of Army forces. The present approach consists of a Joint US Marine Corps/US Army program where the technical and operational feasibility of the PLRS was demonstrated and the Joint Service Operational Requirement was formalized. The PLRS consists of a Master Unit (MU) which provides central network management and automatic processing of position, navigation, identification and special digital data message capabilities to all cooperating User Units (UU). The BLC program was initiated in FY 1976 to provide an improved technical fire control computational capability for field artillery firing batteries. The BLC will improve mission effectiveness in the target area, increase battlefield survivability, and provide for independent or autonomous battery operations. It will perform ballistic computations for individual weapons, storage and application of non-standard ballistic data, moving target prediction, and provide for interface with TACFIRE and two-way digital data communications with the TACFIRE Digital Message Device used by forward observers. The BLC will be employed in all field artillery batteries including reserve components. It will replace the obsolescent Field Artillery Digital Automatic Computer (FADAC) and the TACFIRE Battery Display Unit in cannon batteries and, in rocket and missile batteries, replace the FADAC and TACFIRE Variable Format Message Entry Device. The system will consist of a computer unit located at battery headquarters and a gun display unit for each battery weapon.

RELATED ACTIVITIES: The US Marine Corps is funding approximately 40% of the PLRS system under Program Element No. 6.47.65M. The BLC has application in the TACFIRE program (P.E. 2.37.26.A) in that it is planned to replace the TACFIRE Battery Display Unit (BDU) with the BLC. The Program Manager's Office, Army Tactical Data Systems, insures there is no duplication of effort through liaison contacts with the other services.

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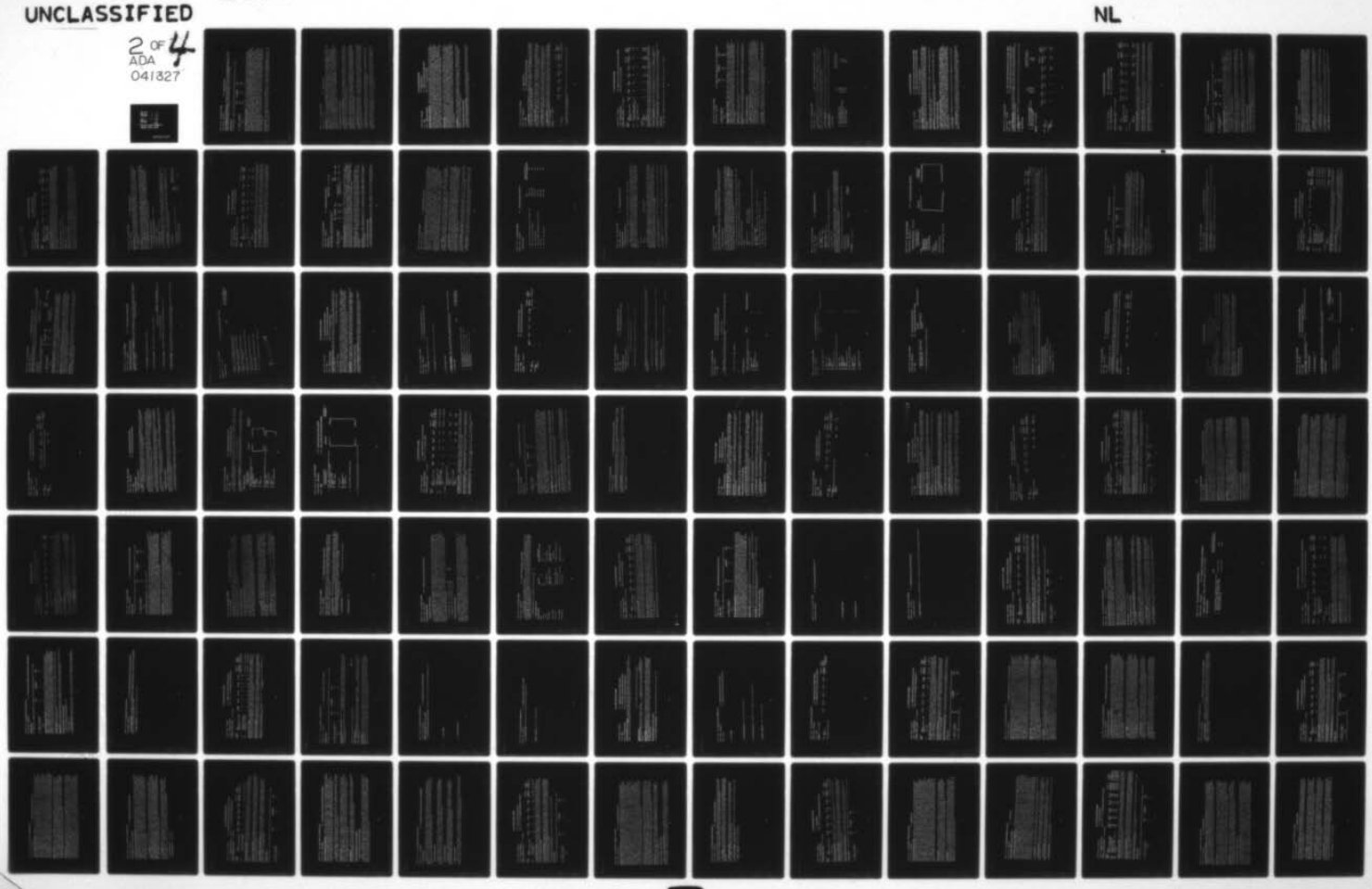

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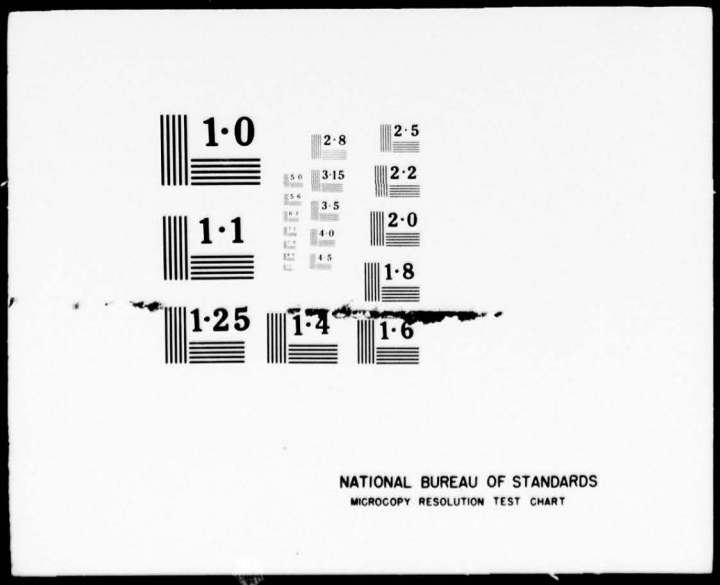

Budget Activity #4 - Tactical Programs

Program Element #6.47.27.A Title Command and Control

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: The increase in funds for Position Location Reporting System (PLRS) is in accord with the increase in contractual commitments to meet approved schedules. The primary engineering development efforts for the Battery Level Computer (BLC) will be completed in FY 1977 permitting a decrease in project funding.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 8 | 0 | 8 |
| (2) Contractor Employees | 278 | 0 | 278 |
| Total | 286 | 0 | 286 |

DETAILED BACKGROUND AND DESCRIPTION: The objective of PLRS is to utilize available technology to significantly improve the Positioning/Navigation methodology of Army forces. The present approach consists of a Joint US Marine Corps/US Army program where the technical and operational feasibility of the PLRS was demonstrated and the Joint Service Operational Requirement was formalized. The PLRS consists of a Master Unit (MU) which provides central network management and automatic processing of position, navigation, identification and special digital data message capabilities to all cooperating User Units (UU). The BLC program was initiated in FY 1976 to provide an improved technical fire control computational capability for field artillery firing batteries. The BLC will improve mission effectiveness in the target area, increase battlefield survivability, and provide for independent or autonomous battery operations. It will perform ballistic computations for individual weapons, storage and application of non-standard ballistic data, moving target prediction, and provide for interface with TACFIRE and two-way digital data communications with the TACFIRE Digital Message Device used by forward observers. The BLC will be employed in all field artillery batteries including reserve components. It will replace the obsolescent Field Artillery Digital Automatic Computer (FADAC) and the TACFIRE Battery Display Unit in cannon batteries and, in rocket and missile batteries, replace the FADAC and TACFIRE Variable Format Message Entry Device. The system will consist of a computer unit located at battery headquarters and a gun display unit for each battery weapon.

RELATED ACTIVITIES: The US Marine Corps is funding approximately 40% of the PLRS system under Program Element No. 6.47.65M. The BLC has application in the TACFIRE program (P.E. 2.37.26.A) in that it is planned to replace the TACFIRE Battery Display Unit (BDU) with the BLC. The Program Manager's Office, Army Tactical Data Systems, insures there is no duplication of effort through liaison contacts with the other services.

Budget Activity #4 - Tactical Programs

Program Element #6.47.27.A Title Command and Control

WORK PERFORMED BY: The Army in-house developing organization responsible for the Position Location Reporting System (PLRS) is the Project Manager, Army Tactical Data Systems (PM ARTADS), US Army Electronics Research and Development Command, Fort Monmouth, New Jersey. PLRS contractors performing tasks are: Hughes Aircraft Company, Fullerton, California and Telcom Systems, Inc., Arlington, Virginia. Battery Level Computer (BLC): The Project Manager, Army Tactical Data Systems (PM ARTADS), US Army Electronics Research and Development Command, Fort Monmouth, New Jersey, is the developer of this system. Technical support is furnished by the US Army Computer Systems Command, Fort Belvoir, Virginia, US Army Armament Research and Development Command, and the US Army Electronics Research and Development Command, Fort Monmouth, New Jersey. System testing is to be performed by the US Army Test and Evaluation Command and the US Army Training and Doctrine Command (USATRADOC). USATRADOC will perform cost and operational effectiveness analyses for the system. The engineering development contractor is The Norden Division of United Technologies, Incorporated, Norwalk, Connecticut.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: All necessary experimental work was performed on the PLRS program and the full scale development contract was awarded on 16 August 1976. BLC accomplishments include approval on 2 October 1975 of the Required Operational Capability, release to industry on 20 February 1976 of the Request for Proposal, evaluation of proposals, and award on 28 September 1976 of a single contract for Engineering Development.

2. FY 1977 Program: Monitor the PLRS contract and in conjunction with the Marine Corps, the test plan will be further refined. The PLRS Contractor will begin fabrication and factory testing of the PLRS equipments. The FY 1977 PLRS program is at the minimum sustaining level with the bulk of the Army's contractual commitment being paid in FY 1978. BLC contractors will complete hardware and software design, "debug" software, fabricate prototypes, and train Government personnel for Operational Test II and the Government's Preliminary Qualification Test (PQT-G).

3. FY 1978 Planned Program: Continue to monitor the PLRS contractor, assist in performing Development Tests (DT II), and prepare data necessary for the Procurement Data Package. The increase in PLRS funds over FY 1977 is needed to meet the Army's contractual commitment. Planned BLC activities include conduct of Reliability, Availability and Maintainability testing, Preliminary Qualification Test, and Operational Test II. The majority of the development efforts will be completed in FY 1977 permitting a decrease in FY 1978 funding.

4. FY 1979 Planned Program: Continue to monitor PLRS contractual and testing efforts. The requirement for funds for PLRS in FY 1979 is less than FY 1978 because contractual costs will decrease during testing. BLC: Planned activities include conduct of the Development Validation In-Process Review and initiation of limited procurement.

5. Program to Completion: PLRS system will complete operational testing (OT II) and the Development In-Process Review (DEVA-IPR) will be completed. The system will proceed to full procurement after Type Classification. Major events in the remainder of the Battery Level Computer (BLC) program include first delivery of initial production equipment, completion of developmental and operational testing, the full production decision, and production deliveries.

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.27.A

Title Command and Control

Project #DC98

Title Position Location Reporting System (PLRS)

Category Engineering Development

Budget Activity #4 - Tactical Programs

DETAILED BACKGROUND AND DESCRIPTION: Position Location Reporting System (PLRS) - The objective of this project is to utilize available technology to significantly improve the Position/Navigation (POS/NAV) methodology of Army forces. The present approach consists of a Joint US Marine Corps and US Army (USMC/USA) program where the technical and operational feasibility of the PLRS was demonstrated prior to the Marine Corps and Army formalizing a Joint Service Operational Requirement. The PLRS consists of a Master Unit which provides central network management and automatic processing of position, navigation, identification and special digital data message capabilities to all cooperating User Units. The User Units are configured as manpack, surface vehicle and airborne units. All User Units are functionally identical to each other and they have a high degree of part commonality. The PLRS utilizes digital data, spread-spectrum transmission between cooperating User Units and the Master Units which gives good Electronic Warfare protection. A line-of-sight, airground, ground-air, and ground to ground time division, multiple access (TDMA) technique is employed. Over-the-horizon capability is achieved via either ground or airborne integral relays.

RELATED ACTIVITIES: The US Marine Corps is funding 40% of the PLRS development under Program Element No. 6.47.65.M. The 60/40 *(US Army/US Marine Corps) cost sharing ratio will be applied in the context* of total shared costs, rather than as a year-by-year funding requirement for each service. Within approved funding levels, the Marine Corps will provide funds to assist the Army to make up funding shortfalls during FY 77, and the Army will provide funds required in subsequent years to achieve the specified ratio relative to total shared cost. The NAVSTAR Global Position System PEs No. 6.34.03.A, No. 6.34.01.N, and No. 6.34.21.F is an advanced development follow-on system that will provide Army PLRS tie in to common Air Force/Navy Grid, direct access to common Grid for selected users, and positioning/navigation for vehicles operating outside and across PLRS grids. This program is monitored by the Position/Navigation Executive Committee in the office of the Secretary of Defense to avoid duplication of efforts in this area by other agencies.

WORK PERFORMED BY: The Army in-house organization responsible for the program is the Project Manager, Army Tactical Data Systems (PM ARTADS), US Army Electronics Research & Development (ERADCOM) Command, Fort Monmouth, NJ. The US Marine Corps has provided personnel to work with the Army at ERADCOM Fort Monmouth, NJ. Contractors performing tasks are: Hughes Aircraft Company, Fullerton, CA., Telcom Systems, Inc., Arlington, VA.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: All necessary experimental work was performed, the Request for Proposal for full scale development was released to the two competitors (Hughes Aircraft Company, Fullerton, CA and General Dynamics Corporation, San Diego, CA on 17 March 1976 and a contract was awarded to Hughes on 16 August 1976.

Budget Activity #4 - Tactical Programs

Program Element #6.47.27.A Title Command and Control

Project #DC98 Title Position Location Reporting System (PLRS)

2. FY 1977 Program: Monitor the PLRS Contractor. In conjunction with US Marine Corps (USMC) personnel, the Test Plan documented in the joint US Marine Corps/US Army (USMC/USA) Development Plan, will be further refined. The Contractor will begin fabrication and factory testing of the PLRS full scale development models. The FY 77 program is at the minimum sustaining level. The bulk of the Army's contractual commitment will be paid in FY 78.

3. FY 1978 Planned Program: The developer will continue to monitor the PLRS contractor, assist in performing Development Tests (DT II), and prepare data necessary for the Procurement Data Package. The PLRS Contractor will perform additional system design, computer programming and equipment design for the Service Test Model. The development contract was let in FY 7T for equipment delivery in FY 78. The increase in funds over FY 1977 is needed to meet the Army's contractual commitment.

4. FY 1979 Planned Program: Continue to monitor the contractor's final efforts and continue Development Testing (DT II) and Operational Testing (OT II). The funds needed in FY 79 are less than FY 78 because the developmental models will have been delivered and the contractor primary emphasis and costs in FY 79 are associated with contractor support during tests.

5. Program to Completion: The developer will continue to monitor the PLRS contractor, assist the Test Command in completing Development Testing (DT II), and prepare date necessary for the Procurement Data Package. The system will complete Operational Testing (DT II) and the Development In-Process Review (DEVA-IPR) will be completed. Retrofit kits for new land, sea and airborne vehicles will be developed.

RESOURCES: ($ in Thousands)

| | | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| RDTE: | Funds | 674 | 1430 | 2288 | 6569 | 5241 | Continuing | Not Applicable |
| | Quantities | | | | | | | 1 1/ |

1/ The one PLRS system is funded approximately 60% by this Project in P.E. 6.47.27 and 40% by PE 6.47.65.M, and the system consists of 64 user units and 2 master units.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element # 6.47.28.A

Title Family of Military Engineer Construction Equipment (FAMECE)

Category Engineering Development

Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 4180 | 891 | 6907 | 4880 | 2275 | 1100 | 40093 |
| | Quantities | | | | | | | 45 |
| DH08 | Family of Military Engineer Construction Equipment (FAMECE) | 4180 | 891 | 6907 | 4687 | 1875 | 1100 | 32770 |
| D500 | Universal Engineer Tractor (UET) | 0 | 0 | 0 | 193 | 400 | 0 | 7323 |
| Procurement: | | | | | | | | |
| FAMECE | Funds | 0 | 0 | 0 | 0 | 31800 | 96200 | 128000 |
| | Quantities | 0 | 0 | 0 | 0 | 480 | 1474 | 1954 |
| UET | Funds | 0 | 0 | 0 | 27200 | 22500 | 230600 | 284600 |
| | Quantities | 0 | 0 | 0 | 120 | 110 | 1000 | 1230 |

BRIEF DESCRIPTION OF ELEMENT: This program will provide increased mobility, simplicity of operation, reduced maintenance and commonality of parts by providing a sectionalized family of construction equipment. The UET will provide an increased combat engineer capability essential for the success of the armor and mechanized combat forces in the field.

BASIS FOR FY 1978 RDTE REQUEST: Development Test II and Operational Test II (DT/OT II) will be completed for FAMECE with the exception of environmental and airdrop tests. Test plans and preparation for DT/OT III for the UET will be completed.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: Program provides adequate funding to support DT/OT II of the FAMECE and begin DT/OT III of the UET. The engineering development costs begin to taper off as prototypes are completed and testing is conducted.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

Budget Activity #4 - Tactical Programs

Program Element # 6.47.28.A Title Family of Military Engineer Construction Equipment (FAMECE)

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ Employees | 23 | 0 | 23 |
| (2) Contractor Employees | 20 | 260 | 280 |
| Total | 43 | 260 | 303 |

DETAILED BACKGROUND AND DESCRIPTION: This program consists of the development of the Family of Military Engineer Construction Equipment (FAMECE) and the Universal Engineer Tractor (UET). FAMECE is airmobile and air-droppable and designed to perform construction tasks required of combat engineer units to include dozing, scraping, loading, grading, compacting, excavating, hauling and spreading. It will utilize a standard wheeled power section which, when combined with comparable wheeled construction sections, will meet combat support construction requirements. The UET is an armored, multi-purpose, tracked combat engineer earthmover capable of performing pioneer tasks such as dozing, scraping, rough grading, and off-road prime moving in support of combat operations.

RELATED ACTIVITIES: There is no effort by other Services to develop like equipment. The Army maintains coordination with the US Marine Corps and Navy concerning this project.

WORK PERFORMED BY: In-house work is performed by elements of the Mobility Equipment Research and Development Command, Fort Belvoir, VA. Contractors are Clark Equipment Company, Renton Harbor, MI, for FAMECE and Pacific Car and Foundry, Seattle, WA, for UET.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: The Advanced Development Plan for FAMECE was prepared and approved by the Department of the Army. Competitive contracts were awarded for the design and fabrication of prototype hardware which included: one power, scraper, and grader section per contractor. The two competing contractors (Lockheed and Clark) fabricated the prototype equipment and completed the Contractors Demonstration Tests on their individual prototype hardware. The prototypes completed a combined Development Test I/Operational Test I (DT I/OT I). The program was approved for entry into Full Scale Development and a contract was awarded to Clark Equipment Company. The second generation power sections and the remaining work sections were designed and fabricated. The contractor initiated DT II on those second generation sections and continued fabrication of remaining sections for DT II. The UET was designed, fabricated and tested through five prototype models.

2. FY 1977 Program: The Engineering Design Test on the second generation sections of FAMECE will continue and the Government DT/OT II will begin. The Development Acceptance In-Process Review will approve the UET for type classification standard. The Development Acceptance In-Process Review of the UET will type classify the item standard.

Budget Activity #4 - Tactical Programs

Program Element # 6.47.28.A Title Family of Military Engineer Construction Equipment (FAMECE)

3. FY 1978 Planned Program: Development Testing/Operational Testing II (DT/OT II) for Family of Military Engineer Construction Equipment (FAMECE) will be completed with the exception of environmental testing and airdrop testing. Items will be type classified standard and preparation for the first production contract will continue. The technical data package will be accepted. The decrease in funding represents a shift from prototype fabrication to prototype testing. Preparations for the Universal Engineer Tractor (UET) DT/OT III will be made. The UET production contract will be awarded.

4. FY 1979 Planned Program: Production will begin on the FAMECE and continue on the UET. DT/OT III on the UET will be conducted and DT/OT II on FAMECE will begin. Reduction in funding from FY 1978 is consistent with both projects moving into production.

5. Program to Completion: DT/OT III for FAMECE will be completed. Both items will move totally into production and out of research and development.

6. Major Milestones:

| | Date | Estimated RDTE Cost to Reach Events (Cumulative) |
|---|---|---|
| a. Enter concept phase (UET) | 1958 | $ 0 |
| b. Enter concept phase (FAMECE) | May 1969 | 0 |
| c. Development Acceptance (initial UET) | Oct 1969 | 7730 |
| d. Enter Full Scale Development (FAMECE) | Dec 1974 | 8735 |
| e. Type Classify (UET) | Dec 1976 | 7730 |
| f. Complete DT/OT II (FAMECE) | Jul 1978 | 29704 |
| g. Type Classify (FAMECE) | Nov 1978 | 30948 |

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element # 6.47.28.A Title Family of Military Engineering Construction Equipment (FAMECE)

Project # DH08 Title Family of Military Engineering Construction Equipment (FAMECE)

Category Engineering Development Budget Activity #4 - Tactical Programs

DETAILED BACKGROUND AND DESCRIPTION: This program consists of the development of the Family of Military Engineer Construction Equipment (FAMECE). FAMECE is airmobile and air-droppable and designed to perform construction tasks required of combat engineer units to include dozing, scraping, loading, grading, compacting, excavating, hauling and spreading. It will utilize a standard wheeled power section which, when combined with comparable wheeled construction sections, will meet combat support construction requirements.

RELATED ACTIVITIES: There is no effort by other Services to develop like equipment. The Army maintains coordination with the US Marine Corps and Navy concerning this project.

WORK PERFORMED BY: In-house work is performed by elements of the Mobility Equipment Research and Development Command, Fort Belvoir, VA. Contractor is Clark Equipment Company, Benton Harbor, MI.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: The Advanced Development Plan for FAMECE was prepared and approved by the Department of the Army. Competitive contracts were awarded for the design and fabrication of prototype hardware which included: one power, scraper, and grader section per contractor. The two competing contractors (Lockheed and Clark) fabricated the prototype equipment and completed the Contractors Demonstration Tests on their individual prototype hardware. The prototypes completed a combined Development Test I/Operational Test I (DT/OT I). The program was approved for entry into Full Scale Development and a contract was awarded to Clark Equipment Company. The second generation power sections and the remaining work sections were designed and fabricated. The contractor initiated DT II on those second generation sections and continued fabrication of remaining sections for DT II.

2. FY 1977 Program: The Engineering Design Test on the second generation sections of FAMECE will continue and the Government DT/OT II will begin.

3. FY 1978 Planned Program: DT/OT II for FAMECE will be completed with the exception of environmental testing and airdrop testing. Items will be type classified standard and preparation for the first production contract will continue. The technical data package will be accepted. The decrease in funding represents a shift from prototype fabrication to prototype testing.

Budget Activity #4 - Tactical Programs

Program Element # 6.47.28.A Title Family of Military Engineering Construction Equipment (FAMECE)

Project # DH08 Title Family of Military Engineering Construction Equipment (FAMECE)

4. FY 1979 Planned Program: Production will begin on the Family of Military Engineering Construction Equipment (FAMECE). Development Testing/Operational Testing III (DT/OT III) for FAMECE will begin. Reduction in funding from FY 1978 is consistent with this project moving into production.

5. Program to Completion: DT/OT III for FAMECE will be completed. Item will move totally into production and out of research and development.

6. Major Milestones:

| | Date | Estimated RDTE Cost to Reach Events (Cumulative) |
|---|---|---|
| a. Enter Concept Phase (FAMECE) | May 1968 | $ 0 |
| b. Enter Full Scale Development (FAMECE) | Dec 1974 | 8735 |
| c. Complete DT/OT II (FAMECE) | Jul 1978 | 29704 |
| d. Type Classify (FAMECE) | Nov 1978 | 30948 |

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 4180 | 891 | 6907 | 4687 | 1875 | 1100 | 32770 |
| Quantities | | | | | | | 31 |
| Procurement: | | | | | | | |
| Funds | 0 | 0 | 0 | 0 | 31800 | 96200 | 128000 |
| Quantities | 0 | 0 | 0 | 0 | 480 | 1474 | 1954 |

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.29.A  Title Countermortar Radar (AN/TPQ-36)

Category Engineering Development  Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 8820 | 1425 | 5817 | 4270 | 4381 | 210 | 42645 |
| | Quantities | | | | | | | 5 |
| DL-81 | Countermortar Radar | 8820 | 1425 | 5817 | 4270 | 4381 | 210 | 42645 |
| Procurement: | | | | | | | | |
| | Funds | | | | 57100 | 72300 | 134900 | 264300 |
| | Quantities | | | | (20) | (48) | (85) | (153) |

BRIEF DESCRIPTION OF ELEMENT: The countermortar radar, AN/TPQ-36, will automatically detect and locate hostile mortars and rockets at short and mid ranges over a wide sector. It is being developed to provide an effective and responsive capability to front line units against the heavy mortar/artillery threat.

BASIS FOR FY 1978 RDTE REQUEST: To provide for limited system development to meet inter-service requirements, development of special tools and test equipment for field and depot use, contractor in plant and field engineering support, and producibility engineering planning (PEP Phase II) during initial phase of production.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: The RDTE funding in FY 1978 is decreased to reflect reduced RDTE requirements in support of basic system development as the program enters production. Sustaining RDTE through FY 80 is required for in-plant and field engineering support of the engineering development units, additional field testing, and development of support hardware.

Budget Activity #4 - Tactical Programs

Program Element #6.47.29.A Title Countermortar Radar (AN/TPQ/36)

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civilian Employees | 24 | 0 | 24 |
| (2) Contractor Employees | 12 | 116 | 128 |
| Total | 36 | 116 | 152 |

DETAILED BACKGROUND AND DESCRIPTION: The countermortar radar, designated the AN/TPQ-36, is now designed to automatically locate hostile mortar launch sites out to a range of km with an accuracy of, meters and a probability of location of, Artillery and rockets can also be located to this range with a small reduction in accuracy and probability of location. The AN/TPQ-36 will replace the AN/MPQ-4 which has been the Army mortar locating radar since 1958. The AN/MPQ-4 is limited by reduced sector coverage, manual operation, and reliability and maintainability problems. The AN/TPQ-36 incorporates the latest advances in planer array antennas and computer technology and will provide highly mobile, automatic first round location over a wide selectable sector. Experience with the AN/MPQ-4 radar in Vietnam has clearly indicated its shortcomings and the need for improvements represented in the developmental radar system.

RELATED ACTIVITIES: Development of the countermortar radar, AN/TPQ-36, was previously funded in Program Element/Project 6.47.23.A, DL72 Radars. Transfer to Project Element/Project 6.47.29.A, DL81 (countermortar radar) was made in FY 1973 to separate funding of the countermortar radar from other radars found in the previous program element. The counterbattery radar, AN/TPQ-37, is being developed under 6.47.31.A, DL83. (Counterbattery radar).

WORK PERFORMED BY: The in-house developing organization for this program is the Project Manager, FIREFINDER, US Army Electronics Research and Development Command, Fort Monmouth, New Jersey. A contract for five Engineering Development models of the radar system was awarded to Hughes Aircraft Company, Fullerton, California, in October 1973.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 7T, FY 1976, and Prior Accomplishments: Engineering Development of the countermortar radar was initiated as a new start in FY 1972. Several administrative milestones were accomplished leading to expected award of a contract for Engineering Development models of the radar in late FY 1972. This award was delayed until October 1973 due to protests of the procurement selection proceedings by ITT-Gilfillian, RCA, and General Electric. Extensive litigation concerning the protests was conducted, but no work on the radars could be undertaken in FY 1973. The General Accounting Office resolved the protests in favor of the Army in

October 1973. A contract for five engineering development (ED) models was then awarded to Hughes Aircraft Company, Fullerton, California. Extensive design-to-cost engineering effort was conducted in FY 1974 to achieve the most cost effective radar design. In FY 1975, fabrication of the five models was initiated. The first model was delivered July 1975 to Yuma Proving Ground (USAPG) where it has completed Prototype Qualification Testing (PQT). During FY 1976 fabrication of the remaining four models were completed. To date, four models have been live fire tested at Yuma Proving Ground, Arizona with all critical test requirements successfully completed. The Army completed a comparative evaluation with the United States Marine Corps Hostile Weapons Locating Radar (HWLS) and the AN/TPQ-36 in July 1976. The USMC has since terminated the HWLS development and plans to procure 22 AN/TPQ-36 units.

2. FY 1977 Program: Planned program will provide continued support of development and operational testing, environmental testing, and continuation of producibility engineering and planning (PEP). All ED models are being modified with enhanced capabilities to satisfy Marine Corps and Army requirements. Funds will provide a simplified mobile recording system with a data reduction capability to support the AN/TPQ-36 during DT/OT II and future service testing.

3. FY 1978 Planned Program: Full Scale Production is expected to begin in early FY 1978 following Development Acceptance In-Process Review and Type Classification. The decrease in FY 1978 RDTE funding is mainly attributable to a reduced level of contractor and in-house development and test during the production transition.

4. FY 1979 Planned Program: RDTE funded sustaining in-plant and field engineering is required through initial operational capability. RDTE funding will decrease slightly due to a reduced level of effort during production transition.

5. Program to Completion: The AN/TPQ-36 is expected to enter production in FY 1978, and achieve an operational capability by Calendar Year 1980. Authorized Acquisition Objective is planned for completion during 3 Qtr FY 1983.

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## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.30.A Title Remotely Piloted Vehicles

Category Engineering Development Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 0 | 0 | 0 | 0 | 8500 | 23000 | 31500 |
| | Quantities | | | | | | | 14 |
| D040 | Remotely Piloted Vehicle Engineering Development | 0 | 0 | 0 | 0 | 8500 | 23000 | 31500 |

BRIEF DESCRIPTION OF ELEMENT: This is a new element in FY 1979. This P.E. will provide funding to accomplish the Engineering Development of a Remotely Piloted Vehicle (RPV) system. Based upon the successful completion of the AQUILA demonstration, experimentation and testing under P.E. 6.37.25.A and the joint preparation and approval of a required operational capability (ROC), a military RPV system will be developed to fulfill the Army's requirement for an unmanned aerial reconnaissance, surveillance, target acquisition and designation system. This effort will be aimed at correcting the technology deficiencies uncovered during the AQUILA program, militarizing an RPV system, and integrating an anti-jam data link, with the goal of moving into initial production in FY 1981.

BASIS FOR FY 1978 RDTE REQUEST: Not Applicable.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: Not Applicable.

PERSONNEL IMPACT: Not Applicable.

DETAILED BACKGROUND AND DESCRIPTION: This program element will accomplish the Engineering Development (ED) of the RPV systems for employment by the Army. This is a new P.E. beginning in FY 1979. The initiation of ED is contingent upon the successful completion of the AQUILA program in P.E. 6.37.25.A during FY 1978 and the approved Required Operational Capability (ROC) for the system which is required to operate in the field. An RFP (Request for Proposal) will be issued to industry. Contractors will be selected to design and fabricate a system leading to production in FY 1981. The initial RPV effort will provide for reconnaissance, surveillance, target acquisition and laser designation. It will be a clear weather, day system with an anti-jam data link. The system parameters will be defined as a result of the AQUILA program and will be available in mid FY 1978.

Budget Activity #4 - Tactical Programs

Program Element #6.47.30.A Title Remotely Piloted Vehicles

RELATED ACTIVITIES: This Remotely Piloted Vehicle (RPV) was funded during advanced development FY 1975 - 1978 under P.E. 6.37.25.A, Remotely Piloted Vehicles. The Air Force RPV programs consisting of the Advanced RPV in P.E. 6.37.39.F, high altitude programs in P.E. 6.47.32.F, the harassment program in P.E. 6.47.46.F and the Navy RPV program in P.E. 6.37.37.51.N are all being monitored to utilize applicable technology and equipment developments as appropriate. The other services will be asked to participate in the source selection.

WORK PERFORMED BY: US Army Aviation Research and Development Command, St. Louis, Mo; US Army Electronics Research and Development Command, Fort Monmouth, NJ; US Army Missile Research and Development Command, Huntsville, AL; Air Mobility Research and Development Laboratory's - Ames Research Center, CA; Fort Eustis Directorate, Fort Eustis, VA; and the US Army Mobility Equipment Research and Development Command, Fort Belvoir, VA. Contractors actively participating in the RPV development will probably be Lockheed Missiles and Space Company, Inc., Sunnyvale, CA; Aeronutronic-Ford, Newport Beach, CA; E-Systems Inc., Melpar Division, Falls Church, VA; McDonnel Douglas, Huntington Beach, CA; Teledyne Ryan, San Diego, CA; Texas Instruments, Dallas, TX; Honeywell, Minneapolis, MN; Perkin Elmer, Norwalk, CN; and Westinghouse, Baltimore, MD.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: Not Applicable.

2. FY 1977 Program: Not Applicable.

3. FY 1978 Planned Program: Not Applicable.

4. FY 1979 Planned Program: This is a new P.E. starting in FY 1979. Program will increase because FY 1979 will be the first year of a two year Engineering Development contract. Engineering design will be completed and fabrication initiated. In-house support will consist of monitoring the contractor's work using design reviews and controlling the costs of the program.

5. Program to Completion: The contractor portion of the program will continue through FY 1980 with completion of fabrication and testing by the contractor. Developer and user testing will commence in FY 1981 for a four month period. An IPR will be held for a decision to enter Low Rate Initial Production.

6. Major Milestones:

| | Date | Estimate RDTE Cost to Reach Events (Cumulative) |
|---|---|---|
| a. Approved Required Operational Capability for Little Scout | Feb 78 | |
| b. In Process Review | Mar 78 | |
| c. Initiate Engineering Development | Oct 78 | |
| d. Initiate Low Rate Production | Mar 81 | 31500 |

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.31.A Title Counterbattery Radar (AN/TPQ-37)

Category Engineering Development Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 10340 | 1200 | 10799 | 11354 | 4849 | 1300 | 70614 |
| | Quantities | | | | | | | 2 |
| DL83 | Counterbattery Radar | 10340 | 1200 | 10799 | 11354 | 4849 | 1300 | 70614 |
| Procurement: | | | | | | | | |
| | Funds | 0 | 0 | 51800 | 22500 | 0 | 257800 | 332100 |
| | Quantities | 0 | 0 | 10 | 5 | 0 | 69 | 84 |

BRIEF DESCRIPTION OF ELEMENT: The counterbattery radar, AN/TPQ-37, will automatically detect and locate hostile artillery and long range rockets at extended ranges over a wide sector. It is being developed to fill a critical void in our current capabilities.

BASIS FOR FY 1978 RDTE REQUEST: The funding in FY 1978 will complete development and integration of the common equipment shelter (commonality between AN/TPQ-37 and AN/TPQ-36 Mortar Locating Radar), complete development of Special Test Equipment, complete the survivability program, continue producibility engineering and planning (PEP) and purchase development models of training devices.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: The increase in FY 1978 is due principally to the development of training devices for this system. These are required before the equipment is finally fielded in FY 1980. It is imperative that development of these devices scheduled to begin in FY 1977 be fully funded in FY 1978 to meet the accelerated 1980 date for achieving initial operational capability (IOC).

Budget Activity #4 - Tactical Programs

Program Element #6.47.31.A Title Counterbattery Radar (AN/TPQ-37)

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 19 | 0 | 19 |
| (2) Contractor Employees | 33 | 158 | 191 |
| Total | 52 | 158 | 210 |

TERMINATION COST: ($ in Thousands)

| | FY 1977 and Prior | FY 1978 | Total |
|---|---|---|---|
| (1) Estimated Government Liability Financed with: RDTE | 52739 | 2000 | 54739 |

DETAILED BACKGROUND AND DESCRIPTION: The counterbattery radar, designated the AN/TPQ-37, will automatically locate hostile artillery and long-range rocket launch sites out to ranges of | for tube artillery and meters for large rockets. The US Army has no effective means to locate hostile artillery with sufficient accuracy and speed. The location and suppression of hostile artillery and rocket weapons is vital to ground warfare, and experience in Vietnam has vividly documented the inability of US forces to locate these indirect fire weapons. The AN/TPQ-37 incorporates the latest advances in phased array antenna and computer technology and will provide first round detection and location of weapons over a wide | sector coverage. Detailed system characteristics are depicted in the Test and Evaluation Data Section of this descriptive summary.

RELATED ACTIVITIES: Development of the counterbattery radar, AN/TPQ-37, was previously funded in Program Element/Project 6.37.19.A., DK72, Radars. Transfer to Program Element/Project 6.37.29.A., DK83, was made in FY 1973 to separate funding of the counterbattery radar from other radars found in the previous program element. Transfer to Program Element/Project 6.47.13.A., DL83, was made in FY 1977. The countermortar radar, AN/TPQ-36, is funded under Program Element/Project 6.47.29.A., DL81, Countermortar Radar.

WORK PERFORMED BY: The in-house developing organization for this program is the Project Manager, FIREFINDER, US Army Electronics Research and Development Command, Fort Monmouth, New Jersey. Contractual work is being performed by Hughes Aircraft Company, Fullerton, California.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: Studies and computer simulations of the proposed counterbattery radar system to determine the technical feasibility of developing such a radar were conducted prior to FY 1972. The desired capabilities of the

proposed radar were evaluated against the state-of-the-art, resulting in a firm conclusion that the radar could be designed and built. The advanced development program included a two contractor, competitive phase to shorten the total development cycle and reduce technical risk. Contracts were awarded to Hughes Aircraft Company and Sperry Rand Corporation in June 1972, for each to build a model of the radar system. Both contractors completed engineering design planning in mid-FY 1973, and fabrication of components was started. Fabrication of both systems was completed in FY 1975. The radars were subjected to live fire acceptance testing at Fort Sill, Oklahoma, followed by competitive developmental testing. Weapons were located automatically at ranges to The radar demonstrated the capability to transmit information digitally to the Tactical Fire Direction System, marking the first time two operational systems had transferred such digital information. Competitive developmental and operational testing was concluded in FY 1976, followed by an environmental evaluation. Source selection was concluded in May 1976, with Hughes Aircraft Company being chosen as the prime contractor. As a result of a May 1976 decision briefing to the Principal Deputy, Director of Defense Research and Engineering, guidance was given to emphasize commonality of components between the countermortar radar, AN/TPQ-36, and the counterbattery radar, AN/TPQ-37, particularly the shelterized components.

2. FY 1977 Program: On 27 October 1976, an Army Systems Acquisition Review Council (ASARC) rendered a decision to proceed into production. Concurrent with the start of production will be continuing developmental effort to effect a common shelter design including a changeover to 400 Hz power, producibility engineering and planning (PEP), initiation of training device development and other engineering changes to improve Reliability, Availability, and Maintainability (RAM).

3. FY 1978 Planned Program: Continue fabrication and assembly of first ten Low Rate Initial Production (LRIP) radars. In order to minimize risk of retrofit in LRIP, current plan is to include a built-in break of six months between first three and last seven production models. Results of initial live fire test and environmental testing would then be available for fixes to be incorporated into the remaining seven deliveries. During FY 1978, award first increment of a three year multi-year contract for additional Low Rate Initial Production radars to maintain continuous production. Conclude development effort on most areas started in FY 1977. Continue producibility engineering and planning to facilitate transition into Full Scale Production and continue training device development. The increase in funding is due to continued efforts on the common shelter, and development of the training devices which are required before the system is fielded.

4. FY 1979 Planned Program: Award second year of three-year multi-year production contract. Conduct production acceptance testing (PAT) on first ten LRIP systems and commence development and operational testing. Continue PEP effort and conclude training device development. Decrease in funding from FY 1978 is due to completion of most development effort on this program.

5. Program to Completion: The last year of a three year multi-year production contract will be awarded in first month of FY 1980 to maintain continuous production. Full scale production is expected to be authorized in mid-FY 1980 following successful completion of a developmental and operational testing phase conducted on the initial ten LRIP systems.

Budget Activity #4 - Tactical Programs

Program Element #6.47.31.A Title Counterbattery Radar (AN/TPQ-37)

6. Major Milestones:

| | Date | Estimated RDTE Cost to Reach Events (Cumulative) |
|---|---|---|
| a. Army Systems Acquisition Review Council (ASARC) II/III | October 1976 | 42.9 |
| b. Start Low Rate Initial Production | November 1976 | 44.0 |
| c. First System Delivery | July 1978 | 61.5 |
| d. Start Development Test/Operational Test (DT/OT) II | July 1979 | 68.0 |
| e. ASARC IIIa | March 1980 | 69.9 |
| f. Start Full Scale Production | March 1980 | 69.9 |

Budget Activity #4 - Tactical Program

Program Element #6.47.31.A Title Counterbattery Radar (AN/TPQ-37)

TEST AND EVALUATION DATA:

1. Development Test and Evaluation:

a. Development Contractor: Hughes Aircraft Company Ground Systems Division, Fullerton, California.

b. Summary Description: Development Test (DT) I - During DT I the system was operated by typical Army crews. More than 1400 rounds in both single and multiple weapon problems were fired during the test. Test shots were designed to stress radar performance at minimum and maximum ranges, at the search sector edges, and with high crossing and elevation rates. The radar was located at five different sites requiring crews to frequently emplace and displace the systems. Weather during DT I was hot with several periods of heavy rainfall; however, no testing was conducted during the rain. Performance characteristics demonstrated during DT I are listed below. U.S. Army Test and Evaluation Command is responsible for conduct of the developmental testing of this system.

c. Schedule:

| | |
|---|---|
| DT I | 16 Jun 75 - 19 Sep 75 |
| DT II/III | Aug 78 - Sep 80 |

d. Similarity of Equipment: The central data function of the tested AN/TPQ-37 was configured in a S280 shelter mounted on a 2 1/2 ton truck. In order to take advantage of commonality in design with the AN/TPQ-36 system, this function in the production version will be reconfigured into a S250 shelter. The new shelter will be identical for both systems. This change will require that some hardware be moved to the antenna trailer assembly. There are several other design changes which will be made to facilitate the production process. One example is the redesign of the antenna sub-array pattern. These changes should not detrimentally affect the performance demonstrated to date in either Development Test (DT) or Operational Test (OT). An automatic height correction capability will be incorporated in the production equipment.

e. Items not tested: Built-in-Test-Equipment (BITE). Because the BITE was not finished, it was difficult to determine the system's operability under all conditions.

f. Deficiencies: Safety hazards were found associated with the rotation and elevation of the antenna. These hazards have since been corrected.

g. Reliability, Availability, and Maintainability (RAM) comments: The radar demonstrated an instantaneous MTBF of 28 hours at the completion of DT I. All maintenance was performed by contractor personnel, and BITE software was not complete so no

accurate maintainability evaluation could be made. A maintenance assessment was conducted during August 1976. This assessment demonstrated a Mean Time To Repair (MTTR) of about 10 minutes against a requirement of 30 minutes at organizational level.

2. Operational Test and Evaluation:

a. Operational test and evaluation accomplished to date: OT I was conducted by the U.S. Army Operational Test and Evaluation Agency (OTEA) at Fort Sill, Oklahoma, during an eight week period in the 2d Quarter FY 1976. This was a combined test in which OT type data was collected and evaluated in conjunction with DT data taken in the 4th Quarter, FY 1975 and the 1st Quarter FY 1976. The test included military crews performing enemy artillery detection and friendly registration mission using two competing prototype radars. Electronic countermeasures, vulnerability and reliability were also evaluated to a limited extent. Four different threat matrices were used, the largest of which employed 24 firing positions firing simulated preparatory fires. During the entire OT I, 8,500 rounds were fired. The system was required to move 30 times. The final subtest involved a 72 hour field training exercise. The weather during OT I was colder than during DT I.

b. Operational Test and Evaluation to be accomplished prior to program budget year major production contract award: None.

c. Reason Initial Operational Test not accomplished prior to production award contract: Not applicable.

d. Summary Description: Same as 2a above.

e. Schedule:

| | |
|---|---|
| Operational Test (OT) I | 13 Oct 75 - 14 Dec 75 |
| OT II | 6 Aug 79 - 21 Dec 79 |
| OT III | Mar - Jun 80 (tentative) |

f. Statement of results: The results were achieved against a mixture of calibers and ranges represented by the threat.

Mean Probability of Location =
Mean Accuracy of Location =
Radar Located batteries under jamming conditions, Probability of Location =

g. Similarity between tested and production items: Same as 1e above.

h. Subsystems not tested: Same as 1f above.

i. Agency responsible for OT: U.S. Army Operational Test and Evaluation Agency (OTEA).

j. Location of Tests:

OT I, Fort Sill, Oklahoma
OT II, USAERUR
OT III, Fort Lewis, Washington

k. Operators - Military Crews
Maintenance Personnel - Contractors

l. Major deficiencies and remedial action: There were no major deficiencies found during OT I.

m. Retesting comments: None.

n. Reliability, availability, and maintainability (RAM) comments: Using a hardware oriented methodology, the radar demonstrated an instantaneous MTBF of 63 hours at the completion of Operational Test (OT) I. Using methodology designed to capture operational considerations, the mean time between failures was 11.5 hours. This methodology includes failures of government furnished equipment (e.g., generators) and those failures caused by crew errors and does not address partial mission failures. As stated above, no assessment of maintainability was made during OT I.

o. Operational test and evaluation not yet completed but planned prior to production award: None.

3. System Characteristics:

| Operational/Technical Characteristics | Objective | Demonstrated Performance |
|---|---|---|
| Single Weapon Probability of 1st Round Location | | |

Budget Activity #4 - Tactical Program

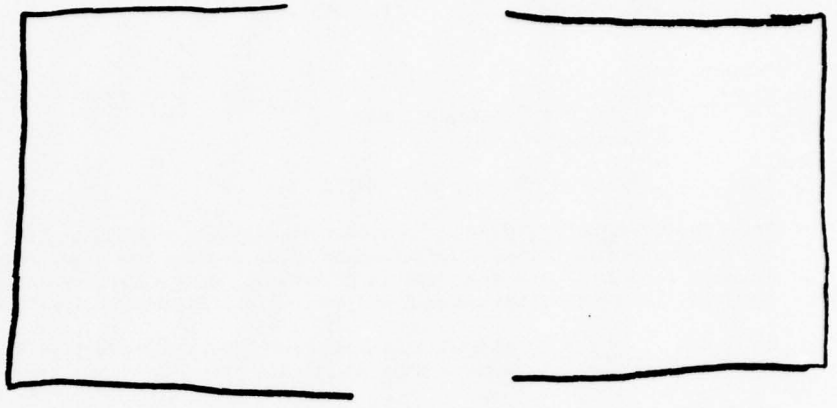
Program Element #6.47.31.A

Title Counterbattery Radar (AN/TPQ-37)

System Characteristics: (Continued)

| Operational/Technical Characteristics | Objective | Demonstrated Performance |
|---|---|---|
| Range | | |
| 105mm Howitzer | | |
| 155mm Howitzer | | |
| 175mm Howitzer | | |
| 4.5 inch Rocket | | |
| Honest John Rocket | | |
| Accuracy | | |
| Artillery | | |
| Registration | | |
| Simultaneous Firings | | |

*Limited by range safety constraints.



## FY 1978 RDTE DESCRIPTIVE SUMMARY

**Program Element** #6.47.40.A  Title Tactical Surveillance System

**Category** Engineering Development  Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 0 | 0 | 0 | 13920 | 22778 | Continuing | Not Applicable |
| | Quantities | | | | | | | Not Applicable |
| D662 | TACTICAL SURVEILLANCE SYSTEM | 0 | 0 | 0 | 13920 | 22778 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: This element supports the Engineering Development of a tactical support system to collect, process, and disseminate intelligence/information which locates and identifies enemy targets representing a general tactical threat. Advanced techniques are exploited in interfacing with a variety of strategic surveillance programs and making the information available in the tactical command and control environment in a sufficiently timely and useful form to influence field operations.

BASIS FOR FY 1978 RDTE REQUEST: Initiate and complete Production Engineering Design and complete development of system interface specification for interface(s) with collection program.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: FY 1978 represents the transition year to total system development and integration for interface with a collection program. Increase represents funds required to perform production design for this system.

Budget Activity #4 - Tactical Programs

Program Element #6.47.40.A Title Tactical Surveillance System

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 10 | 0 | 10 |
| (2) Contractor Employees | 100 | 0 | 100 |
| Total | 110 | 0 | 110 |

DETAILED BACKGROUND AND DESCRIPTION: Data originating from a variety of tactical surveillance sensors is transmitted over short and long distances to collection points. Techniques and equipment are to be provided for expediting the collection of target acquisition information and for the rapid dissemination of tactical intelligence. Means of exploiting advanced techniques of data transmission will be developed to use information collected by tactical surveillance systems more effectively by making the information available in the command and control environment in a sufficiently timely and useful form to influence field operations.

RELATED ACTIVITIES: Technological developments designed to shorten the time required to collect and disseminate information are related to this development. The initial efforts to provide the technical basis for the equipment and techniques were addressed under 6.37.30.A D560, Tactical Surveillance Systems. Program coordinated with efforts of other Services and agencies.

WORK PERFORMED BY: RCA Corp., Camden, NJ; Lockheed Missile and Space Co., Sunnyvale, CA; TRW, Los Angeles, CA; Aerospace Corp., El Segundo, CA; Electromagnetic Systems Laboratories, Sunnyvale, CA; US Army Electronics Research and Development Command (ERADCOM), Fort Monmouth, NJ.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: Not applicable.

2. FY 1977 Program: Not applicable.

Budget Activity #4 - Tactical Programs

Program Element #6.47.40.A Title Tactical Surveillance System

3. FY 1978 Planned Program: Perform Production Design analysis for interface with collection program. All necessary experimental work has been performed and the improved system is ready for full scale development.

4. FY 1979 Planned Program: Initiate Engineering Development for equipment to interface with one collection system. Initiate development of advanced exploitation system.

5. Program to Completion: An engineering development level system will be completed in FY 81.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.45.A Title Tactical Electronic Warfare Systems

Category Engineering Development Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | | | | | | Continuing | Not Applicable |
| | Quantities | | | | | | Continuing | Not Applicable |
| D540 | Protective Electronic Warfare Systems | | | | | | Continuing | Not Applicable |
| D906 | Division Tactical Electronic Warfare Systems | | | | | | Continuing | Not Applicable |
| D926 | Corps Tactical Electronic Warfare Systems | | | | | | Continuing | Not Applicable |
| D909 | Tactical Electronic Surveillance System | | | | | | Continuing | Not Applicable |
| Procurement: | | | | | | | | |
| | Funds | | | | | | Continuing | Not Applicable |
| | Quantities | | | | | | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: The objective of this program element is to develop electronic warfare (EW) equipment and systems including electronic countermeasures (ECM) systems and electronic support measures (ESM) systems to provide tactical electronic order of battle information or deny or degrade the enemy's use of his electromagnetic devices.

BASIS FOR 1978 RDTE REQUEST: Conduct of Automatic Ground-Transportable Emitter Location and Identification System (AGTELIS) and Multiple Target Electronic Warfare System (MULTEWS) (Airborne). Initiate of MULTEWS (Ground), Close Air Support Jammer (AN/MLQ-33) and Tactical Control and Analysis Centers. Continue of Airborne Multichannel Communications Jammer (CEFIRE TIGER), Division Support Company Operations Center (DSCOC), Army Security Agency Tactical Support Element (ATSE), very high frequency and ultra high frequency receivers.

Budget Activity #4 - Tactical Programs

Program Element #6.47.45.A Title Tactical Electronic Warfare Systems

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: The increase in funds is required for initiation of of Multiple Target Electronic Warfare System (MULTEWS) (Ground), Close Air Support Jammer (AN/MLQ-33) and Tactical Control and Analysis Center and to accelerate development of Division Support Company Operations Center and Army Security Agency Tactical Support Element.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 74 | 0 | 74 |
| (2) Contractor Employees | 352 | 270 | 622 |
| Total | 426 | 270 | 696 |

TERMINATION COST: ($ in Thousands)

| | FY 1977 and Prior | FY 1978 | Total |
|---|---|---|---|
| (1) Estimated Government Liability Financed with: RDTE | | | |

DETAILED BACKGROUND AND DESCRIPTION: The objective of this program element is to develop electronic warfare (EW) equipment to deny or degrade the enemy's use of his electromagnetic devices. This program includes the development of EW equipment to and degrade enemy communications, counter-battery radar, infrared, and optical battlefield surveillance devices and provide Equipment development includes ground vehicular and airborne mounted systems. Also under development are electronic surveillance systems.

RELATED ACTIVITIES: Related EW developments are conducted by the Air Force and Navy. Coordination is effected between the Services to minimize duplication of effort and insure the interchange of technical data. Coordination is effected by reviews conducted by the Office of the Secretary of Defense (Defense 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.

WORK PERFORMED BY: Major contractors are: United Technology Laboratory, Dallas, Texas; Bunker-Ramo, Westlake Village, California; Cincinnati Electronics, Cincinnati, Ohio; Northrop Electronics, Rolling Meadows, Illinois. In-house development and contract monitoring is conducted by the Army's Electronic Warfare Laboratory, Fort Monmouth, New Jersey; and the US Army Security Agency, Arlington Hall Station, Arlington, Virginia.

Budget Activity #4 - Tactical Programs

Program Element #6.47.45.A Title Tactical Electronic Warfare Systems

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: AN/GLQ-3 and AN/TLQ-15 (very high frequency and high frequency communications jammers) have been deployed. The AN/TLQ-17 (transportable communications jammer) has completed development and is fielded. Development of a Teampack (AN/MSQ-103) has been

2. FY 1977 Program: Ongoing developments will continue.

3. FY 1978 Planned Program: Efforts initiated in prior years will continue.

(AN/MLQ-33) will be initiated.
(MULTEWS-GND) will be initiated. The MULTEWS (Airborne) will be

of the ATSE, DSCOC, and CEFIRE TIGER.

4. FY 1979 Planned Program: Development of MULTEWS-GND, the AN/MLQ-33 and CEFIRE TIGER will continue.

5. Program to Completion: This is a continuing program. Developments under this project will normally have been transferred from Advanced Development, Program Element 6.37.11.A., Tactical Self-Protection EW Equipment.

Budget Activity #4 - Tactical Programs

Program Element #6.47.45.A Title Tactical Electronic Warfare Systems

6. Major Milestones:

| | Date | Estimated RDTE Cost to Reach Events (Cumulative) ($ in Thousands) |
|---|---|---|
| a. Automatic Ground Transportable Emitter Location and Identification System (AGTELIS) type classification. | | |
| b. Multiple Target Electronic Warfare System (MULTEWS) (Airborne) type classification. | | |
| c. Multiple Target Electronic Warfare System (MULTEWS) (Ground) type classification. | | |
| d. Airborne Multichannel Communications Jammer (CEFIRE TIGER) type classification. | | |
| e. Division Support Company Operations Center (DSCOC) type classification. | | |
| f. Army Security Agency Tactical Support Element (ATSE) type classification. | | |
| g. Tactical Control and Analysis Center type classification. | | |

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## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.45.A Title Tactical Electronic Warfare Systems

Project #D906 Title Division Tactical Electronic Warfare Systems

Category Engineering Development Budget Activity #4 - Tactical Programs

DETAILED BACKGROUND AND DESCRIPTION: The objective of this project is to develop electronic warfare (EW) equipment to deny or degrade the enemy's use of his electromagnetic devices. This program includes the development of EW equipment for operation in the Army Divisions to

Equipment development includes ground vehicular and airborne mounted systems.

RELATED ACTIVITIES: Related electronic warfare developments are conducted by the Air Force and Navy. Coordination is effected between the Services to minimize duplication of effort and insure the interchange of technical data. Coordination is effected by reviews conducted by the Office of the Secretary of Defense (Defense Research and Engineering), through the exchange of RDTE resume cards and 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.

WORK PERFORMED BY: Major contractors are: Bunker-Ramo, Westlake Village, California; Northrop, Rolling Meadows, Illinois; United Technology Laboratory, Greenville, Texas. In-house development and contract monitoring is conducted by the Army's Electronic Warfare Laboratory, Fort Monmouth, New Jersey, and the US Army Security Agency, Arlington Hall Station, Arlington, Virginia.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: AN/GLQ-3 and AN/TLQ-15 (very high frequency and high frequency communications jammers) have been deployed. The AN/TLQ-17 (transportable communications jammer) has completed development and is fielded. Development of a Teampack radar emitter location and identification system (AN/MSQ-103) has been completed and

Budget Activity #4 - Tactical Programs

Program Element #6.47.45.A Title Tactical Electronic Warfare Systems

Project: #D906 Title Division Tactical Electronic Warfare Systems

2. FY 1977 Program: Ongoing developments will continue.

3. FY 1978 Planned Program: Efforts initiated in prior years will continue.

4. FY 1979 Planned Program:

5. Program to Completion: This is a continuing program. Developments under this project will normally have been transferred from advanced development, program element 6.37.45.A, Tactical Electronic Warfare Equipment.

6. Major Milestones:

| | Dates | Estimated RDTE Cost to Reach Events (Cumulative) ($ in Millions) |
|---|---|---|
| a. Multiple Target Electronic Warfare System (MULTEWS) (Airborne) type classification. | | |
| b. Multiple Target Electronic Warfare System (MULTEWS) (Ground) type classification. | | |
| c. Division Support Company Operations Center (DSCOC) type classification. | | |
| d. Army Security Agency Tactical Support Element (ATSE) type classification. | | |

Budget Activity #4 - Tactical Programs

Program Element #6.47.45.A Title Tactical Electronic Warfare Systems

Project #D906 Title Division Tactical Electronic Warfare Systems

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | | | | | | Continuing | Not Applicable |
| Quantities | | | | | | | |
| Procurement: | | | | | | | |
| Funds | | | | | | | |
| Quantities | | | | | | | |

Budget Activity #4 - Tactical Programs

Program Element #6.47.45.A Title Tactical Electronic Warfare Systems

Project #D906 Title Division Tactical Electronic Warfare Systems

TEST AND EVALUATION DATA:

1. Development Test and Evaluation:

a. TEAMPACK (AN/MSQ-103) (lightweight non-communications intercept and direction finding system).

The contractor, Bunker Ramo Corporation, has

b. MULTEWS (airborne) (AN/ALQ-143) (non-communications intercept and direction finding system).

c. MULTEWS (ground) (AN/ULQ-14). DT I conducted on the Airborne MULTEWS (cited above) also applies to the ground version of this system. The need for specific improvements applies to both systems, however, the ground system will follow the airborne system by about

d. Close Air Support (CAS) jammer (AN/MLQ-33).

e. Two additional tasks under this project, Division Support Company Operations Center (DSCOC) and the Army Security Agency Tactical Support Element (ATSE) will undergo

2. Operational Test and Evaluation:

a. TEAMPACK (AN/MSQ-103) (lightweight non-communications intercept and direction finding system).

and only one

Budget Activity #4 - Tactical Programs

Program Element #6.47.45.A Title Tactical Electronic Warfare Systems

Project #D906 Title Division Tactical Electronic Warfare Systems

at Fort Hood, Texas.

b. MULTEWS (AN/ULQ-14 - ground) (AN/ALQ-143 - airborne). MULTEWS is a non-communications (radar) jamming system which has been designed to be installed in either an aircraft or ground vehicle.

c. Close Air Support (CAS) jammer (AN/MLQ-33).

d.

3. System Characteristics:

| | Objective | Demonstrated Performance 1/ |
|---|---|---|
| a. Teampack (lightweight non-communication intercept and direction finding system) | | |
| (1) Frequency Range | | |
| (2) Output | | |
| (3) Communications | | |
| (4) Line of Bearing Accuracy | | |
| (5) Platform | | |
| (6) Sensivity | | |

Budget Activity #4 - Tactical Programs

Program Element #6.47.45.A Title Tactical Electronic Warfare Systems

Project #D906 Title Division Tactical Electronic Warfare Systems

| | Objective | Demonstrated Performance 1/ |
|---|---|---|
| b. Multiple Target Electronic Warfare System (MULTEWS) Airborne | | |
| (1) Frequency Range | | |
| (2) Range | | |
| (3) Jamming Capability | | |
| (4) Communications | | |
| (5) Platform | | |
| (6) Modes | | |
| (7) Effective Radiated Power | | |
| c. MULTEWS GND (Multiple Target Electronic Warfare System) | | |
| (1) Frequency Range | | |
| (2) Range | | |
| (3) Jamming Capability | | |
| (4) Communications | | |
| (5) Platform | | |
| (6) Modes | | |
| (7) Effective Radiated Power | | |
| d. AN/MLQ-33 (Close Air Support Jammer) | | |
| (1) Frequency Range | | |
| (2) Range | | |
| (3) Jamming Capability | | |
| (4) Effective Radiated Power | | |
| (5) Platform | | |

Budget Activity #4 - Tactical Programs

Program Element #6.47.45.A Title Tactical Electronic Warfare Systems

Project #D906 Title Division Tactical Electronic Warfare Systems

| | Objective | Demonstrated Performance 1/ |
|---|---|---|
| e. Division Support Company Operations Center (DSCOC) and Army Security Agency Tactical Support Element (ATSE) | To be determined when new intelligence structure is finalized. | |

1/ To be demonstrated during operational and developmental testing.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.45.A Title Tactical Electronic Warfare Systems

Project #D909 Title Tactical Electronic Surveillance System

Category Engineering Development Budget Activity #4 - Tactical Programs

DETAILED BACKGROUND AND DESCRIPTION: Data originating from a variety of strategic electronic surveillance sensors is transmitted over short and long distances to collection points. Techniques and equipment are to be provided for expediting the collection of target acquisition information and for the rapid dissemination of tactical intelligence. Means of exploiting advanced techniques of data transmission will be developed to use information collected by tactical surveillance systems more effectively by making the information available in the command and control environment in a sufficiently timely and useful form to influence field operations. The purpose of this project is to collect, process and disseminate through tactical command and control interfaces and locate hostile emitters representing a particular threat with intercept frequency from A to K band.

RELATED ACTIVITIES: Technological developments designed to shorten the time required to collect and disseminate information are related to this development. The initial efforts to provide the technical basis for the equipment and techniques are addressed under 6.37.45.A D907, Tactical Electronic Surveillance Systems.

WORK PERFORMED BY: US Army Security Agency, Arlington Hall Station, Arlington, VA; Aerospace Corporation, El Segundo, CA; Lockheed Missiles and Space Corporation, Sunnyvale, CA; Electromagnetic Systems Laboratories, Sunnyvale, CA.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments:

   a. FY 1976 and Prior Accomplishments: Not applicable.

   b. FY 197T Accomplishments: Not applicable.

2. FY 1977 Program: Not applicable.

Budget Activity #4 - Tactical Programs

Program Element #6.47.45.A Title Tactical Electronic Warfare Systems

Project #D909 Title Tactical Electronic Surveillance System

3. FY 1978 Planned Program: Not applicable.

4. FY 1979 Planned Program: Initiate Engineering Development of systems to interface with two collection program previously addressed in advanced development under 6.37.45 D907, Tactical Electronic Surveillance Systems. All necessary experimental work for interfaces with the two collection systems has been performed and the proposed system is ready for full scale development.

5. Program to Completion: An engineering development level system for interfacing with all collection programs will be completed in FY 81.

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 0 | 0 | 0 | 0 | — — — — | Continuing | Not Applicable |

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.45.A Title Tactical Electronic Warfare Systems

Project #D926 Title Corps Tactical Electronic Warfare Systems

Category Engineering Development Budget Activity #4 - Tactical Programs

DETAILED BACKGROUND AND DESCRIPTION: The objective of this program element is to develop electronic warfare (EW) equipment for operation in Army Corps to deny or degrade the enemy's use of his electromagnetic devices. This program includes the development of EW equipment to locate and degrade enemy communications. Equipment development includes ground vehicular and airborne mounted systems.

RELATED ACTIVITIES: Related electronic warfare developments are conducted by the Air Force and Navy. Coordination is effected between the Services to minimize duplication of effort and insure the interchange of technical data. Coordination is effected by reviews conducted by the Office of the Secretary of Defense (Defense Research and Engineering), through the exchange of RDTE resume cards and 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.

WORK PERFORMED BY: Major contractors are: United Technology Laboratory, Dallas, Texas; Bunker-Ramo, Westlake Village, California; GTE Sylvania, Mountain View, California. In-house development and contract monitoring is conducted by the US Army Electronic Research and Development Command (ERADCOM), Fort Monmouth, New Jersey, and the US Army Security Agency, Arlington Hall Station, Arlington, Virginia.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments:

Budget Activity #4 - Tactical Programs

Program Element #6.47.45.A Title Tactical Electronic Warfare Systems

Project #D926 Title Corps Tactical Electronic Warfare Systems

2. FY 1977 Program: Ongoing developments will continue. of the CEFIRE TIGER (airborne multichannel communications jammer) system will be initiated.

3. FY 1978 Planned Program:

4. FY 1979 Planned Program:

5. Program to Completion: This is a continuing program. Developments under this project will normally have been transferred from advanced development, program element 6.37.45.A, Tactical Electronic Warfare Equipment.

6. Major Milestones:

| | Date | Estimated RDTE Cost to Reach Events (Cumulative) ($ in Millions) |
|---|---|---|
| a. AGTELIS type classification. | | |
| b. CEFIRE TIGER type classification. | | |
| c. Tactical Control and Analysis Center type classification. | | |

Budget Activity #4 - Tactical Programs

Program Element #6.47.45.A

Title Tactical Electronic Warfare Systems

Project #D926

Title Corps Tactical Electronic Warfare Systems

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | | | | | | Continuing | Not Applicable |
| Quantities | | | | | | | Not Applicable |
| Procurement: | | | | | | | |
| Funds | 0 | 0 | 0 | 28200 | 59000 | | |
| Quantities | | | | 6 | 9 | | |

Budget Activity #4 - Tactical Program

Program Element #6.47.45.A Title Tactical Electronic Warfare Systems

Project #D926 Title Corps Tactical Electronic Warfare Systems

TEST AND EVALUATION DATA:

1. Development Test and Evaluation:

a. AGTELIS (Automatic Ground-Transportable Emitter Location and Identification System (AN/TSQ-109)). Three months of extensive feasibility testing of an original prototype system in 1972, in lieu of Development Test (DT) I. Test results established the feasibility of the AGTELIS concept and confirmed the validity of the development approach. The system is now under contract with Bunker Ramo Corporation. DT II is now scheduled for

b. CEFIRE TIGER (AN/ALQ-150) (Airborne multichannel communications jammer). The feasibility of a proposed CEFIRE TIGER system was demonstrated by laboratory testing of experimental prototypes of modulators, antennas, and transmitters during 1972. A more complete system model was field tested in 1973 (confirming earlier laboratory findings) which partially satisfied the objectives for a DT I. Further DT I is now planned during to confirm operating this system in an airborne configuration. The final engineering prototype will then be fabricated and subjected to No contractor at present time.

c. Quick Look II (AN/ALQ-133) (Airborne non-communications emitter location/identification system). DT II was conducted in 1975 at Fort Huachuca, Arizona, during which a few discrepancies were found. These are being corrected by the limited production contractor, United Technology Laboratory, Dallas, Texas, and the system will undergo DT II from

d. Tactical Control and Analysis Center. An initial contract for development of a software module was awarded to GTE Sylvania in FY 1973. A contract for the advanced development model of the control and analysis center was awarded in 1976. DT I is scheduled for DT II is currently scheduled for

2. Operational Test and Evaluation:

a. AGTELIS (Automatic Ground-Transportable Emitter Location/Identification System) (AN/TSQ-109). A feasibility test was conducted by the contractor, Bunker Ramo Corporation, in 1973 in lieu of Operational Test (OT) I. Based on these tests results of the system developer (US Army Security Agency) recommended the system be militarized and subjected to operational testing. OT II is presently scheduled for

b. CEFIRE TIGER (AN/ALQ-150) (Airborne multichannel communications jammer). Feasibility testing was conducted in 1972 and the system will proceed in its development cycle when required funding is available. OT II is projected to take place in

Budget Activity #4 - Tactical Program

Program Element #6.47.45.A Title Tactical Electronic Warfare Systems

Project #D926 Title Corps Tactical Electronic Warfare Systems

c. Quick Look II (AN/ALQ-133) (Airborne non-communications emitter location/identification system). Operational Test (OT) II was conducted by US Army Security Agency personnel at Fort Huachuca, Arizona in early 1976. Based on the success of this testing it was recommended that Quick Look II be

OT II is currently scheduled for

d. Tactical Control and Analysis Center. OT II will be conducted by Army personnel at Fort Huachuca, Arizona. It will provide an assessment of military worth, operational suitability, potential and effectiveness of the system. OT II is currently scheduled for

3. System Characteristics:

| Operational/Technical Characteristics | Objectives | Demonstrated Performance 1/ |
|---|---|---|
| a. AGTELIS (Automatic ground-transportable emitter location/identification system | | |
| (1) Frequency Range | | |
| (2) Range | | |
| (3) Platform | | |
| (4) Accuracy | | |
| (5) Mode | | |
| (6) Sensitivity | | |
| b. CEFLY TIGER (Airborne multichannel communications jammer | | |
| (1) Frequency Range | | |
| (2) Range | | |
| (3) Jamming Capability | | |
| (4) Sensitivity | | |
| (5) Mode | | |
| (6) Effective Radiated Power | | |

Budget Activity #4 - Tactical Program

Program Element #6.47.45.A Title Tactical Electronic Warfare Systems

Project #D926 Title Corps Tactical Electronic Warfare Systems

| Operational/Technical Characteristics | Objectives | Demonstrated Performance 1/ |
|---|---|---|
| c. QUICK LOOK II (Airborne non-communications emitter location/identification system) | | |
| (1) Frequency Range | | |
| (2) Range | | |
| (3) Target Signals | | |
| (4) Accuracy | | |
| (5) Communications | | |
| (6) Platform | | |
| (7) Sensitivity | | |
| d. Tactical Control and Analysis Center | | |

1/ To be demonstrated during development and operational testing.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.46.A Title Engineering Development Automatic Test Equipment

Category Engineering Development Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 1866 | 426 | 1695 | 13052 | 11165 | Continuing | Not Applicable |
| | Quantities | | | | | | Not Applicable | Not Applicable |
| D536 | AN/USM-410, Automatic Test Support System | 0 | 4 | 100 | 12074 | 7165 | Continuing | Not Applicable |
| D632 | Automatic Test Equipment (ATE) Internal Combustion Engine | 1866 | 422 | 1595 | 978 | 4000 | Continuing | Not Applicable |
| Procurement: | | | | | | | | |
| | AN/USM-410 Electronic Automatic Test Support System | | | | | | | |
| | Funds | 0 | 0 | 0 | 0 | 13900 | 18400 | 32300 |
| | Quantities | 0 | 0 | 0 | 0 | 4 | 5 | 9 |
| | Simplified Test Equipment | | | | | | | |
| | Funds | 0 | 0 | 0 | 1800 | 8100 | 36100 | 46000 |
| | Quantities | 0 | 0 | 0 | 50 | 500 | 5000 | 5550 |

BRIEF DESCRIPTION OF ELEMENT: Accomplish engineering development of automated test equipment. These are required to provide test and diagnostic services at all Army maintenance levels. The overall objective is to develop and produce test equipment which will increase maintenance accuracy and reduce both man-hour requirements and repair parts useage.

BASIS FOR FY 1978 RDTE REQUEST: Establish an engineering development contract to fabricate and test two ruggedized AN/USM-410 general purpose electronic Automatic Test Support Systems (ATSS); continue development of an assemblage of Simplified Test Equipment for Internal Combustion Engines.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: The increase in FY 1978 funds over FY 1977 is due to accelerated establishment of an engineering development contract to fabricate and test two ruggedized AN/USM-410 Automatic Test Support Systems.

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Budget Activity #4 - Tactical Programs

Program Element #6.47.46.A Title Engineering Development Automatic Test Equipment

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 18 | 0 | 18 |
| (2) Contractor Employees | 36 | 26 | 62 |
| Total | 54 | 26 | 80 |

DETAILED BACKGROUND AND DESCRIPTION: One of the considerations pertinent to development and acquisition of mission-oriented weapons systems and combat support systems is the manner in which they will be maintained. Logistics support analyses associated with several combat and combat support systems now in development have revealed that currently used manual methods of testing and fault diagnosis will not adequately support the intended primary mission. The increasing complexity of many weapons systems and an expanding use of microprocessors in electronic components have made manual fault isolation and repair extremely difficult. These systems require computer-assisted maintenance techniques and hardware for their support. The objective of this program element is to accomplish the engineering development necessary to acquire these needed computer-assisted automatic test support systems (ATSS). The types of operational systems now in development which require ATSS include aircraft, radar, communications, fire support and electronic warfare.

RELATED ACTIVITIES: Program Elements 6.27.79.A, Test, Measurement and Diagnostic Equipment Technology, and 6.37.48.A, Automatic Test Equipment Advanced Development, support the exploratory and advanced development which precedes the work accomplished here.

WORK PERFORMED BY: US Army Communications Research and Development Command, Fort Monmouth, New Jersey; US Army Tank-Automative Research and Development Command, Warren, Michigan; RCA Inc., Burlington, Massachusetts.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishments: Fabricated and tested initial prototypes of simplified manual test equipments for internal combustion engines (STE/ICE). Studied the feasibility of ruggedizing the commercially produced AN/USM-410 Automatic Test Support System (ATSS). In FY 197T, the STE/ICE engineering development effort was completed. In addition, completed the feasibility study of ruggedizing the AN/USM-410; determined cost impact of this effort.

2. FY 1977 Program: Acquire preliminary technical data for producibilityengineering planning of STE/ICE equipments; develop an engineering development solicitation package for a ruggedized AN/USM-410 ATSS.

Budget Activity #4 - Tactical Programs

Program Element #6.47.46.A Title Engineering Development Automatic Test Equipment

3. FY 1978 Planned Program: Acquire pre-production engineering models of STE/ICE equipments and prepare competitive procurement technical data package; establish an engineering development contract for two ruggedized AN/USM-410 ATSS assemblages. The increase in FY 1978 over FY 1977 is due to establishment of AN/USM-410 Ruggedization Contract.

4. FY 1979 Planned Program: Conduct Development Test (DT) III/Operational Test (OT) III testing on STE/ICE pre-production models; establish an engineering development contract for ATE/ICE; conduct DT II/OT II testing of AN/USM-410 ATSS. The decrease in FY 1979 funding from FY 1978 is due to decreased AN/USM-410 incremental funding requirements.

5. Program to Completion: This is a continuing program.

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.46.A Title Automatic Test Support Systems

Project #D536 Title AN/USM-410 Automatic Test Support System

Category Engineering Development Budget Activity #4 - Tactical Programs

DETAILED BACKGROUND AND DESCRIPTION: The objective of this project is to conduct engineering development on general purpose electronic Automatic Test Support Systems (ATSS). Such systems are anticipated to be the only viable means of test and diagnosis of complex military electronic systems now in development. The mission-oriented developments requiring this support include aircraft, electronic warfare, communications, fire support and radar systems.

RELATED ACTIVITIES: Program Elements 6.27.79.A, Test Measurement and Diagnostic Equipment Technology and 6.37.48.A, Automatic Test Equipment support the exploratory and advanced development work which is subsequently transferred to this program element for engineering development.

WORK PERFORMED BY: RCA Corp., Burlington, MA. The in-house developing organization is the Product Manager, Automatic Test Support Systems, US Army Communications Research and Development Command, Fort Monmouth, New Jersey.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: Completed preliminary investigations into the feasibility of ruggedizing the commercially produced AN/USM-410 ATSS to make it Military Standard for tactical applications. Identified specific sub-assemblies and components which would require ruggedization and conducted a cost analysis on the required work. Completed sub-assembly identification and cost analysis work initiated previously.

2. FY 1977 Program: Develop a complete engineering development solicitation package for fabrication and testing of two ruggedized AN/USM-410 Electronic Automatic Test Support Systems.

3. FY 1978 Planned Program: Award an engineering development contract for the fabrication and testing of two ruggedized AN/USM-410 systems. The increase in FY 1978 funding over FY 1977 is due to establishment of the AN/USM-410 Development Contract.

4. FY 1979 Planned Program: Continue the engineering development effort with Development Test/Operation Test II (DT II/OT) of the AN/USM-410 models. The decrease in FY 1979 funding from FY 1978 is due to a reduction in incremental funding requirements for contract effort.

5. Program Completion: This is a continuing program.

Budget Activity #4 - Tactical Programs

Program Element #6.47.46.A Title Automatic Test Support Systems

Project #D536 Title AN/USM-410 Automatic Test Support System

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 0 | 4 | 100 | 12074 | 7165 | Continuing | Not Applicable |
| Quantities | | | | | | Not Applicable | Not Applicable |
| Procurement: | | | | | | | |
| AN/USM-410 Electronic Automatic Test Support System | | | | | | | |
| Funds | | | | | 13900 | 18400 | 32300 |
| Quantities | | | | | 4 | 5 | 9 |

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FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.46.A Title Automatic Test Support Systems

Project #D632 Title Automatic Test Equipment - Internal Combustion Engines

Category Engineering Development Budget Activity #4 - Tactical Programs

DETAILED BACKGROUND AND DESCRIPTION: To develop and field Automatic Test Equipment for use at direct support (DS) and higher maintenance levels which will reduce unnecessary parts replacement due to incorrect diagnosis. Through the incorporation of diagnostic computer logic and transducer sensors, it is intended to provide a simple-to-use, accurate diagnostic field set which will enable a mechanic to accurately diagnose and repair vehicle faults.

RELATED ACTIVITIES: Program Elements 6.27.79.A Test, Measurement and Diagnostic Equipment Technology and 6.37.48.A. Automatic Test Equipment Advanced Development provide the exploratory and advanced developments that are continued by this effort into engineering development and subsequent adoption by Army and other agencies.

WORK PERFORMED BY: The in-house developing organization is the US Army Tank-Automotive Research and Development Command, Warren, Michigan. The contractor is RCA Corporation.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishments: Tests were performed on initial prototype equipments fabricated by contractual effort. These models were manual test assemblages called simplified test equipment for internal combustion engines (STE/ICE). The STE/ICE engineering development effort was completed and a configuration baseline established for Producibility Engineering Planning (PEP).

2. FY 1977 Program: Acquire preliminary technical data from the PEP contract. This data will serve as the basis for award of Low Rate Initial Production (LRIP) and Initial Production Facilities (IPF) contracts.

3. FY 1978 Planned Program: Acquire pre-production engineering models and validate accuracy of the technical data package to be used in subsequent competitive procurements. Preparation for Development/Operational Testing III (DT III/OT III) testing of engineering models will be started. The decrease in FY 1978 funds from FY 1977 level is due to decreased incremental funding requirements for the STE/ICE contract effort.

4. FY 1979 Planned Program: Conduct DT III/OT III testing on engineering models and provide engineering support for production preparations. Establish an engineering development contract for fabrication and testing of an assemblage of automatic test equipment for internal combustion engines (ATE/ICE). The increase in FY 1979 funds over FY 1978 is due to establishment of the ATE/ICE Development Contract.

Budget Activity #4 - Tactical Programs

Program Element 6.47.46.A Title Automatic Test Support Systems

Project #D632 Title Automatic Test Equipment - Internal Combustion Engines

5. Program to Completion: This is a continuing program.

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 1866 | 422 | 1595 | 978 | 4000 | Continuing | Not Applicable |
| Quantities | | | | | | Not Applicable | Not Applicable |
| Procurement: | | | | | | | |
| Simplified Test Equipment | | | | 1800 | 8100 | 36100 | 46000 |
| Funds | | | | 50 | 500 | 5000 | Not Applicable |
| Quantities | | | | | | | |

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.47.A Title Joint Compatibility and Interoperability Program

Category Engineering Development Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 1750 | 1012 | 1745 | 7822 | 10550 | Continuing | Not Applicable |
| D502 | Joint Compatibility & Interoperability | 1750 | 1012 | 1745 | 7822 | 10550 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: This is a new program element starting FY 1978. This program provides for accomplishment of those unique tasks required of the Chief of Staff, US Army, to perform the mission of Executive Agent for the Joint Chiefs of Staff for the Ground and Amphibious Military Operations Program (GAMO). This program element does not include funds for accomplishment of the Army's portion of the Joint GAMO Program. Funds for that purpose are included in P.E. 6.47.12.A, Joint Advanced Tactical C3P. Funds prior to FY 1978 for accomplishment of the Joint Chiefs of Staff (JCS) Executive Agent's mission, as outlined above, were included in P.E. 6.47.12.A.

BASIS FOR FY 1978 RDTE REQUEST: The primary objective is establishment of a Joint Interface Testing capability during FY 1978. This will require establishment and operation of a Joint Interface Test Force along with the provision of a Joint Test Facility equipped with electronic equipment along with technical engineering services necessary to allow joint testing to start in July 1978. In addition, engineering efforts will continue to develop documentation such as Joint Test Proposals, Joint Test Plans, Joint Technical Interface Design Standards, and Joint Configuration Management Plans.

BASIS FOR INCREASE IN FY 1978 OVER FY 1977: This program evolves from the "planning and preparation stage" to the "testing stage" in FY 1978. Joint GAMO testing is scheduled to start in July 1978 and is scheduled to continue through FY 1985.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 24 | 0 | 24 |
| (2) Contractor Employees | 50 | 0 | 50 |
| Total | 74 | 0 | 74 |

Budget Activity #4 - Tactical Programs

Program Element #6.47.47.A Title Joint Compatibility and Interoperability Program

DETAILED BACKGROUND AND DESCRIPTION: The joint Ground and Amphibious Military Operations (GAMO) program was established by the Joint Chiefs of Staff (JCS) on 1 April 1971 to achieve compatibility and interoperability of the tactical command and control systems to be used by the Services in support of Joint military operations during the 1980's. The Chief of Staff, US Army, was assigned the responsibility to accomplish the joint aspects of this program as the Executive Agent for the JCS with the program to be accomplished in three phases: Phase I -- conceptual phase; Phase II -- planning phase; and Phase III -- joint testing and demonstration phase. This program will develop the technical standards necessary for compatibility and interoperability of 30 different tactical command and control systems of the Services and Agencies, 38 different tactical facilities, and will conduct joint testing of over 84 major interfaces between these systems and facilities.

RELATED ACTIVITIES: The Joint Tactical Air Control System/Tactical Air Defense System (TACS/TADS) program with Chief of Naval Operations as its JCS Executive Agent, was established 13 February 1969, to achieve compatibility and interoperability of five specified tactical air defense and air control systems of the Services. This program is entering its final testing phase and is being considered for incorporation into the GAMO Program as a subset of the Air Operations Group. This incorporation will be accomplished when a technical and management capability has been established within the GAMO program to perform joint configuration management and joint testing of the Air Operations Group, presently scheduled for FY 1977.

WORK PERFORMED BY: Overall coordination and management of the joint aspects of the program is accomplished by the JCS Executive Agent's Management Office which is located with the Office, Deputy Chief of Staff for Operations and Plans (*ODCSOPS*), of the Army Staff. The Executive Agent's management office is supported by the Joint Planning Group which consists of two full-time representatives from each Service, one full-time representative from National Security Agency (NSA) and from Defense Intelligence Agency (DIA). Joint coordination is accomplished by the Joint Management Committee which meets monthly and is composed of representatives from all Services and Agencies participating in the GAMO program. A seven man nucleus of the Joint Interface Test Force (JITF) has been formed and is collocated with the GAMO Management Office and the Joint Planning Group. Incremental expansion of the JITF to an 85 man organization is planned over the next four years. The initial increment to establish a staff capable of performing joint testing is scheduled during FY 1978. Location of the joint testing facility and the JITF is being addressed by the JCS. This location should be determined by 1 January 1977.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: The GAMO Management Office, the Joint Planning Group, the Interface Coordination Committee, and the Joint Management Committees were established prior to February 1976. The Joint GAMO Management Plan was prepared and approved by the Services, the GAMO Technical Interface Concepts were prepared and approved by the JCS, a GAMO Implementation Plan was prepared, a JITF organizational plan was prepared and approved, Program Memorandum No. 99 was prepared and approved by JCS, OSD, and the Services, and a generalized Technical Interface Test Plan was prepared. In February 1976, the GAMO program was redirected to achieve a joint testing capability as early as possible by dividing the systems of the Services into four

functional groups (Intelligence, Air Operations, Amphibious and Fire Support, and Operations Control) and by placing priorities on these groups for testing. Since February 1976, the initial Joint Interface Test Force (JTIF) has been staffed with 7 officers and is operational, the Ground and Amphibious Military Operations (GAMO) Technical Interface Concepts document has been completely revised, forwarded for approval by Joint Chiefs of Staff (JCS), Program Memorandum (PM) 99 has been revised and forwarded for OSD/Service approval, a JITC site selection study completed, and other GAMO documentation revised to reflect the program orientation. CINCLANT was designated to accomplish GAMO operational effectiveness demonstrations.

2. FY 1977 Program: During FY 1977, the JITC site will be designated and occupied by the JITF, the JITF will be expanded to accomplish preliminary Intelligence Interface testing, PM 99 will be revised to reflect changes in the program resulting from budgetary actions, the Intelligence Group TIDP-TE will be completed, Intelligence Group test plans will be prepared, the Intelligence Group portion of the GAMO Test Proposal will be completed, a JITC systems design plan will be in preparation, a contract will be let for JITC testing hardware, a contract will be let for engineering services for support of the JITF, a Joint Configuration Management plan will be prepared, Joint policies, procedures and directives will be issued for configuration management of approved technical interface standards, various engineering studies will be initiated for accomplishment of the program, and additional Joint technical working groups will be established for development of technical interface design plans (TIDP) for the other functional groups.

3. FY 1978 Planned Program: The Joint Interface Test Center (JITC) will be activated, testing hardware will be delivered and installed in JITC, communications equipment will be delivered and installed, joint test plans completed, joint preliminary testing of the Intelligence Group will start, JITF staffing will be increased, the JITC system design plan will be completed, the GAMO Test Proposal will be completed, plans for testing of the Air Operations Group will be initiated, initial test results of Intelligence Group will be evaluated, configuration management of developmental standards will start, configuration management plans for approved standards will be completed, a plan for transition of Tactical Air Control Systems/Tactical Air Defense Systems (TACS/TADS) functions into GAMO will be completed, plans for the Operational Effectiveness Demonstration of Intelligence Group will be initiated, and the study for equipment to emulate air defense, air control systems will be completed. Various GAMO documents will be revised such as the Management Plan, PM 99, GAMO Implementation Plan, GAMO Data Elements Dictionary, and the JITF organizational plan. Increase in funding over the FY 1977 level is due to the activation of the JITC and the delivery and installation of communications equipment.

4. FY 1979 Planned Program: Preparation and refinement of Technical Interface Design Standards, Joint Interface Test Plans, Evaluation plans, Engineering studies, Test Concepts, Test Proposals, JITC system design plans, configuration management plans, emulation design studies, Electronic Countermeasures (ECM) studies, management plans, implementation plans, and the like will continue. Operation of the GAMO Management Office, the Joint Planning Group, the Joint Management Committee, the Joint Test Force, joint technical working groups and other joint organizations will continue to operate. Increase in funding over the FY 1978 level is due to the transition of the remaining TACS/TADS program functions into the GAMO program, the acquisition of additional JITC equipment, and initiation of joint testing of the Air Operations Group.

5. Program to Completion: This is a continuing program.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.47.48.A

Title Stand-Off Target Acquisition System (SOTAS)

Category Engineering Development

Budget Activity #4 - Tactical Program

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 4749 | 1219 | 8136 | 12962 | 23920 | 45153 | 96811 |
| | Quantities | | | | | | | 2 |
| D171 | Stand Off Target Acquisition System | 4749 | 1219 | 8136 | 12962 | 23920 | 45153 | 96811 |

BRIEF DESCRIPTION OF ELEMENT: This is an Army program to develop a Stand-Off Target Acquisition System which will locate moving targets at extended ranges in hostile territory during day or night under most weather conditions. The information will be displayed in real time at a ground station(s) to permit the most timely and efficient attack of these targets. The program is using existing hardware to test the concept, and concurrent study efforts to review and define other pertinent aspects of the program, prior to fabricating developmental hardware. This is designed to keep the program low risk and low cost while permitting early operational fielding.

BASIS FOR FY 1978 RDTE REQUEST: The FY 1978 program will be directed to the initiation of program for SOTAS. A significant part of this program will be the award of an contract for the SOTAS radar and the of the ground station. The SOTAS helicopter will be tested using its newly developed airborne flight control and Instrumented Flight Rules (IFR) avionic systems. Additional effort will be expended in developing the Integrated Communication and Navigation System (ICNS) data link for application to SOTAS. Effort will also be required in the analysis of data resulting from the SOTAS emulation test.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: The increased funding requirement in FY 1978 is due to the start of of both the airborne radar and the ground display system; the testing of the all weather helicopter platform; the development of a SOTAS data link from the ICNS and the analysis of data resulting from the SOTAS emulation tests.

Budget Activity #4 - Tactical Programs

Program Element #6.47.48.A Title Stand-Off Target Acquisition System (SOTAS)

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 15 | 0 | 15 |
| (2) Contractor Employees | 98 | 0 | 98 |
| Total | 113 | 0 | 113 |

DETAILED BACKGROUND AND DESCRIPTION: The United States (US) Army The Stand-Off Target Acquisition System (SOTAS) is an airborne target acquisition system concept comprised of an airborne moving target indicator (MTI) radar, integrated with a position location system and a ground data processing/data display van. This system has demonstrated the capability to detect and accurately locate moving targets at ranges well beyond ground line of sight and independent of day/night/weather conditions. A significant feature of the concept which had been verified, is its ability to store ground referenced radar imagery and to display that data at high data rates (time-compression) to enhance the probability of target detection and to minimize the probability of false targets. SOTAS is currently a cooperative Army/Air Force effort which will provide the basis for the tactically effective engagement of targets located beyond the ground line of sight by both Army and Air Force organic weapons systems because of its real time detection and location capability and will insure maximum interchange and utilization of applicable technology between the two services.

RELATED ACTIVITIES: Initial development efforts of SOTAS were funded in Program Element/Project 6.37.19.A, DK72, Radars. It was transfered to Program Element/Project 6.37.36.A, Stand-Off Target Acquisition System, in FY 1976 to separate funding of the Stand-Off Target Acquisition System from other radars found in the previous program element. A joint Army/Air Force test was accomplished during FY 1975 and FY 1976. The Air Force effort was conducted in Program Element 6.37.47.F, Low Visibility Stand-Off Target Acquisition/Strike. The joint program was initiated in FY 1975 with the Air Force applying $1.9 million to the development effort from Program Element 6.47.42.F, Position Location Strike System. It is estimated that the Joint nature of this resulted in a Department of Defense saving of approximately $3.0 million through FY 1976. Advanced Development will be essentially completed by FY 1978 and the program will transition to ED in PE 6.47.48.A.

Budget Activity #4 - Tactical Programs

Program Element #6.47.48.A Title Stand-Off Target Acquisition System (SOTAS)

WORK PERFORMED BY: The in-house developing organization for this program is the US Army Electronics Research and Development Command, Fort Monmouth, New Jersey. Contracts have been awarded to General Dynamics Electronics Corporation, San Diego, California, System Planning Corporation, Arlington, Virginia, Honeywell Systems and Research Center, Minneapolis, Minnesota, and Technology Services Corporation of Santa Monica, California for feasibility hardware, system effectively studies, man/machine systems analyses and an advanced radar design plan respectively.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: FY 1974 and prior accomplishments consisted of establishing the technical feasibility of key subsystem elements of the Stand-Off Target Acquisition System (SOTAS). These key subsystems included the helicopter mounted mechanical scan of the AN/APS-94 radar antenna, moving target indicator (MTI) data collection and transmission to a ground station, and data storage and retrieval techniques. In FY 1975 the fabrication of the initial total system and integration of the subsystems into the SOTAS system was initiated and successfully completed. The SOTAS was then tested in an instrumented tactical environment at the US Army Combat Development Experimentation Center (CDEC) Training and Doctrine Command, Fort Ord, California. This test provided technical data that verified the capability of the SOTAS to detect, locate and conceptually engage enemy targets at ranges well beyond the Forward Edge of the Battle Area (FEBA). Test data to support the US Air Force effort in closed-loop weapon guidance was also obtained during this test program.

System studies, man/machine simulations and analyses were conducted. A successful demonstration of the SOTAS in Korea was accomplished. In FY 197T, an advanced development model, improved over the model tested at CDEC, was tested in Europe during the Reforger 1976 exercise. This model was operated in a tactical context by cadre drawn from the Training and Doctrine Command schools. The preliminary assessment by the supported division - the 1st Armored Division - is that SOTAS filled a critical surveillance and target acquisition void by providing reliable, responsive and accurate data on targets. The SOTAS derived data was Maintenance of the test bed hardware was contractor provided. An advanced radar system design was also completed in FY 197T.

2. FY 1977 Program: The requisite data necessary is being developed. As a part of this effort three competitive contracts were awarded for the study of critical design issues that may occur in the implementation of the advanced SOTAS radar design. A contract to study the design of model of the ground display station was also awarded. A competitive contract was awarded for the fabrication of an advanced flight control and Instrumented Flight Rules (IFR) avionics system for the SOTAS helicopter platform. A test program is being undertaken to test a modified

version of the Hostile Weapons Location System radar in order to emulate those signal processing techniques proposed for the advanced SOTAS radar. Of particular interest is the advanced processing proposed to meet the Electromagnetic Counter Measure threat forecast for the SOTAS. An effort will be initiated to develop the Integrated Control and Navigation System data link hardware to meet SOTAS data transmission requirements.

3. FY 1978 Planned Program: Following Defense System Acquisition Review Council/Army System Acquisition Review Council (DSARC/ASARC) II in of SOTAS will be initiated. This will consist of separate development contracts for initiation of fabrication of the airborne radar and the ground display station. The SOTAS helicopter will be outfitted with the advanced airborne flight control and Instrumented Flight Rules avionics systems and flight tested. The modified Integrated Control and Navigation System data link will be tested. The increase in funding is due to starting of the elements listed.

4. FY 1979 Planned Program: In FY 1979 radar and ground station will be completed.

5. Program to Completion: In FY

Budget Activity #4 - Tactical Program

Program Element #6.47.48.A Title Stand-Off Target Acquisition System (SOTAS)

TEST AND EVALUATION DATA:

1. Development Test and Evaluation:

a. The Advanced Development (Feasibility) Model of the SOTAS was the result of contractual efforts by General Dynamics. The DT/I testing for SOTAS was accomplished in three distinct phases. The first phase consisted of a test at the Combat Development Experimental Center (CDEC), located at Ft Hunter-Liggett, CA, and conducted during the fourth quarter of FY 1975. The results of this effort provide; a data base for the Air Force Multilateration Radar Surveillance Strike System Program, the measurement of SOTAS accuracy as a function of a range and other parameters, and the performance of SOTAS in a so-called "mini-war" to determine capability in a simulated tactical environment. The second phase of the development test (DT)/I occurred in a joint exercise with the Air Force, at White Sands, NM, during the second quarter of FY 1976. In this test the SOTAS functioned as a target locator and interfaced with the Air Force's Advanced Location Strike System (ALSS) which directed an inert guided glide bomb (GBU 15) to the designated target. The third phase of DT/I involved a test in Korea during the fourth quarter of FY 1976. In Korea SOTAS demonstrated the capability to provide real time information with the number of detected targets exceeding that detected by any other sensor.

b. Development Test (DT) II is scheduled to start [redacted]

c. Development Test (DT) III is scheduled in [redacted]

2. Operational Test and Evaluation:

a. The Operational Testing OT I was conducted in two phases. The first phase was conducted in Korea in March 1976. The result was the demonstration of the capability of SOTAS to perform in a constructive manner within a tactical environment. The major part of OT occurred when SOTAS participated in the Reforger '76 FTX during the period of August - October 1976, in the Federal Republic of Germany. For this purpose SOTAS was operated entirely by cadre selected from the Army Training Schools. Contractor personnel were present to provide system maintenance. The duration of the field training exercise was 14 days. During this period SOTAS performed as an integral part of the 1st Armored Division. It successfully provided, during both day and night, real time data pertaining to the movement and location of enemy forces. The informal comments of the 1st Armored Division to the SOTAS performance in the field training exercise were very supportive of the SOTAS concept.

Budget Activity #4 - Tactical Programs

Program Element #6.47.48.A Title Stand-Off Target Acquisition System (SOTAS)

b. Operational Test (OT) II is scheduled to be conducted [redacted] The hardware configuration test at that time will consist of engineering models of the airborne helicopter platform, airborne radar, data link and ground display station. It is anticipated that four Engineering Development models consisting of two airborne units, one data link and one ground display station will be available for test at that time. Following the OT II tests these models will be deployed overseas for an Extended Overseas Troop Test (EOTT). Such a deployment will provide a factual basis for any modification that may be required while simultaneously providing an interim capability to the field.

c. Operational Test (OT) III is scheduled to be conducted during [redacted]

3. Systems Characteristics:

| Feasibility Model | Objectives | Demonstrated (Feasibility Model DT I/OT I) |
|---|---|---|
| Range | [redacted] | 35 Km |
| Accuracy | [redacted] | [redacted] |
| Endurance | 2 hours, VFR, IFR | 1 hour, VFR only |
| Target Types | Tanks, Trucks, Helicopter Walking Man | Tanks, Trucks, Helicopter Walking Man |
| Target Velocity | [redacted] | [redacted] minimum |
| Type of Scan | (Simultaneous) Mechanical/ Electronic X-Band | Mechanical, Circular and Sector |
| Rain Performance | Essentially rain independent | Degraded in driven rain |
| ECCM Capability | To be Determined | None |

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.57.01.A

Title Communications-Electronics Testing Activities

Category Management and Support

Budget Activity #4 - Tactical Programs

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 3420 | 758 | 3277 | 3385 | 3482 | Continuing | Not applicable |
| D918 | USASA Testing Activities | 3420 | 758 | 3277 | 3385 | 3482 | Continuing | Not applicable |

BRIEF DESCRIPTION OF ELEMENT: This element provides those facilities and resources essential to the conduct of the US Army Security Agency (USASA) Test and Evaluation Program. Under the provisions of Army Regulation (AR) 10-122, AR 70-10 and AR 705-5, USASA, as a major developing agency, is responsible for the testing and evaluation of equipment developed by, or intented for use by, the USASA. For the accomplishment of its test and evaluation mission, USASA is authorized and maintains the US Army Security Agency Test and Evaluation Center at Fort Huachuca, Arizona. In addition to testing equipment intended exclusively for USASA, this activity also provides vulnerability and Electronic Security (ELSEC) test support to other Army test activities.

BASIS FOR FY 1978 RDTE REQUEST: The US Army Security Agency Test and Evaluation Center is currently capable of conducting approximately ten equipment and/or limited systems tests. The actual number of tests which can be conducted at any one time varies with the type and complexity requirements of the tests scheduled. Necessary reorganization of staff is in progress to improve the capability for testing complete systems. In addition, limited personnel and equipment are available to provide Electronic Countermeasures (ECM) vulnerability and ELSEC test support as required. An in-house effort to improve instrumentation, equipment and semi-automatic data processing necessary to meet all projected requirements is continuing and contractual assistance is being utilized where appropriate.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: Increased number of systems scheduled for developmental testing in FY 78.

Budget Activity #4 - Tactical Programs

Program Element #6.57.01.A Title Communications-Electronics Testing Activities

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 47 | 0 | 47 |
| (2) Contractor Employees | 10 | 0 | 10 |
| Total | 57 | 0 | 57 |

DETAILED BACKGROUND AND DESCRIPTION: This project provides those facilities and resources essential to the conduct of the US Army Security Agency Test and Evaluation Program. For the accomplishment of this program, the US Army Security Agency is authorized and maintains a Test and Evaluation Center at Fort Huachuca, Arizona, where it shares the use of range facilities with other electronic test activities. This activity plans, conducts and reports on material tests of new equipment and systems developed by and for the use of the US Army Security Agency. Test extends from determination of technical feasibility of a concept, through engineering suitability test to field testing of production type hardware. The capabilities of the Test Center are uniquely applicable to testing of equipment requiring an evaluation of Signal Intelligence, Signal Security and Electronic Warfare applications. The facility occupies a combined headquarters and laboratory building constructed specifically to meet their testing needs. This activity has unique test facilities and instrumentation applicable to testing US Army Security Agency mission equipment and which provides a capability of simulating a specific enemy electronic threat.

RELATED ACTIVITIES: Because of the special capability of the US Army Test Center, support is provided to other Army and, in response to special requests, other service and the

Although the Test Center occupies over 30 acres of land, they do share the extensive range facilities of the US Army Electronic Proving Ground.

WORK PERFORMED BY: Contractor is Digital Equipment Corporation (Automated Test Facility). In-House is done by the US Army Security Agency Test and Evaluation Center, Fort Huachuca, Arizona.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishments:

Budget Activity #4 - Tactical Programs

Program Element #6.57.01.A Title Communications-Electronics Testing Activities

2. FY 1977 Planned Program:

3. FY 1978 Planned Program:

Budget Activity #4 - Tactical Programs

Program Element #6.57.01.A Title Communications-Electronics Testing Activities

4. FY 1979 Planned Program:

5. Program to Completion: This is a continuing program. Development tests will be conducted as the equipment becomes available.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #3.10.22.A Title Scientific and Technical Intelligence

Category Operational System Budget Activity #5 - Intelligence and Communications

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | | | | | | Continuing | Not Applicable |
| | Quantities | | | | | | | |
| D381 | | | | | | | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: Research and Development (R&D) effort to enhance Automatic Data Processing (ADP) support of Army Scientific and Technical (S&T) activities by interfacing existing functional support on scientific type computers at the Missile Intelligency Agency (MIA) at Huntsville, AL.

BASIS FOR FY 1978 RDTE REQUEST: Continue development support commencing in FY 1977. FY 1978 funding will provide the initial software required for correlating and analyzing Electronic Intelligence (ELINT) data passed through the analog-digital interface relating to foreign missile modeling and simulation applications.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: FY 1978 funding increase is required for research, design and development of advanced scientific and technical (S&T) software to include graphics software capabilities.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 3 | 0 | 3 |
| (2) Contractor Employees | 3 | 0 | 3 |
| Total | 6 | 0 | 6 |

Budget Activity #5 - Intelligence and Communications

Program Element #3.10.22.A Title Scientific and Technical Intelligence

DETAILED BACKGROUND AND DESCRIPTION: Analog/digital data analysis applications were previously developed and operating on a Control Data Corporation (CDC) 3300 computer system. The applications expanded to a level requiring large scale computer support, which necessitated the development of new interfaces and modification of existing applications to run on the CDC 6000 series system. The contract effort will provide follow-on support to this system integration action by providing for the development of advanced data analysis software to include graphics applications.

RELATED ACTIVITIES: Defense Intelligence Agency (DIA) sponsored projects requiring improved support of Scientific and Technical (S&T) activities and expanded access to their data bases by the other members of the intelligence community as well as to weapons design and development activities in order to provide improved counter weapon design in promoting advanced US technological superiority over foreign weapons system. To this end, Missiles Intelligence Agency (MIA) is being provided an AN/GYQ-21(V) computer as part of the Army System for Standard Intelligence Support Terminals (ASSIST) project which will provide the requisite national level file access through the ASSIST switch in the Army Operations Center, and data management capability which will complement and support analog/digital data analysis efforts.

WORK PERFORMED BY: Contractor to be selected.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: RDTE project was not initiated in FY 1976 due to reprograming of funds by Materiel Development and Readiness Command (DARCOM) in coordination with the Deputy Chief of Staff for Research, Development, and Acquisition (DCSRDA).

2. FY 1977 Program: The FY 1977 program is to initiate improvement of Missile Intelligence Agency's Scientific Automatic Data Processing (ADP) equipment by interfacing the analog/digital equipment to use Control Data Corporation (CDC) 6000 series main processor to make the full capabilities of the total ADP system available. This effort is still achievable even though prior reprograming actions have impacted the overall effort.

3. FY 1978 Planned Program: FY 1978 expenditures are for research design and development of advanced Scientific and Technical (S&T) software to include graphics software capabilities to meet Army's responsibilities and use data available through new sensor collection systems. The increase in FY 1978 over FY 1977 is to develop and implement required software modules which facilitate correlation, analysis and graphic display of overhead sensor derived data for the intelligence analyst.

4. FY 1979 Planned Program: Continue and complete software efforts in FY 1977 and FY 1978. Program is expected to move from Research and Development (R&D) environment to intelligence production support environment in late FY 1979.

Budget Activity #5 - Intelligence and Communications

Program Element #3.10.22.A Title Scientific and Technical Intelligence

5. Program to Completion: Complete RDTE development by end of FY 1979.

6. Major Milestones:

| | Date | Estimated RDTE Cost to Reach Events (Cumulative) |
|---|---|---|
| a. Applied Dynamics-4 interface to Control Data Corporation (CDC) 6000 series system | 1st Qtr FY 1978 | $175K |
| b. Expanded Scientific and Technical (S&T) software capabilities | 1st Qtr FY 1979 | $375K |

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #3.20.53.A Title National Military Command System-Wide Support--Communications

Category Advanced Development Budget Activity #5 - Intelligence and Communications

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 0 | 0 | 0 | 2614 | 2000 | 0 | 4700 |
| DXXX | Rapid Reaction Deployable Command and Control and Communications ($C^3$) | 0 | 0 | 0 | 2614 | 2000 | 0 | 4700 |
| Procurement: | | | | | | | | |
| | Funds | 0 | 0 | 0 | 0 | 2200 | 2400 | 4600 |
| | Quantities | * | * | * | * | * | * | * |

* Number of diverse items

BRIEF DESCRIPTION OF ELEMENT: This advanced development program is in support of the Department of Defense (DOD) Worldwide Military Command and Control Systems (WWMCS) architecture activity and the Department of the Army studies relating to the development of Deployable Command and Control facilities in support of the WWMCCS. This includes studies and analysis on mobile/transportable command and control, systems engineering and tactical command and control interface with the WWMCCS.

BASIS FOR FY 1978 RDTE REQUEST: Institute new program for the development of mobile/transportable command and control facilities in support of crisis management for the National Command Authority (NCA). Conduct feasibility study to examine integrating current capabilities of fixed WWMCCS modes into a mobile/transportable configuration. The Department of Army was designated as cognizant agent to develop Rapid Reaction Deployable $C^3$ facilities by Deputy Secretary of Defense (DEPSECDEF) memorandum 24 June 1976. This effort is to pursue the timely achievement of new capabilities in the WWMCCS selected architecture and initial designated Research and Development efforts leading to this capability.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: Program to begin in FY 1978.

Budget Activity #5 - Intelligence and Communications

Program Element #3.20.53.A Title National Military Command System-Wide Support--Communications

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 3 | 0 | 3 |
| (2) Contractor Employees | 11 | 0 | 11 |
| Total | 14 | 0 | 14 |

DETAILED BACKGROUND AND DESCRIPTION: This newly initiated program will accomplish the analysis, development, planning and evaluation of equipment to define a mobile/transportable Command and Control and Communications ($C^3$) system configuration in support of the Worldwide Military Command and Control Systems (WWMCCS). This program will also address all interface requirements between the WWMCCS and tactical Command and Control systems. The facilities will enhance the survivability, interoperability, reliability, flexibility, security and integration of $C^3$ elements responsive to the National Command and Control Authorities and Department of the Army (DA) for the direction of all US Military forces from non-conflict crisis management through general war. The Army, by the Office of Secretary of Defense (OSD) directive has program funding support for this program starting in FY 1978.

RELATED ACTIVITIES: This program is related to efforts being accomplished under the WWMCCS selected architecture and the Army Tactical Command and Control Master plan.

WORK PERFORMED BY: The Director, Telecommunication and Command and Control, Office, Deputy Chief of Staff for operations and Plans (ODCSOPS), DA, is the Program Manager. Contract will be awarded first quarter FY 1978 for prototype equipment.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: None.

2. FY 1977 Program: None

3. FY 1978 Planned Program: Systems Definition Program to permit facility to be structured. Development of specific guidance and specification study. Mix and sizing alternative study. Increase in FY 1978 funds over FY 1977 is due to new start in FY 1978.

Budget Activity #5 - Intelligence and Communications

Program Element #3.20.53.A Title National Military Command System-Wide Support--Communications

4. FY 1979 Planned Program: Continue with the implementation of the Rapid Reaction Deployable Command and Control and Communications ($C^3$) program as defined in the WWMCCS selected architecture. Decrease in FY 1979 funds from FY 1978 is due to reduced level of effort in the conclusion of the program in FY 1979.

5. Program to Completion: Program is planned for completion in FY 1979.

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #3.34.01.A Title Communications Security (COMSEC) Equipment

Category Operational System Budget Activity #5 - Intelligence and Communications

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | | | | | | Continuing | Not Applicable |
| | Quantities | | | | | | Not Applicable | Not Applicable |
| D491 | Communications Security Equipment & Techniques | | | | | | Continuing | Not Applicable |
| D901 | Signal Security (SIGSEC) Activities | | | | | | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: This program is principally designed to develop Communications Security (COMSEC) techniques, equipment, and to provide system engineering support to Army materiel developers in the integration and installation of COMSEC in communications-electronics and command/control systems. It also provides Signal Security (SIGSEC) guidance to Army RDTE Programs. The primary efforts are devoted to Exploratory, Advanced and Engineering Development.

BASIS FOR FY 1978 RDTE REQUEST: Advanced Development of a single security device for use with several radios; Engineering Development of a wire line adapter; Advanced Development of a cost effective receive only COMSEC device for inventory Very High Frequency/ Frequency Modulation (VHF/FM) auxillary receivers used in combat units. Continued effort to support SIGSEC activities.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: The decrease in FY 1978 over FY 1977 is because of a reduction in TEMPEST support and equipments and in installation kit development of equipments.

Budget Activity #5 - Intelligence and Communications

Program Element #3.34.01.A Title Communications Security (COMSEC) Equipment

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civilian Employees | 38 | 0 | 38 |
| (2) Contractor Employees | 65 | 0 | 65 |
| Total | 103 | 0 | 103 |

DETAILED BACKGROUND AND DESCRIPTION: This continuing Army Communications Security (COMSEC) RDTE program supports Army, and upon the request of COMSEC requirements. Primary exploratory efforts include continuing studies of voice and data security techniques required to satisfy future Army requirements. Primary Advanced Engineering efforts are for the development of a

into Army communications and automatic data processing systems.

RELATED ACTIVITIES:

This effort represents those COMSEC developments delegated to the Army Program Element 6.47.01.A, Communications Engineering Development, is related to this effort. Programs are coordinated at regular intervals with services and civilian agencies.

WORK PERFORMED BY: Developing Agencies: US Army Communications Research and Development Command, Fort Monmouth, New Jersey; Project Manager, Single Channel Ground and Airborne Radio Subsystem (SINCGARS), Fort Monmouth, New Jersey. Contractors include: Magnavox Corporation, Fort Wayne, Indiana; General Atronix, Philadelphia, Pennsylvania; Watkins Johnson Corporation, Gaithersburg, Maryland; CECO, Cincinnati, Ohio; Honeywell, New Shrewsbury, New Jersey; Radiation Incorporated, Melbourne, Florida; Atlantic Research, Alexandria, Virginia; TRW, Redondo Beach, California; IBM, Kingston, New York.

Budget Activity #5 - Intelligence and Communications

Program Element #3.34.01.A Title Communications Security (COMSEC) Equipment

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: Significant program accomplishments included the development of the

2. FY 1977 Program:

3. FY 1978 Planned Program:

Budget Activity #5 - Intelligency and Communications

Program Element #3.34.01.A Title Communications Security (COMSEC) Equipment

4. FY 1979 Planned Program: Upon completion of the necessary prior year experimental work.

5. Program to Completion: This is a continuing program.

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #3.34.01.A Title Communications Security (COMSEC) Equipment

Project #D491 Title Communications Security Equipment and Techniques

Category Operational Systems Budget Activity #5 - Intelligence and Communications

DETAILED BACKGROUND AND DESCRIPTION: This continuing Army COMSEC RDTE program supports Army, and upon the request of the COMSEC requirements. Primary exploratory efforts include studies of voice and data security techniques required to satisfy future Army requirements. Primary Advanced Engineering efforts are for the development of a

into Army communications and automatic data processing systems.

RELATED ACTIVITIES: This effort represents those COMSEC developments delegated to the Army Program element 6.47.01.A, Communications Engineering Development, is related to this effort. All efforts in this project are coordinated at regular intervals with services and civilian agencies.

WORK PERFORMED BY: Developing Agencies; US Army Communications Research and Development Command, Fort Monmouth, New Jersey; Project Manager, SINCGARS, Fort Monmouth, New Jersey. Contractors include: Magnavox Corporation, Fort Wayne, Indiana; General Atronix, Philadelphia, Pennsylvania; Watkins Johnson Corporation, Gathersburg, Maryland; CECO, Cincinnati, Ohio; Honeywell, New Shrewsbury, New Jersey; Radiation Incorporated, Melbourne, Florida; Atlantic Research, Alexandria, Virginia; TRW, Redondo Beach, California; IBM, Kingston, New York.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 76, 7T and Prior Accomplishments: Significant program accomplishments included the development of the

Budget Activity #5 - Intelligence and Communications

Program Element #3.34.01.A Title Communications Security (COMSEC) Equipment

Project #D491 Title Communications Security Equipment and Techniques

2. FY 77 Program:

3. FY 1978 Planned Program: This program includes completion of

4. FY 79 Planned Program: Upon completion of the necessary prior year experimental work,

5. Program to Completion: This is a continuing program.

Budget Activity #5 - Intelligence and Communicatio

Program Element #3.34.01.A Title Communications Security (COMSEC) Equipment

Project #D491 Title Communications Security Equipment and Techniques

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 1977 | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | | | | | | Continuing | Not Applicable |
| Quantities | * | * | * | * | * | * | Not Applicable |

*Large Number of diverse items.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #3.51.64.A Title NAVSTAR Global Positioning System (GPS) User Equipment

Category Advanced Development Budget Activity #5 - Intelligence and Communications

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 0 | 0 | 0 | 8535 | 5509 | Continuing | Not Applicable |
| | Quantities | | | | | | | 32 |
| D168 | NAVSTAR GPS | 0 | 0 | 0 | 8535 | 5509 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: The NAVSTAR Global Positioning System will consist of 24 satellites, a Master Ground Station, and user equipment in vehicles, ships, airplanes, and manportables. The system will provide global, highly accurate information which will serve a broad spectrum of military navigation and positioning missions. This program element funds the Army's participation in the Joint Program Office (JPO) for the Phase I, Concept Validation. Pending validation, the Department of Defense plans to make a decision in 1978 regarding operational deployment of the system beginning in the early 1980's.

BASIS FOR FY 1978 RDTE REQUEST: The efforts on the advance development user equipment contracts with General Dynamics and Texas Instruments, and tests on deliverable equipment from these contracts to determine suitability to meet Army requirements will be completed in P.E. 6.34.03.A, NAVSTAR Global Positioning System (GPS). Funds are required to initiate contracts for full scale development in this Program Element.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: To initiate the contracts for full scale development models with two contractors to maintain the established competitiveness in the user equipment development and provide the required number of 32 sets for testing.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 8 | 0 | 8 |
| (2) Contractor Employees | 44* | 0 | 44* |
| Total | 52 | 0 | 52 |

* Includes 15 spaces also reported by US Air Force.

Budget Activity #5 - Intelligence and Communications

Program Element #3.51.64.A Title NAVSTAR Global Positioning System (GPS) User Equipment

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. Technologies available at the time these systems were developed tended to limit their use to specific applications with only a minimum of integration possible. Further improvements in their military utility is constrained by accuracy limits, extent of geographic coverage, dependence on foreign base rights and other reasons. 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 Department of Defense positioning requirements. In particular, the ultimate utility of such a system is in its ability to provide the precision required for accurate weapons delivery, in all weather conditions, day or night, anywhere. During 1976, the Joint Program Office of the NAVSTAR Global Positioning System continued to make progress in the development of prototype NAVSTAR satellites and user equipment. When operational, the system will provide unprecedented accuracies of position and velocity in three dimensions, i.e., position within 10 meters and velocity within 0.03 meters per second. This will greatly enhance military capabilities for enroute navigation and position fixing. The NAVSTAR 24 satellites will be in 17,600 kilometer orbits and estimates are that some 25,000 to 35,000 users in almost every kind of military mission will use NAVSTAR for navigation and position fixing.

RELATED ACTIVITIES: This is a Joint Program with all Services participating. The Air Force is executive agency. Funding for Phase I of the Joint Program is derived from Program Elements No. 63403A, No. 63401N, and No. 63421F, NAVSTAR Global Positioning System (GPS). Phase II efforts will be in Program Elements 3.51.64.A, 3.51.64.N, 3.51.64.F, NAVSTAR Global Positioning System (GPS) User Equipment, and 3.51.65.F, NAVSTAR Global Positioning System (GPS) Space and Control Segment. The Program Manager for this joint-Service program coordinates the supporting activities of the Army, Navy, Air Force, Marine Corps and the Defense Mapping Agency through his Service Deputies to provide cohesive and complementary development, test and evaluation of the Global Positioning Systems. Civil agencies electing to participate (e.g., Departments of Interior, Commerce and Transportation) can be represented in the joint Program Office. The Department of Commerce, Maritime Administration is investigating very low cost user equipment through the joint program office.

WORK PERFORMED BY: Phase I efforts: The contractor for the ground stations and user equipment is the General Dynamics-Electronics Corp., San Diego, CA, with the Magnavox Research Laboratory, Torrance, CA as the user equipment subcontractor. Texas Instruments, Inc., Dallas, TX is developing user equipment for use in high dynamic aircraft applications and for manpack use. Collins Radio Corp., Cedar Rapids, IA is developing a receiver for maximum protection from enemy interference, under contract with the Air Force Avionics Laboratory. The satellite contractor is Rockwell International, Seal Beach, CA, with International Telephone and Telegraph, Nutely, NJ as the subcontractor for navigation subsystems. Additional contractors are: General Dynamics, Convair, San Diego, CA - Atlas E/F Boosters; Fairchild Industries, Germantown, MD - Stage Vehicles; the Aerospace Corporation, El Segundo, CA - Engineering Support; the Analytic Sciences Corporation, Reading, MA - System Simulations; Charles Stark Draper Laboratories, Cambridge, MA; Stanford Telecommunications, Inc., Palo Alto, CA; and Aeronautical Radio, Inc., Annapolis, MD. In-house Army developing organizations are the Army Satellite Communications Agency, Fort Monmouth, NJ and the Army Satellite Communications Agency Group in the Joint Program Office, U.S. Air Force Space and Missile Systems Organization, El Segundo, CA.

Budget Activity #5 - Intelligence and Communications

Program Element #3.51.64.A Title NAVSTAR Global Positioning System (GPS) User Equipment

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: Studies were conducted first to determine operational characteristics, performance parameters and equipment characteristics to meet Army requirements and applications. Then a cost-effectiveness evaluation of an integrated system using the NAVSTAR Global Positioning System (GPS) was performed. A Materiel Need with supporting technical plan and cost analysis was prepared and appr ed. The Joint Program Office (JPO) awarded a contract on 23 Oct 74 to General Dynamics Corporation for study and fabrication ound control systems and joint service airborne, vehicle and manportable user system equipments. The Army is to get 10 adva development models of 3 different unique types of user equipments. Advanced development contracts were initiated for development of complementary manpack equipment in June 1975 for two models from Texas Instruments and in March 1976 for four models from Magnavox. Ground tests were conducted to determine type and location of antennas required on Army rotary wing aircraft. Field tests were continued, at various locations, to measure ground multipath and foliage effects on range accuracy using ground test probes. All of these efforts were funded under Program Element 6.34.03.A, NAVSTAR Global Positioning System (GPS).

2. FY 1977 Program: Continue monitoring the contracts for study efforts and fabrication of joint service user equipment. Continue development and testing of the Tactical Crystal Oscillator and investigate sources for future production of this unique equipment. Continue investigation of presence and magnitude of multipath and foliage effects on range measurement signal accuracy as related to specific environments at multiple geographic locations. Resultant data will impact on both specification and development of production model Army User Equipment. Continue to investigate and test Rotor Blade Modulation and Multipath effects of antenna design and location in Army aircraft. Continue to evaluate, analyze and determine suitability of both baseline and competitive contract equipment on meeting Army requirements. Complete testing of specific directional receiver antenna designs and their effects upon user navigation performance and applicability. Complete cost analysis study to determine product unit and life cycle costs agreeable to both the Army user and the Army developer. All of these efforts were funded under Program Element 6.34.03.A, NAVSTAR Global Positioning System (GPS).

3. FY 1978 Planned Program: Complete the on-going concept validation efforts in Program Element 6.34.03.A, NAVSTAR Global Positioning System (GPS). Continue investigation of multipath and foliage effects on range measurement signal accuracy as related to specific environments at multiple geographic locations. Initiate contracts for Army user equipment as all necessary experimental work will be completed and NAVSTAR will be ready for full scale development. The increase in funds over FY 1977 is required to let the contracts and field the Army user equipment in consonance with the other Services.

4. FY 1979 Planned Program: Continue efforts by identifying in scope user equipment vulnerability in the Army environment; integration of user equipment with Artillery Survey systems; developing retrofit kits for wheel, track and existing aircraft and for new land, sea and airborne vehicles; developing maintenance and repair philosophy for implementation in existing Army logistical systems; and continuing participation in Joint Service computer software refinement programs. FY 1979 funding needs are significantly less than the funds required in FY 1978 because the Engineering Development Contract costs had to fund long lead time items.

Budget Activity #5 - Intelligence and Communications

Program Element #3.51.64.A Title NAVSTAR Global Positioning System (GPS) User Equipment

5. Program to Completion: Upon completion of PHASE I testing, a decision is expected in early 1978 to deploy the operational systems in the early 1980's. The decision will be made primarily on cost and performance merits of the system to meet military missions. Present plans call for continued support of the NAVSTAR program and the installation of user equipment in selected airborne and surface vehicles.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.34.03.A Title NAVSTAR Global Positioning System (GPS)

Category Advanced Development Budget Activity #5 - Intelligence and Communications

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 6400 | 1550 | 7518 | 1937 | 0 | 0 | 25141 |
| | Quantities | | | | | | | 16 |
| D656 | NAVSTAR GPS | 6400 | 1550 | 7518 | 1937 | 0 | 0 | 25141 |

BRIEF DESCRIPTION OF ELEMENT: The NAVSTAR Global Positioning System will consist of 24 satellites, a Master Ground Station, and user equipment in vehicles, ships, airplanes, and manportables. The system will provide global, highly accurate information which will serve a broad spectrum of military navigation and positioning missions. This program element funds the Army's participation in the Joint Program Office (JPO) for the Phase I, Concept Validation. Pending validation, the Department of Defense plans to make a decision in 1978 regarding operational deployment of the system beginning in the early 1980's.

BASIS FOR FY 1978 RDTE REQUEST: Complete the efforts on the user equipment contracts with General Dynamics and Texas Instruments. Accept and test deliverable equipment from these contracts to determine suitability to meet Army requirements. Initiate contracts for full scale development in P.E. 3.51.64.A, NAVSTAR Global Positioning System (GPS) User Equipment.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: The $1.9 million completes the validation phase. The Phase II effort will be funded in P.E. 3.51.64.A, NAVSTAR Global Positioning System (GPS) User Equipment, to initiate the contracts for full scale development models.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 8 | 0 | 8 |
| (2) Contractor Employees | 44* | 0 | 44* |
| Total | 52 | 0 | 52 |

* Includes 15 spaces also reported by US Air Force.

Budget Activity #5 - Intelligence and Communications

Program Element #6.34.03.A Title NAVSTAR Global Positioning System (GPS)

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. Technologies available at the time these systems were developed tended to limit their use to specific applications with only a minimum of integration possible. Further improvements in their military utility is constrained by accuracy limits, extent of geographic coverage, dependence on foreign base rights and other reasons. 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 Department of Defense positioning requirements. In particular, the ultimate utility of such a system is in its ability to provide the precision required for accurate weapons delivery, in all weather conditions, day or night, anywhere. During 1976, the Joint Program Office of the NAVSTAR Global Positioning System continued to make progress in the development of prototype NAVSTAR satellites and user equipment. When operational, the system will provide unprecedented accuracies of position and velocity in three dimensions, i.e., position within 10 meters and velocity within 0.03 meters per second. This will greatly enhance military capabilities for enroute navigation and position fixing. The NAVSTAR 24 satellites will be in 17,600 kilometer orbits and estimates are that some 25,000 to 35,000 users in almost every kind of military mission will use NAVSTAR for navigation and position fixing.

RELATED ACTIVITIES: This is a Joint Program with all Services participating. The Air Force is executive agency. Funding for Phase I of the Joint Program is derived from P.E.s No. 63403A, No. 63401N, and No. 63421F. Phase II efforts will be in P.E.s 3.51.64.A, 3.51.64.N, 3.51.64.F, and 3.51.65.F. The Program Manager for this joint-Service program coordinates the supporting activities of the Army, Navy, Air Force, Marine Corps and the Defense Mapping Agency through his Service Deputies to provide cohesive and complementary development, test and evaluation of the Global Positioning Systems. Civil agencies electing to participate (e.g., Departments of Interior, Commerce and Transportation) can be represented in the joint Program Office. The Department of Commerce, Maritime Administration is investigating very low cost user equipment through the joint program office. The Joint Program Office manages the program and insures there is no duplication of effort.

WORK PERFORMED BY: The contractor for the ground stations and user equipment is the General Dynamics-Electronics Corp., San Diego, CA, with the Magnavox Research Laboratory, Torrance, CA as the user equipment subcontractor. Texas Instruments, Inc., Dallas, TX is developing user equipment for use in high dynamic aircraft applications and for manpack use. Collins Radio Corp., Cedar Rapids, IA is developing a receiver for maximum protection from enemy interference, under contract with the Air Force Avionics Laboratory. The satellite contractor is Rockwell International, Seal Beach, CA, with International Telephone and Telegraph, Nutely, NJ as the subcontractor for navigation subsystems. Additional contractors are: General Dynamics, Convair, San Diego, CA - Atlas E/F Boosters; Fairchild Industries, Germantown, MD - Stage Vehicles; the Aerospace Corporation, El Segundo, CA - Engineering Support; the Analytic Sciences Corporation, Reading, MA - System Simulations; Charles Stark Draper Laboratories, Cambridge, MA; Stanford Telecommunications, Inc., Palo Alto, CA; and Aeronautical Radio, Inc., Annapolis, MD. In-house Army developing organizations are the Army Satellite Communications Agency, Fort Monmouth, NJ and the Army Satellite Communications Agency Group in the Joint Program Office, U.S. Air Force Space and Missile Systems Organization, El Segundo, CA.

Budget Activity #5 - Intelligence and Communications

Program Element #6.34.03.A Title NAVSTAR Global Positioning System (GPS)

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: Studies were conducted first to determine operational characteristics, performance parameters and equipment characteristics to meet Army requirements and applications. Then a cost-effectiveness evaluation of an integrated system using the NAVSTAR Global Positioning System (GPS) was performed. A Materiel Need with supporting technical plan and cost analysis was prepared and approved. The Joint Program Office (JPO) awarded a contract on 23 Oct 74 to General Dynamics Corporation for study and fabrication of ground control systems and joint service airborne, vehicle and manportable user system equipments. The Army is to get 10 advanced development models of 3 different unique types of user equipments. Advanced development contracts were initiated for development of complementary manpack equipment in June 1975 for two models from Texas Instruments and in March 1976 for four models from Magnavox. Ground tests were conducted to determine type and location of antennas required on Army rotary wing aircraft. Field tests were continued, at various locations, to measure ground multipath and foliage effects on range accuracy using ground test probes.

2. FY 1977 Program: Continue monitoring the contracts for study efforts and fabrication of joint service user equipment. Continue development and testing of the Tactical Crystal Oscillator and investigate sources for future production of this unique equipment. Continue investigation of presence and magnitude of multipath and foliage effects on range measurement signal accuracy as related to specific environments at multiple geographic locations. Resultant data will impact on both specification and development of production model Army User Equipment. Continue to investigate and test Rotor Blade Modulation and Multipath effects of antenna design and location in Army aircraft. Continue to evaluate, analyze and determine suitability of both baseline and competitive contract equipment on meeting Army requirements. Complete testing of specific directional receiver antenna designs and their effects upon user navigation performance and applicability. Complete cost analysis study to determine product unit and life cycle costs agreeable to both the Army user and the Army developer.

3. FY 1978 Planned Program: Complete the on-going contracts. Accept and test deliverable equipment from these contracts to determine suitability to meet Army requirements. Complete rotor blade modulation and multipath effects of antenna design and location on Army aircraft. Complete investigation, testing and evaluation, to include production source, of Tactical Crystal Oscillator. The decrease in funds from FY 1977 is due to the completion of the Advance Development efforts. Further efforts for Army user equipment will be in P.E. 3.51.64.A, NAVSTAR Global Positioning System (GPS) User Equipment.

4. FY 1979 Planned Program: Not applicable.

5. Program to Completion: Not applicable.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.58.02.A Title International Cooperative Research and Development

Category Management and Support Budget Activity #5 - Intelligence and Communications

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 425 | 100 | 456 | 581 | 600 | Continuing | Not Applicable |
| M798 | International Cooperative Research and Development | 425 | 100 | 456 | 581 | 600 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: Encompasses the exchange of R&D technology with selected allies in order to reduce the incidence of duplicative efforts and costs. Media of exchange include bilateral data exchange agreements and multinational forums such as North Atlantic Treaty Organization (NATO) and American, British, Canadian and Australian (ABCA) Standardization Program.

BASIS FOR FY 1978 RDTE REQUEST: This program supports travel, US share of costs of the NATO Industrial Advisory Group (NIAG), and other minor costs associated with international exchange of technology and negotiation of cooperative research and development projects. US portion of shared costs of cooperative projects is borne by applicable Research, Development, Test, and Evaluation (RDTE) program elements.

BASIS FOR CHANGE IN 1978 OVER FY 1977: There is an increased emphasis on international cooperation which will necessitate a greater incidence of travel in FY 1978 and out years over FY 1977. Further, shared administrative support costs for personnel in Bonn will increase for FY 1978 as will the budget for the NATO NIAG, the Department of Defense (DOD) portion of which is paid from this program element.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement) is as follows

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ Employees | 1 | 0 | 1 |
| (2) Contractor Employees | 0 | 0 | 0 |
| Total | 1 | 0 | 1 |

Budget Activity #5 - Intelligence and Communications

Program Element #6.58.02.A Title International Cooperative Research and Development

DETAILED BACKGROUND AND DESCRIPTION: Program encompasses the exchange of research and development technology with selected allies in order to reduce the incidence of duplicative efforts, thereby lowering costs. Through these exchanges, cooperative research and development projects are identified, negotiated and pursued. Cooperative projects reduce costs to each participant and promote standardization and interoperability of equipment. Exchange of technology and negotiation of cooperative projects occur through the media of bilateral data exchange agreements and multinational forums such as North Atlantic Treaty Organization (NATO) and the American, British, Canadian, Australian (ABCA) Standardization Program.

This program supports the NATO Industrial Advisory Group travel, and other costs associated with exchange of technology and exploration of potential cooperative projects. US portion of shared costs of cooperative ventures is charged to applicable Research, Development, Test and Evaluation Program Elements.

RELATED ACTIVITIES: This activity is related to all Army research and development programs in that part of the analysis leading to a development decision is investigation and evaluation of all comparable NATO systems so as to increase the incidence of NATO standardization or interoperability. This program provides the base data which identifies NATO equipments which should be evaluated. To preclude duplication of exchange of information programs among the three Services, inter Service coordination is effected on each new program. Many such exchange programs become tri-Service or bi-Service which assures maximum dissemination of technology.

WORK PERFORMED BY: In-house by US Army Materiel Development and Readiness Command, Corps of Engineers, the Surgeon General, and Army Security Agency. International meetings and forums are attended by Army military and civilian personnel from those agencies having research and development responsibility in a given discipline.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments:

Exchange of information under this program resulted in a procurement of French ground surveillance radar which was used in Vietnam as the AN/TPS-58A; negotiated agreements with Germany, France, and Great Britain for tests of their air defense systems which resulted in the ROLAND Program; arranged with Germany for participation of the LEOPARD 2 in the US tank selection program; concluded agreement with Germany and France to assure interoperability of the US and European ROLAND systems; established multinational requirements for a future family of gap crossing equipment and coordinated US Army participation in NATO research and development activities.

Budget Activity #5 - Intelligence and Communications

Program Element #6.58.02.A Title International Cooperative Research and Development

2. FY 1977 Program:

US participation in the North Atlantic Treaty Organization (NATO) will emphasize the need for standardization and interoperability of defense equipment; bilaterally the US will work with Great Britain in remotely piloted vehicles, with Germany in air defense and rocket artillery support systems, with Great Britain and Germany in 120MM tank guns, and as opportunities are surfaced, negotiate cooperative agreements with other allied nations. Additionally structured information exchange programs will continue on a bilateral and multilateral basis.

3. FY 1978 Planned Program:

Programs initiated in FY 1977 will be carried on to completion. As identified through information exchange media, new cooperative programs will be initiated. Increased Congressional emphasis on NATO Rationalization and Standardization has accelerated US efforts to identify and capitalize on cooperative opportunities. This increased activity coupled with cost growth in cost of travel and temporary duty requires an increased funding level.

4. FY 1979 Planned Program:

Participation in established bilateral and multilateral forums will continue consistent with US policy. The need for increased NATO standardization and interoperability of defense equipment will be stressed. It is anticipated that as the North Atlantic Council defines a specific plan for NATO standardization and interoperability that the incidence of cooperative development programs will increase the importance of this program.

5. Program to Completion:

As Department of Defense, Congressional and NATO policies on NATO standardization develop, this program will be reoriented to assure compliance with such policies. It is expected that a growing awareness and concern for increased combat efficiency in NATO will create a requirement for increased US involvement with commensurate increased costs.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.32.15.A  Title Joint Survivability Investigation

Category Advanced Development  Budget Activity #6 - Programwide Management and Support

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 600 | 150 | 500 | 581 | 600 | Continuing | Not Applicable |
| D079 | Joint Survivability Investigation | 600 | 150 | 500 | 581 | 600 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: This program element supports the Army portion of interservice efforts of the Joint Technical Coordinating Group on Aircraft Survivability (JTCG/AS) to reduce the vulnerability of aeronautical systems in a non-nuclear threat environment. The JTCG/AS effort is intended to complement on-going separate service work, to provide a vehicle for cross service aircraft survivability interchange, and to develop design and specification criteria and standards for further aeronautical systems survivability equipment development.

BASIS FOR FY 1978 RDTE REQUEST: Research will be supported in new and relevant efforts in coordination with the Joint Commanders of the Army Materiel Development and Readiness Command, Naval Materiel Command, Air Force Logistics Command, and Air Force Systems Command to ensure that the latest aircraft non-nuclear survivability technology will be available for incorporation into design of new aircraft. The Army effort is directed mainly toward methodology of analysis, design criteria, specifications, and documentation for aircraft survivability equipment.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: This project is considered as being on a level funded basis.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 10 | 0 | 10 |
| (2) Contractor Employees | 0 | 0 | 0 |
| Total | 10 | 0 | 10 |

Budget Activity #6 - Programwide Management and Support

Program Element #6.32.15.A Title Joint Survivability Investigation

DETAILED BACKGROUND AND DESCRIPTION: The Joint Technical Coordinating Group on Aircraft Survivability (JTCG/AS) was formally chartered in June 1971. JTCG/AS is specifically chartered to: (1) implement interservice efforts to reduce vulnerability of aeronautical systems in a non-nuclear threat environment, (2) coordinate research and advanced development efforts which contribute to the reduction of aeronautical systems vulnerability, and (3) maintain close liaison with Services to insure that all survivability research and development data and systems criteria are made available to the developers of new aircraft. The JTCG/AS subgroups are: Technology R&D, Vulnerability Assessment, Survivability Assessment, Design Criteria and Industrial Interface, Countermeasures, and Laser Effects/Threat Assessment. In 1972, the JTCG/AS established a Tri-Service aircraft non-nuclear survivability program, called Test and Evaluation, Aircraft Survivability (TEAS). Joint tasks were coordinated and proposed to fill R&D gaps and voids. TEAS was approved by Director of Defense Research and Engineering, Test and Evaluation, who approved $10 million in DOD funds for three years (FY 73-75). The TEAS program was a technology oriented program whose goals were: (1) conduct vulnerability experiments to strengthen the data base for vulnerability analysis and vulnerability reduction, (2) evaluate design prototype hardware by tests and analyses, (3) develop engineering theory and criteria useful for design and (4) develop improved computer techniques to predict aircraft subsystem failure and damage effects based on emperical testing. This program is intended to complement on-going service work and includes methodology projects to develop and validate general input data and assessment procedures allowing proper consideration of vulnerability reduction inputs in the design phase. The design criteria, specification and documentation projects will develop the design criteria, specification military standards and other documentation to be used by the Services in contracts for future aeronautical systems and technology support projects.

RELATED ACTIVITIES: The program complements other Army Exploratory and Advanced Development aircraft survivability efforts conducted under Program Elements #6.22.09, Aeronautical Technology; #6.32.08.2, Aircraft Survivability Concepts; and #6.37.11.A, D653, Tactical Self-Protection Electronic Warfare Equipment. The basis for the program is the Five Year Plan of the JTCG/AS. The highest priority efforts within the plan are the basis for the program for each fiscal year which is then approved by the Joint Materiel Command Commanders. Duplication of effort is eliminated through joint reviews by the JTCG/AS and the service responsible for each effort. The Five Year Plan, prepared and coordinated with Service Staffs, includes only survivability efforts required to complement on-going service efforts and to continue to develop survivability as a design discipline.

WORK PERFORMED BY: Work will be performed at US Army Materials and Mechanics Research Center, Watertown, MA; US Army Aviation Research and Development Command, US Army Air Mobility Research and Development Laboratory, Ft. Eustis, VA; US Army Armament Research and Development Command, Ballistic Research Laboratories, Aberdeen Proving Ground, MD; US Army Electronics Research and Development Command, Ft. Monmouth, NJ.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: The most significant accomplishment of the JTCG/AS through FY 197T was the development of design enhancement features contributing to more survivable flight control systems for the AH-1G which serves as a basis for modifications to improve the survivability of the AH-1, UH-1, and OH-58 helicopters. A hydraulic ram damage limitation feature was developed for protecting the Air Force A-7 aircraft inlet duct. This design feature is being adapted to protect the

fuel tank inlet duct interface on other aircraft. Work on void filler foams as fire path interrupters was also utilized to improve the operation safety of aircraft. The survivable external fuel tank work developed under JTCG/AS funding was also incorporated to produce superior fire emersion endurance, internal explosion resistance and hydraulic ram damage limitation.

2. FY 1977 Program: The FY 1977 program will emphasize work in survivability and vulnerability assessment methodologies, design criteria and hardware feasibility studies and investigations. The work will include aircraft engine vulnerability baseline tests, laser vulnerability analysis procedures, determination of damage tolerances and the characterization of battle damage to composite structures.

3. FY 1978 Planned Program: Continuation of work started in FY 1977. This year will also include work on the protection of personnel against laser weapons, a tri-Service standard for the measurement of infrared (IR) signatures and jam-proof flight control components. The program is essentially level funded.

4. FY 1979 Planned Program: Continued research in new and relevant efforts in coordination with the Air Force and Navy in the latest aircraft non-nuclear survivability technology.

5. Program to Completion: This is a continuing program.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.33.15.A Title Target Missiles

Category Advanced Development Budget Activity #6 - Programwide Management and Support

RESOURCES/PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 2496 | 1150 | 2800 | 2905 | 4000 | Continuing | Not Applicable |
| D238 | Target Missiles | 2496 | 1150 | 2800 | 2905 | 4000 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: The objective of this element is to develop and evaluate targets and target ancillary equipment required in evaluating and testing air defense systems and in training air defense troops.

BASIS FOR FY 1978 RDTE REQUEST: The FY 1978 budget request supports efforts to develop Vector Miss Distance Indicator (VMDI) for evaluating missile performance of developing air defense systems, radar and plume augmentors to provide realistic threat representations with sub scale targets, drone aircraft and their ancillary equipment to provide total threat realism, and a high performance, economical test and evaluation target.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: Development of Radar Augmentation systems which will realistically simulate threat aircraft radar reflectivity characteristics for air defense weapon systems will receive increased funding over FY 77.

PERSONNEL IMPACT: The average number of employees supported with requested FY 1977 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 6 | 0 | 6 |
| (2) Contractor Employees | 22 | 0 | 22 |
| Total | 28 | 0 | 28 |

Budget Activity #6 - Programwide Management and Support

Program Element #6.33.15.A Title Target Missiles

DETAILED BACKGROUND AND DESCRIPTION: The objective is to develop and evaluate targets and target ancillary equipment required in evaluating and testing air defense systems and in training air defense troops. The target ancillary equipment includes scoring devices, infrared (IR) sources, radar augmentation, and electronic countermeasures (ECM). Research and development of proposed air defense systems and the testing of existing systems require target missiles that will fly trajectories and are capable of speeds that will fully exercise the capabilities of the air defense systems. Several target missile systems have been used by the Army in recent years, but few have been able to match the advancing capabilities of either the current or projected enemy air threat. To meet the Army's needs for an effective target missile program, eight major developments are in process. First, the drone aircraft development includes the tri-service F-102 program with the Air Force as lead service and the Army's F-86 program for the test and evaluation of the Surface-to-Air-Missile development Patriot-(SAM-D), STINGER and the Short Range Air Defense (SHORAD) systems. A second development involves the augmenting of existing targets to generate hot gaseous plumes to simulate threat jet engine signatures for the testing of STINGER and Improved CHAPARRAL. Third, development of a joint service subsonic subscale target capable of meeting the present and future subsonic requirements for R&D and training in a cost effective manner. Fourth, radar augmentation devices must be developed for targets for missile guidance and warhead fuzing tests for SAM-D. Fifth, equipment will be developed to provide accurate vector miss distance data for weapon system tests. Sixth, development of a low altitude, Supersonic, highly maneuverable target to satisfy a requirement for SHORADS test and evaluation. Seventh, develop a low cost supersonic target for R&D use in evaluating SHORADS type air defense missiles to complement existing more costly sophisticated targets. Eighth, development of a formation control system for formation flying of all target vehicles used by the Army.

RELATED ACTIVITIES: The Department of the Army maintains close liaison with both the Navy and the Air Force regarding target missile systems. Where possible, such as in the Droned Aircraft program of the U.S. Air Force, the Army will take advantage of the results of other service programs to meet Army requirements. Coordination of requirements and technical development has been closely monitored to insure that all services get maximum benefit from the development efforts. The Army also maintains liaison with target development agencies in Australia, Canada and the United Kingdom through the Target Technical Cooperation (TTCP) Sub-group H, Aerial Target and Drone Working Group annual conferences and through correspondence.

WORK PERFORMED BY: The U.S. Army Missile Research and Development, Command, Huntsville, Alabama, is responsible for the target missile program. For the following programs, the associated contractors are involved: F-86 program, Flight Systems Incorporated, Newport Beach, California; hot gaseous plume program, Teledyne Ryan Aeronautical, San Diego, California, Hayes International, Birmingham, Alabama and Atlantic Research Corporation, Alexandria, Virginia; miss distance measuring program, Cartwright Engineering, Fullerton, California, New Technology Incorporated, Huntsville, Alabama and Babcock Electronics, Costa Mesa, California; radar augmentation, Hayes International Corporation, Leeds, Alabama; Formation Control, IBM Corporation, Huntsville, Alabama; low altitude maneuvering supersonic targets, Beach Aircraft Corporation, Kansas.

Budget Activity #6 - Programwide Management and Support

Program Element #6.33.15.A Title Target Missiles

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 76, and Prior Accomplishments: The FIREBEE/TOWBEE drone system has been the principal research and development, product assurance and training program of interest over the past several years. Associated with the FIREBEE has been development of infrared (IR) and radio frequency (RF) augmentation, scoring devices and towed banners. The results of these efforts have provided the Army with fairly realistic and reliable targets for use in test, evaluation and training. In addition to the FIREBEE, work was concluded on the ROADRUNNER, CARDINAL, and the Mobile Target Tracking System (MTTS). In FY 1972 development was initiated and in FY 1973 completed on modifying the TALOS missile for the Low Altitude Supersonic Target (LAST) program. Two contracts were awarded for the development of prototype targets for the Variable Speed Training Target (VSTT) program. VSTT development continued with the fabrication of the competing candidate prototype and Engineering Design Tests were conducted. Development Test II was initiated in FY 1974. A program was initiated to develop augmentation devices to generate hot gaseous plumes. Programs initiated included control and Vector Miss Distance Indicator (VMDI). In FY 1975, VSTT development Test II was completed and a single contractor was selected to produce the target. Continuing programs included VMDI and plume augmentation. The formation control program was completed. The programs initiated included drone aircraft, maneuver kits and radar augmentation. In FY 1976, the VSTT program entered the production phase. DT III was completed in 1976. Other programs included VMDI plume augmentation, drone aircraft, maneuver kits and radar augmentation. FY 197T Programs included effort in developing VMDI, radar and plume augmentors, and drone aircraft and their ancillary equipment, and consideration of a high performance, economical test target were continued.

2. FY 1977 Program: The programs included VMDI, plume augmentation, drone aircraft, low altitude maneuvering target, high performance towed gun target, radar augmentation and the high performance, economical test and evaluation target.

3. FY 1978 Planned Program: The Vector Miss Distance Indicator (VMDI), plume augmentation, formation control, low altitude maneuvering target, low cost supersonic target, drone aircraft, radar augmentation, and test and evaluation programs will continue. Slight increase over FY 77 RDTE total is due to radar augmentation efforts in development of higher frequency simulators.

4. FY 1979 Planned Program: The Vector Miss Distance Indicator (VMDI), plume augmentation, formation control, low maneuvering target, low cost supersonic target, drone aircraft, radar augmentation, and high performance subsonic targets will continue. The high performance subsonic target will increase approximately $1M to fund development of the new target.

5. Program to Completion: This is a continuing program since it includes development of all required target missiles and related items for current and future air defense weapon systems.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.51.01A Title Studies and Analyses

Category Management and Support Budget Activity #6 - Programwide Management and Support

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 5,000 | 1,500 | 3,800 | 3,971 | 5,400 | Continuing | Not Applicable |
| M710 | Science and Technology | 600 | 125 | 600 | 678 | 900 | Continuing | Not Applicable |
| M746 | Manpower and Personnel | 200 | 350 | 300 | 387 | 600 | Conginuing | Not Applicable |
| M747 | Concepts and Plans | 1,500 | 475 | 1,100 | 968 | 1,600 | Continuing | Not Applicable |
| M748 | Operations and Force Structure | 1,900 | 450 | 1,500 | 1,453 | 1,700 | Continuing | Not Applicable |
| M749 | Logistics | 800 | 100 | 300 | 485 | 600 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: This program element provides for the conduct of contract studies and analyses for the Department of Army Staff and Army Secretariat. These studies and analyses critically examine and investigate specifically defined problems of major concern to the Army within the categories of science and technology, manpower and personnel, concepts and plans, operations and force structure, and logistics.

BASIS FOR FY 1978 RDTE REQUEST: The Army Staff and Army Secretariat annually identify problems which require the application of sophisticated analytical techniques and which, when solved, will make substantive contributions to Army planning, programing and decisionmaking. Planning guidance issued by the Secretary of the Army leads to a definition of problems of the highest priority to the Army. Studies to solve these problems will be identified in the FY 1978 Army Study Program which will be approved by the Chief of Staff in August 1977.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: FY 1977 funding was inadequate for the sustained funding level required to support essential ongoing, planned, unprogramed, and directed studies.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 0 | 0 | 0 |
| (2) Contractor Employees | 80 | 0 | 80 |
| Total | 80 | 0 | 80 |

Budget Activity #6 - Programwide Management and Support

Program Element #6.51.01.A Title Studies and Analyses

DETAILED BACKGROUND AND DESCRIPTION: Studies and analyses funded by this program element deal with the critical examination and investigation of subjects within the defined categories. They require sophisticated analytical techniques to integrate a variety of factors. Results lead to conclusions or recommendations which make substantive contributions to Army planning, programing and decisionmaking. The studies and analyses, often computer-assisted, organize and evaluate data and information already available or which can be inferred or extrapolated from existing data. The results enable the decisionmaker to determine cost effectiveness of systems and programs, alternative organizations, and allocation of resources; and to develop tactics, doctrine, policy, strategy and procedures. Each study or analysis addresses a specifically defined problem of concern to the Army and is individually approved.

RELATED ACTIVITIES: The US Army Training and Doctrine Command, Ft Monroe, VA has a complementary program, Program Element 6.51.02A TRADOC Studies and Analyses. To preclude duplication of study effort, these programs are coordinated by the Office of the Chief of Staff of the Army. The Air Force and Navy have similar study programs. Coordination of interservice investigations is accomplished by the Director of Defense Research and Engineering and is facilitated by Office of the Secretary of Defense-managed scientific information exchange services. Formal and informal coordination among Services is regularly and routinely accomplished. In matters of interservice interest, representatives of the Services involved and of the Office of the Secretary of Defense serve as members of study advisory groups formed to direct and monitor contractor performance. Interservice coordination is also furthered by representative attendance at the semi-annual Military Operations Research Symposium. The contract approval process requires a formal literature search to prevent duplication of study effort within the Army and the Department of Defense.

WORK PERFORMED BY: All work is done under contract. The primary contractors are: Battelle Memorial Institute, Columbus, OH; Braddock, Dunn and McDonald, El Paso, TX; CACI, Inc., Arlington, VA; Computer Sciences Corporation, Falls Church, VA; General Research Corporation, McLean, VA; Historical Evaluation and Research Organization, Dunn Loring, VA; Litton Systems Inc., Sunnyvale, CA; MITRE Corporation, Bedford, MA; Standford Research Institute, Menlo Park, CA; Vector Research, Inc., Lansing, MI. The in-house developing organization responsible for the program is the US Army Research Institute, Arlington, VA.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: During FY 1975, an analysis of command, control, and communications policies and doctrine in Europe was completed; a cost effectiveness analysis of Reserve components testing was completed and has led to an effort designed to evaluate improvement concepts for the Reserve components; work continued to improve the system for forecasting losses to the enlisted force of the Active Army; the Army completed and forwarded to the Office of the Secretary of Defense a study of air and ballistic missile defense, part of a comprehensive, analytical history of the US versus USSR strategic arms competition since World War II, and one study developed a model for producing long-range forecasts related to world conditions affecting national strategy. Among significant studies initiated in FY 1975 which were continued during FY 1976 and FY 197T was an effort to systematically document and analyze Army communications-electronic concepts, trends, functions, and organizations during the 1980-2000 period. New efforts initiated during FY 1976 and FY 197T included an evaluation of an alternative preassignment system

to early deploying units for members of the Individual Ready Reserve; a follow-on development of an integrated nuclear and conventional theater warfare simulation model to assess interacting effects of chemical, nuclear, and conventional warfare on the combat effectiveness of dual capable forces; and a joint study effort with the Defense Nuclear Agency to characterize the Soviet division and smaller unit operations. This latter effort will identify Soviet vulnerabilities and determine US initiatives to capitalize on vulnerabilities identified.

2. FY 1977 Program: The FY 1977 program will consist of approximately 25 new and continuing efforts. Significant studies will continue in the areas of electromagnetic cover and deception, reserve component evaluation and analysis, and electromagnetic spectrum requirements. New efforts will be initiated in the area of logistics aspects of the materiel acquisition program, integration of female chaplains and chaplain assistants, otpimizing the use of operational test resources and the information gained from operational tests, identification of tactical influences of high mobility vehicles, and a study to analyze alternative approaches to the procedures currently utilized to compute Requisitioning Objectives and Order Ship Time.

3. FY 1978 Planned Program: The Army Staff and Army Secretariat annually identify those problems which, when solved will make substantive contributions to Army planning, programing and decisionmaking. Studies to solve these problems are identified in the Army Study Program which is approved by the Chief of Staff in August each year. The FY 1978 and FY 1979 programs are based on the need to conduct more extensive analyses of Army planning and programing, and for continuous reevaluation of the Army's role, posture and force structure because of the major changes in national and world conditions. FY 1977 funding was inadequate for sustained support of essential studies and analyses.

4. FY 1979 Planned Program: The Army Staff and Army Secretariat annually identify those problems which, when solved will make substantive contributions to Army planning, programing and decisionmaking. Studies to solve these problems are identified in the Army Study Program which is approved by the Chief of Staff in August each year. The FY 1978 and FY 1979 programs are based on the need to conduct more extensive analyses of Army planning and programing, and for continuous reevaluation of the Army's role, posture and force structure because of the major changes in national and world conditions. FY 1977 and 1978 funding was inadequate for sustained support of essential studies and analyses. Optimum funding is achieved in FY 1979.

5. Program to completion: This is a continuing program.

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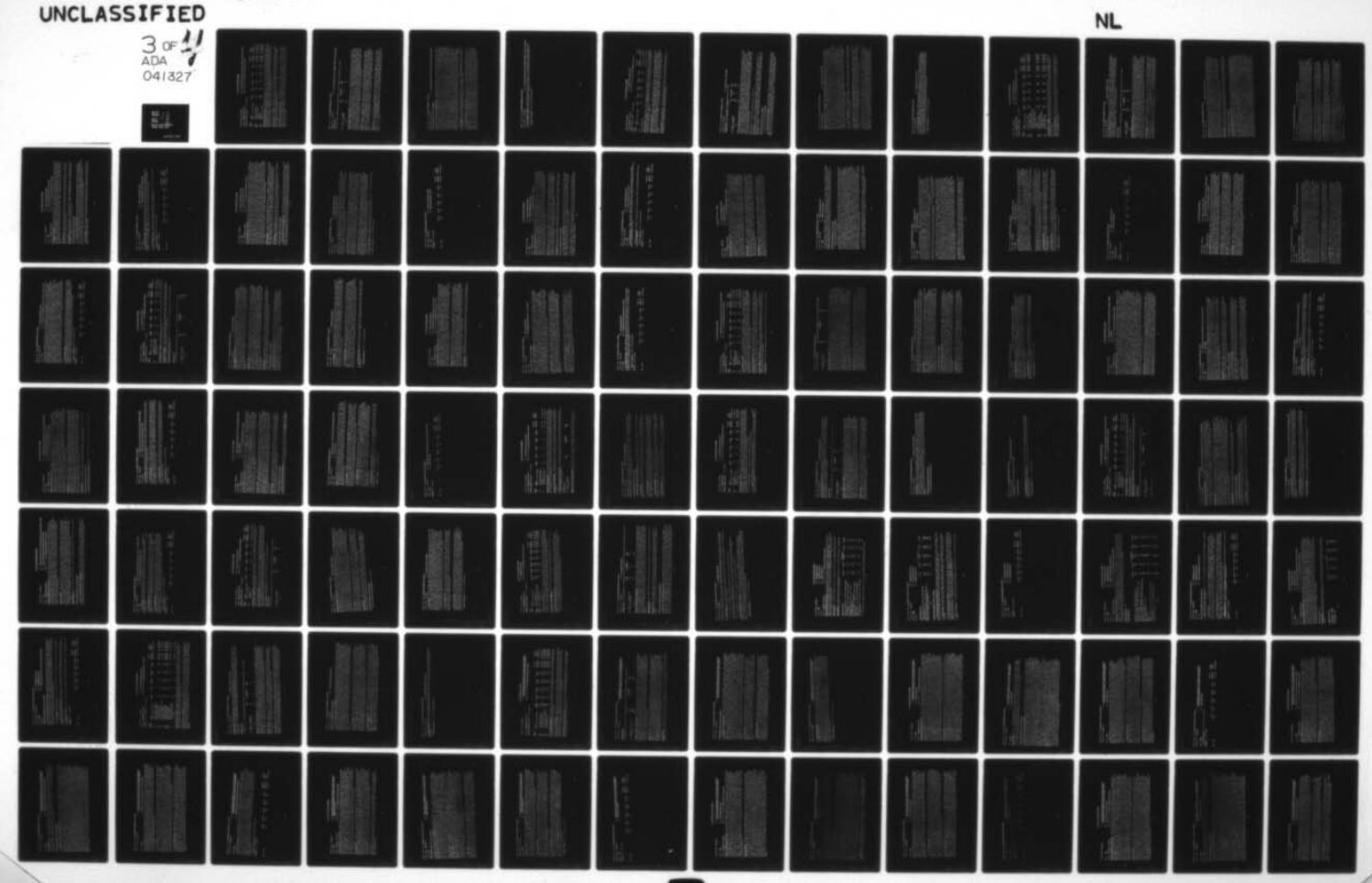

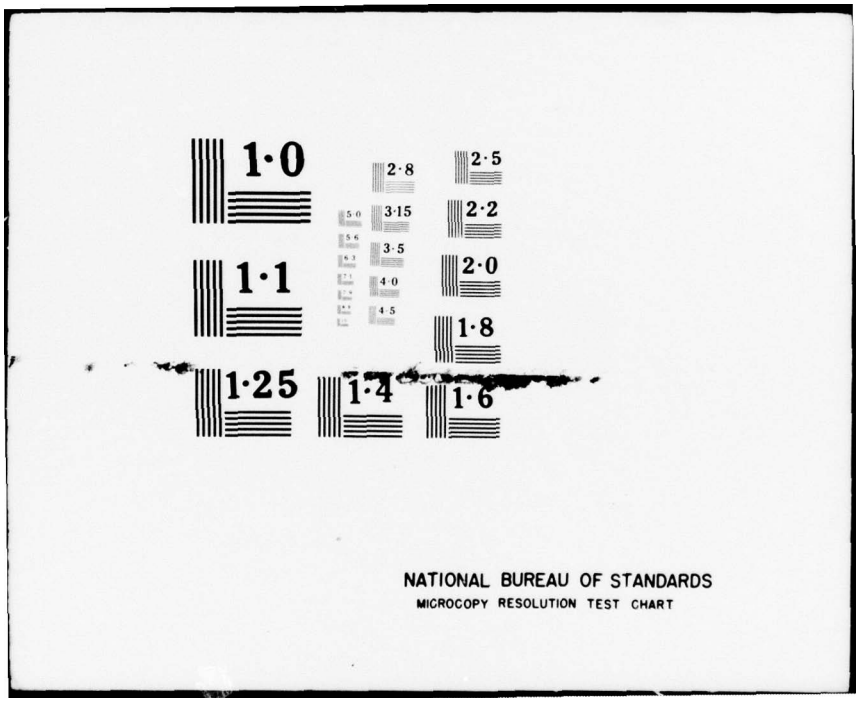
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NATIONAL BUREAU OF STANDARDS
MICROCOPY RESOLUTION TEST CHART

FY 1978 RDTE DESCRIPTIVE SUMMARY

**Program Element** #6.51.02.A **Title** US Army Training and Doctrine Command (TRADOC) Studies and Analyses

**Category** Management and Support **Budget Activity** #6 - Programwide Management and Support

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 3000 | 800 | 2425 | 3389 | 4000 | Continuing | Not Applicable |
| M980 | Science and Technology | 452 | 150 | 500 | 775 | 600 | Continuing | Not Applicable |
| M981 | Concepts and Plans | 823 | 370 | 875 | 968 | 1300 | Continuing | Not Applicable |
| M982 | Operations and Force Structure | 1403 | 230 | 900 | 968 | 1400 | Continuing | Not Applicable |
| M983 | Logistics | 126 | 50 | 150 | 193 | 200 | Continuing | Not Applicable |
| M988 | Manpower and Personnel | 196 | 0 | 0 | 485 | 500 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: This program element provides for the conduct of contract studies and analyses that critically examine and investigate specifically defined problems of major concern to the US Army Training and Doctrine Command (TRADOC) within the categories of science and technology, concepts and plans, operations and force structure, logistics, and manpower and personnel. TRADOC annually identifies those problems which require the application of sophisticated analytical techniques and which, when solved, will make substantive contributions to TRADOC planning, programing and decision making. Planning guidance issued by the Department of the Army leads to a definition of problems of the highest priority.

BASIS FOR FY 1978 RDTE REQUEST: Studies and analyses to solve problems of the highest priority will be identified in the TRADOC Studies and Analyses Program for FY 1978 which will be submitted to the Commander, TRADOC, for approval in May 1977. Expected areas of emphasis are training and doctrine aimed at achieving increased readiness in a resource constrained environment and improving integration of combined arms weapons systems.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: An important new thrust is being added to the TRADOC Studies and Analyses Program, a study of Future Training of the US Army. A principal objective will be to provide thorough analysis of the impact (e.g., on real estate and on the environment) of Army decisions regarding stationing and training. Further, the Army is now placing greater emphasis on the TRADOC program, while the level of effort of Studies and Analyses for the Army Staff (PE 6.51.01.A) has been reduced substantially from the FY 1976 level. A small portion of the FY 1978 increase is accounted for by escalation in contractual costs due to inflation.

Budget Activity #6 - Programwide Management and Support

Program Element #6.51.02.A Title US Army Training and Doctrine Command (TRADOC) Studies and Analyses

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 0 | 0 | 0 |
| (2) Contractor Employees | 50 | 0 | 50 |
| Total | 50 | 0 | 50 |

DETAILED BACKGROUND AND DESCRIPTION: Provides for the conduct of contract studies and analyses for the US Army Training and Doctrine Command (TRADOC). These studies and analyses critically examine and investigate specifically defined problems of major concern to TRADOC. Sophisticated analytical techniques are used to integrate and analyze a variety of factors. Results lead to conclusions or recommendations which make substantive contributions to TRADOC planning, programing, and decision making. Study contributions include assistance in improving the understanding of: alternative organizations, tactics, doctrines, policies, and procedures; cost-effectiveness of systems or programs; and allocation of resources. Unlike experimentally oriented research and development activities, these studies and analyses organize and evaluate data and information already available or which can be inferred or extrapolated from existing data. Computer assistance is often used. Each study is individually evaluated as to its potential contribution with respect to the defined problem prior to approval of study initiation.

RELATED ACTIVITIES: A complementary study program is used by the Army Staff and Army Secretariat, PE 6.51.01.A, Studies and Analyses. To preclude duplication of effort, these programs are coordinated by the Office of the Chief of Staff of the Army. Formal and informal coordination is regularly and routinely accomplished with the US Navy and US Air Force study and analysis efforts in similar areas of investigation. Interservice efforts are coordinated by the Office of the Director of Defense Research and Engineering. Coordination is facilitated by Department of Defense information exchange services (e.g., Defense Documentation Center). Coordination is further effected through attendance at the semiannual Military Operations Research Symposium and the annual Army Operations Research Symposium. The contract study approval process requires a formal literature search to prevent duplication.

WORK PERFORMED BY: Contractors include: Braddock, Dunn and McDonald, Vienna, Virginia; Martin-Marietta Corporation, Orlando, Florida; Lockheed Missiles and Space Company, Sunnyvale, California; Human Resources Research Organization, Alexandria, Virginia; Raytheon, Incorporated, Waltham, Massachusetts; and General Research Corporation, McLean, Virginia. The TRADOC integrating centers (i.e., Combined Arms Combat Developments Activity, Personnel and Administration Combat Developments Activity, and Logistics Center) assist HQ, TRADOC in formulating the study and analysis program. The TRADOC Service Schools monitor the execution of the program by the contractors.

Budget Activity #6 - Programwide Management and Support

Program Element #6.51.02.A Title US Army Training and Doctrine Command (TRADOC) Studies and Analyses

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: Studies completed include: air mobility in high intensity conflicts; strategic ground facilities; simulation of transportation terminals with the objective of developing more efficient terminal operations; bridging for the field Army; criteria for evaluating real-time computer systems and to refine data flow volumes within the division and user requirements for Tactical Operations System data interchange with other Army tactical automatic data processing systems; procedures required to insure effective data flow to and from each system within the Army Tactical Data System including backup provisions required to provide continuity of data system operations; accuracy and effectiveness of field artillery systems including analyses of the nature of artillery errors and of the effects of changes in tactical conditions on total delivery; improvements in efficiency and utility of combat models used in the automatic data processing system; air defense force requirements to support Army divisions in the field during the 1980-1990 time frame; a responsive audio-visual system for the employment of Army forces in a theater of operations; tactical effectiveness testing of antitank missiles; computer simulation of battle casualty assessment; improved manual system for tactical command and control; improved repair parts support. The Tactical Air Defense Computer Simulation Model was revised to be compatible with more than one computer type and to allow for use by many organizations so as to reduce the need for developing additional models; due to the increasing number of organizations using this model, a program was developed to provide uniform and updated documentation of the model. Techniques were developed to analyze system operations and firing doctrine of the Improved HAWK air defense system to insure compatibility of the software package in worldwide use. A determination was made of tactical communications support requirements, and a communications plan for the period 1976-1982 was developed. An integrated battlefield control system was analyzed to determine at which level computer assistance can be used. An analysis was made of operational and technical concepts for a cannon-launched guided projectile in a mid-intensity environment.

2. FY 1977 Program: Studies scheduled for completion during FY 1977 include: antiarmor systems; AN/TSQ-73 Missile Minder System operations/command and control doctrine; Army requirements for space technology; cost and effectiveness analysis for STINGER; and maintenance task demand file and maintenance support structure for contingency forces.

3. FY 1978 Planned Program: Studies and analyses to solve problems of the highest priority will be identified early in CY 1977, and the FY 1978 TRADOC Studies and Analyses program will be formulated by May 1977. Individual contract efforts will focus on training and doctrine aimed at achieving increased readiness in a resource constrained environment; improving integration of combined arms weapons systems; and increasing training effectiveness. An important new thrust is being added to the Studies and Analyses Program to provide thorough analyses of the impacts of decisions regarding future stationing and training of the Army (e.g., on real estate and on the environment). These analyses will be conducted in the light of technological progress in weapons systems, new threat/counterthreat doctrine and advanced training concepts. The level of ongoing efforts is reduced somewhat in order to provide for this new effort and for cost growth within the constrained resources available. The level of effort in the closely related program element 6.51.01.A, Studies and Analyses (for the Army Staff and Army Secretariat), is being reduced substantially from FY 1976 levels at the same time that greater emphasis is being placed on the TRADOC program.

Budget Activity #6 - Programwide Management and Support

Program Element #6.51.02.A Title US Army Training and Doctrine Command (TRADOC) Studies and Analyses

4. FY 1979 Planned Program: Studies and analyses efforts will be continued or initiated aimed at solving problems of major concern to TRADOC at this time. Anticipated areas of emphasis are similar to those on which FY 1978 efforts will focus.

5. Program to Completion: This is a continuing program.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

**Program Element #6.53.01A** **Title Kwajalein Missile Range (KMR)**

Category Management and Support Budget Activity #6 - Programwide Management and Support

RESOURCES [PROJECT LISTING]: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 77827 | 20000 | 82926 | 87239 | 93820 | Continuing | Not Applicable |
| D614 | KMR | 77827 | 20000 | 82926 | 87239 | 93820 | Continuing | Not Applicable |
| Military Construction: | | 0 | 0 | 0 | 2603 | 16147 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: KMR is a National Range whose effort is principally in support of strategic offensive and defensive ballistic missile test programs. Kwajalein is approximately 2100 Nautical Miles southwest of Honolulu, Hawaii. Eleven islands of the Kwajalein Atoll are currently used. This isolated community of over 3500 people is managed locally by a small Army and civil service staff of approximately 60 personnel.

BASIS FOR FY 1978 RDTE REQUEST: During FY 1978, KMR will continue to provide support for Ballistic Missile Defense test programs, strategic offensive ballistic missile programs, space programs, and other range users within the guidelines of DOD Directive 3200.11, "Use, Management and Operation of Defense Major Ranges and Test Facilities." The overall KMR workload is expected to remain fairly constant based on the fact that the increasing complexity of range user requirements and the increase in quantity of data per mission will more than compensate for any slight reduction in the number of major missions. Additionally, this increase in data sophistication plus more stringent data accuracy requirements necessitate a continuing instrumentation modernization program.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: The FY 1978 funding profile is 5% higher than FY 1977 because of inflation, the increased cost of government supplies and transportation, the requirement to exercise a purchase option that will result in future cost savings, and a requirement to improve range instrumentation accuracy.

Budget Activity #6 - Programwide Management and Support

Program Element #6.53.01A Title Kwajalein Missile Range (KMR)

PERSONNEL IMPACT: The average number of employees supported with requested FY 1978 funds (RDTE and Procurement) is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 135 | 0 | 135 |
| (2) Contractor Employees | 2746 | 0 | 2746 |
| Total | 2881 | 0 | 2881 |

DETAILED BACKGROUND AND DESCRIPTION: KMR is a national missile range managed and operated by the Army for the purpose of strategic offensive missile, ballistic missile defense, and space defense testing. KMR utilizes eleven islands in the Kwajalein Atoll which is located some 2100 nautical miles southwest of Honolulu. This isolated community of approximately 3500 people is under the direction of the Commander, Kwajalein Missile Range, with a small Army and civil service staff of approximately 60 personnel. The remaining operating personnel are predominantly civilian contractor personnel who fall into four general categories: logistic support, technical range support, construction, and the prime and subcontractors for the major range user programs. The principal range users are the Air Force and Navy Intercontinental Ballistic Missile/Sea-Launched Ballistic Missile programs, and the Army's Ballistic Missile Defense Systems and Advanced Technology Programs. Satellite object surveillance, identification, and signature are provided for space program users.

RELATED ACTIVITIES: No other National Range duplicates KMR capabilities.

WORK PERFORMED BY: Military, civil service, and contractor personnel. The current logistical support and technical support contractors are Global Associates, Inc., Oakland, California and Kentron Hawaii, Ltd., Honolulu, Hawaii, respectively. The Massachusetts Institute of Technology/Lincoln Laboratory, Lexington, Massachusetts; Radio Corporation of America, Moorestown, New Jersey; and GTE Sylvania, Inc., Needham, Massachusetts, perform the operation and maintenance for the Kiernan Reentry Measurements Site (KREMS) on Roi-Namur.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T FY 1976, and Prior Accomplishments:

a. FY 1976 and Prior Accomplishments: In March 1964, Kwajalein Atoll was established as the center for Department of Defense full-scale reentry measurements and defensive systems test programs. The Army assumed control of Kwajalein Atoll from the Navy on 1 July 1964, at which time it was established as a national range; the official designation was changed to Kwajalein Missile Range (KMR) in April 1968. The second of two splash detection radars was placed in operation during July 1968 and reentry vehicles impacting in the Kwajalein lagoon have since been recovered on a routine basis. In 1968, the Pacific Range Electromagnetic

Budget Activity #6 - Programwide Management and Support

Program Element #6.53.01A Title Kwajalein Missile Range (KMR)

Signature Studies project was transferred from the Advanced Research Projects Agency to KMR; in 1969 this complex was renamed Kiernan Reentry Measurements Site (KREMS). The three reentry radars at KREMS are the only radars in the free world that can provide a complete complement of reentry observables data which are essential to the development and testing of our strategic offensive and defensive systems. In early 1969, a satellite communications capability was established at KMR for communication with the Continental United States. Modernization and equipment improvements since 1965 have continued with the conversion of the entire telemetry system to S-band, expansion of the real-time target tracking capability, upgrading the range timing system, modification of the Target Resolution and Discrimination Experiment Radar (TRADEX) and procurement of two MPS-36 radars. Essential modernization and equipment procurement continued with emphasis on improvement of telemetry and timing, expansion of the real-time target tracking capability and upgrading the satellite communications terminal for compatibility with Defense Communications Agency Phase II satellites. The Designation and Discrimination Engineering System adjunct to TRADEX became an operational system in support of the Army's Advanced Technology Center (ATC). Ballistic camera capability was expanded and spectral cameras were installed. Real-time target designation and pointing capability was accomplished in support of ATC's Signature of Fragmented Tanks (SOFT) Program. A high accuracy state-of-the-art long distance measuring (LDM) optical tracking system was acquired to allow accurate trajectory position measurements of reentry vehicles. A burst matched filter was installed on TRADEX to measure hard-body signatures in the presence of wakes. Digital track signal processing was installed to enhance ALTAIR's chaff tracking capability. A complete launch capability, with range safety assurance, was established at Wake Island permitting Athena missiles to boost reentry payloads into KMR for the Army Special Test Program.

b. FY 197T Accomplishments: The KMR continued operation as a national range to support strategic offensive and defensive test programs and to operate reentry radars to support all Department of Defense reentry programs. Installation of the AN/TPQ-18 radar obtained from Air Force excess was completed.

2. FY 1977 Program: KMR will continue to provide support as required to the Air Force strategic offensive ballistic missile test programs, the Army Ballistic Missile Defense System Technology Test Facility and the Army Ballistic Missile Defense Advanced Technology Center test programs. Efforts to improve the metric tracking accuracy of the KREMS radars will continue. Minor upgrades will be made to the instrumentation acquisition system (IAS), the carrier and terminal systems which support IAS, and the real-time display and control of trajectory data. Development will continue on the Kwajalein Range Safety System which is required to support the Ballistic Missile Defense Advanced Technology Center's Designating Optical Tracker program.

3. FY 1978 Planned Program: KMR will continue to provide support as required to the Air Force strategic offensive ballistic missile test programs, the Army Ballistic Missile Defense System Technology Test Facility and the Army Ballistic Missile Defense Advanced Technology Center test programs. The cost growth between FY 1977 and FY 1978 can be primarily attributed to a 4.8% inflation factor, and major increases in the cost of supplies and services purchased from other Government agencies. The remainder of the cost growth ($1.314 million) will purchase, at a cost of $1.0 million, the KMR 7600/6400 computer system which is presently being leased, and will incorporate an optical tracking capability into the AN/TPQ-18 radar. Purchase of the KMR 7600/6400 computer system will save the government $2.7 million per year in subsequent years. The optical tracker modification to the AN/TPQ-18 radar is being accomplished to satisfy offensive weapon system requirements for more accurate reentry measurements data.

Budget Activity #6 - Programwide Management and Support

Program Element #6.53.01A Title Kwajalein Missile Range (KMR)

4. FY 1979 Planned Program: KMR will continue to provide support as required to the Air Force strategic offensive ballistic missile test programs, the Army Ballistic Missile Defense Systems Technology Test Facility and the Army Ballistic Missile Defense Advanced Technology Center test programs. Additionally, KMR will recommence providing support to Navy missile testing programs. Additional improvement and modernization program modifications required to support the range users testing requirements will be accomplished. The fourth improved RADOT will be acquired. Modifications to the TPQ-18 radar are planned to improve the angular and range resolution capabilities. Telemetry instrumentation and optical tracker site modifications are planned, and a study will be initiated to provide one of the MPS-36 radars with a multiple target tracking capability.

5. Program to Completion: This is a continuing program.

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.57.02.A Title Support of Development Testing

Category Management and Support Budget Activity #6 - Programwide Management and Support

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 24819 | 7136 | 22563 | 23524 | 28473 | Continuing | Not Applicable |
| D026 | Test Evaluation AMSAA | 1900 | 400 | 2017 | 2179 | 2513 | Continuing | Not Applicable |
| D066 | Avn Engr Flight Activity | 2683 | 800 | 3110 | 3001 | 3162 | Continuing | Not Applicable |
| D127 | Met Spt to RDTE Activities | 4080 | 1150 | 3910 | 4066 | 4374 | Continuing | Not Applicable |
| D575 | US Army Materiel Development and Readiness Command Support of US Army Training and Doctrine Command Combined Arms Test Activity | 319 | 46 | 303 | 226 | 329 | Continuing | Not Applicable |
| D618 | Aircraft Dev Test Act | 5931 | 1737 | 6037 | 5809 | 6120 | Continuing | Not Applicable |
| D620 | Ammunition Eff Testing | 5000 | 1300 | 3700 | 3907 | 5419 | Continuing | Not Applicable |
| D623 | Instrumentation Development, US Army Test and Evaluation Command (TECOM) | 1328 | 734 | 2186 | 2324 | 3600 | Continuing | Not Applicable |
| D625 | Test Methodology TECOM | 2322 | 658 | 900 | 1286 | 2106 | Continuing | Not Applicable |
| D671 | SAM-D Tac Vulnerability | 1256 | 311 | 400 | 726 | 850 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: Provides funding required annually for indirect support of the test and evaluation of Army systems under development. This indirect support consists of salaries, supplies, travel expenses, equipment, host/tenant costs, and services not directly associated with any particular test project. This year the Program Element (PE) consists of the nine projects listed above.

BASIS FOR FY 1978 RDTE REQUEST: Continue in-progress projects to support development test and evaluation with emphasis on aircraft testing. Meteorological services are provided to Army test activities and others. Support is also provided to a joint service activity which coordinates munitions effectiveness efforts and to independent evaluation of PATRIOT (SAM-D) vulnerability in a tactical countermeasures environment.

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.02.A Title Support of Development Testing

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: The overall levels of effort programed for both FY 1977 and FY 1978 are approximately 15% lower, after providing for cost growth due to inflation, than the austere level permitted by FY 1976 funding. This accelerates the increase in obsolescence of equipment and test procedures and in the backlog of urgently needed maintenance and repair of facilities and equipment, a process that was begun in FY 1975. The FY 1978 level of effort is approximately the same as the FY 1977 level (after providing for inflation). A funding increase is programed for FY 1979 to assure that a minimal capability for effective test support will be provided in FY 1979 and succeeding years.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 691 | 0 | 691 |
| (2) Contractor Employees | 330 | 0 | 330 |
| Total | 1021 | 0 | 1021 |

DETAILED BACKGROUND AND DESCRIPTION: This program element consists of nine projects that provide funding for indirect support of the test and evaluation of Army systems under development. This indirect support consists of salaries, travel expenses, supplies, equipment, host/tenant costs and services. These projects provide support required annually and not identified with a particular development item or weapon system. The funds are provided to US Army Materiel Development and Readiness Command activities, specifically to several US Army Test and Evaluation Command (TECOM) activities and to the US Army Materiel Systems Analysis Activity, Aviation Research and Development Command and Electronics Research and Development Command. The main areas of effort supported are aircraft development testing, meteorological services, joint service munitions effectiveness efforts, development of instrumentation and test methodology for all Army development test facilities (including the major facilities funded under Program Element (PE) 6.58.04.A) to enable efficient testing of advanced technology systems, independent test and design and evaluation for all major Army developmental systems, and independent evaluation of SAM-D vulnerability.

RELATED ACTIVITIES: This element 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 PE 6.58.04.A, Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM); activities of the US Army Operational Test and Evaluation Agency (OTEA) funded by PE 6.57.12.A, Support User Test OTEA; testing activities of US Army Training and Doctrine Command (TRADOC) funded by PE 6.57.07.A, Support User Test TRADOC; and similar test activities conducted by the other Services. 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 as well as other development test facilities. 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. This PE, 6.57.02.A, is now being restructured to support only development testing. It has been renamed accordingly. Further, two projects that were included in FY 1977 have been moved to other program elements. Project DV02, Test Boards, has been moved under PE 6.57.07.A, Support User Testing, TRADOC, since the test boards now primarily support operational testing and the boards have been transferred to TRADOC. Project M857, Armed Services Explosives Safety Board, has been moved under PE 6.57.06.A, Materiel Systems Analysis, since the Safety Board is not primarily concerned with support of Army development testing. Liaison is maintained between these activities. The Office of the Deputy Director Defense Research and Engineering (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 hightest priority capabilities are established expeditiously and suitably maintained, and to insure integration of testing by the Services.

WORK PERFORMED BY: Approximately 90 percent of the effort is performed in-house by civilian and military personnel assigned to elements of the US Army Materiel Development and Readiness Command. There is an aircraft maintenance contract (about $2.5 million) at the Aircraft Development Test Activity and a number of other smaller contracts (e.g., for development of instrumentation).

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: Based on analysis, testing and evaluation together with available data, Joint Munitions Effectiveness Manuals on air-to-surface and surface-to-surface weapons were published, enhancing weapons employment by providing data on weapons effectiveness, delivery accuracy, vulnerability, weapons characteristics, fragmentation, reliability, lethal area, safe distance, methodology and joint testing procedures; special reports were published on chemical warfare preparedness, aircraft strafing effectiveness, incendiary bombing effectiveness, close air support weapon effectiveness, 20mm ammunition effectiveness, vulnerability of selected foreign equipment, and aircraft survivability and vulnerability. Existing test procedures were documented and the test methodology program placed emphasis on automation of test information and data reduction, including use of automatic data processing, simulation and math modeling to decrease test cost and improve reproducibility of test results. Techniques were examined or developed for environmental testing and for testing of automotive cooling, avionics, lasers, infrared seekers and software. Instrumentation developments included a high precision laser tracker, a large vehicle-sized electromagnetic interference test chamber, and instrumentation for test of infrared sensors and aircraft armament. Development of instrumentation and test methodology were sharply curtailed in FY 1975 due to reduction in funding guidance. Increased emphasis was placed on independent operational testing of developmental systems. An important step for this purpose was the transfer of five test boards (formerly funded under this PE) from US Army Test and Evaluation Command (TECOM) to US Army Training and Doctrine Command (TRADOC). Second, a new project was established to provide for independent design of development tests and for independent evaluations of test results. These evaluations contribute to decisions with respect to acquisition of major and selected nonmajor materiel systems. This new mission was assigned to the US Army Materiel Systems Analysis Activity (AMSAA). Inherent in this mission is the necessity to monitor developmental tests and to provide a complete and independent evaluation of the worth of the materiel system. Significant test design and evaluation effort was performed by AMSAA in FY 1976. Third, tests were performed to provide

the necessary data for publishing or updating the Joint Munitions Effectiveness Manuals on air-to-surface and surface-to-surface guns, rockets and missiles and manuals were published accordingly; a comparison of minefield models was published; preparation of an air-to-air missile effectiveness manual was begun; hand calculator effectiveness methods for surface-to-surface were developed; vulnerability assessments were made for industrial targets, thermal power plants, and steel highway bridges; a major effort to determine effectiveness of multifragment hits on aircraft was initiated; tests and analyses were conducted on tank lethality and Alternate Explosive Fills. Fourth, competitive evaluations were conducted of utility tactical transport aircraft systems and advanced attack helicopter. Instrumentation developments included an improved triggering device for multiple-head X-ray, laser measurement instrumentation and a radar velocimeter. Test methodology efforts included: investigation of shock and vibration measuring techniques; development of a laser reflectance model; techniques and equipment for rapid comprehensive analysis of Army electronic images; measurement of camouflage/smoke characteristics, including effectiveness against electro-optical systems; and electromagnetic evaluation techniques.

2. FY 1977 Program: Continue to support development test and evaluation at a level of effort approximately 15% lower, after providing for cost growth due to inflation, than the austere level permitted by FY 1976 funding. Examples of current efforts follow. Independent test design and evaluation by AMSAA is to include all major materiel systems. Illumination effectiveness and night fighting are being investigated; assessments of effectiveness and of HAWK and CHAPARRAL missiles are being initiated. Instrumentation developments include a projectile dynamic measurement system, laser ranging/video theodolites, camouflage testing instruments, and graphic display interface.

3. FY 1978 Planned Program: Continue to support development test and evaluation at a level of effort approximately the same, after providng for inflation, as the austere FY 1977 level. Examples of planned efforts are: expansion of independent test design and evaluation to include a greater number of nonmajor systems; publication of an aircraft vulnerability manual; development of a real-time video theodolite to reduce manhours required for reduction of data, and of a phased-array multi-target radar to support test programs such as General Support Rocket System; development of procedures for testing laser seekers and laser-augmented air defense systems and updating environmental testing procedures.

4. FY 1979 Planned Program: Continue to support development test and evaluation. The FY 1979 level of effort, which is slightly higher (after providing for inflation) than the austere FY 1976 level, is essential to assure that a capability for effective test support can be provided in FY 1979 and succeeding years. Major efforts will be initiated to develop instrumentation and test methodology capable of effective and efficient testing of advanced technology systems coming out of research and development. Examples of planned instrumentation and methodology efforts are: projectile airburst and impact locating system (completion), interactive real-time test capability, reduced dependence on optical miss-distance methods, improved utilization of microprocessor technology, more effective use of simulators, and improved shock and vibration testing methods. Target acquisition, smoke, and illumination effects will be added to munitions effectiveness manuals.

5. Program to Completion: This is a continuing program.

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.57.02.A Title Support of Development Testing

Project #D066 Title Aviation Engineering Flight Activity (AEFA)

Category Management and Support Budget Activity #6 - Programwide Management and Support

BACKGROUND AND DESCRIPTION: This project provides for the conduct of engineering design tests, engineering flight tests, contractor compliance tests and airworthiness performance tests on all Army aircraft and components entering the inventory or considered by the Army for a specific application. Aviation Engineering Flight Activity (AEFA) monitors contractors' flight testing and participates in engineering flight tests conducted by US Air Force (USAF), US Navy (USN) or Federal Aviation Administration (FAA). AEFA is subordinate to the US Army Aviation Research and Development Command. Approximately 60% of the funds support civilian salaries; remaining funding supports such other activities as rents, utilities, communications, travel, supplies and service and materials.

RELATED ACTIVITIES: Close and continuous coordination exists between AEFA and non-Army testing activities (e.g., USAF, USN and FAA) as well as other Army Testing Activities (US Army Test and Evaluation Command and US Army Operational Test and Evaluation Agency) in order to insure optimum effectiveness.

WORK PERFORMED BY: Work on this project is supported primarily by in-house AEFA-assigned military and civilian personnel, including command and administrative personnel, test and support pilots, engineers, technicians, mechanics, automatic data processing specialists, supply technicians and clerical support personnel.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 1976, 197T and Prior Accomplishments: AEFA conducted engineering design, airworthiness, performance and stability and control testing on designated Army aircraft, with increasing emphasis in the airworthiness area. From 30 to 40 active programs were conducted involving engineering design, airworthiness and stability and control testing. Highlights of these programs were the competitive evaluations of Utility Tactical Transport Aircraft System and Advanced Attack Helicopter, continuation of evaluation tests of Product Improvement Proposals on operational aircraft systems; continuation of inflight reliability and infrared suppression evaluation programs; and the airworthiness qualification test of the OH-58C helicopter.

2. FY 1977 Program: Continue airworthiness, engineering design, performance and stability and control testing on Army aircraft. This includes airworthiness qualification of UTTAS and CH-47C; and continued testing of the OH-58C and of Product Improvement Proposals on operational aircraft systems.

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.02.A Title Support of Development Testing

Project #D066 Title Aviation Engineering Flight Activity (AEFA)

3. FY 1978 Planned Program: While major programs such as competitive testing of the Utility Tactical Transport Aircraft System and airworthiness and flight qualities testing of the CH-47C will continue to occupy the major portion of the AEFA effort, evaluations and Product Improvement Proposals to enhance flight safety, improve maintainability and reliability and improve capability of the existing inventory remain significant due to the need for improvement of existing fleets.

4. FY 1979 Planned Program: Continue testing of Army aircraft as above at approximately the same level of effort as in FY 1977. Specific tasks will correspond with the status of Army aircraft acquisitions and operations.

5. Program to Completion: This is a continuing program.

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 2683 | 800 | 3110 | 3001 | 3162 | Continuing | Not Applicable |

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.57.02.A Title Support of Development Testing

Project #D127 Title Meteorological Support to RDTE

Category Management and Support Budget Activity #6 - Programwide Management and Support

DETAILED BACKGROUND AND DESCRIPTION: This project provides for meteorological support to Army RDTE activities (13 permament test sites) and to users of the national range at White Sands Missile Range (WSMR); and for operation of three sites in the Meteorological Rocket Network (MRN). Meteorological teams provide user-oriented meteorological services to a wide range of RDTE activities at sites both in and out of the continental United States. Meteorological observations needed by Army RDTE activities include measurements of solar radiation at various wave lengths, refractive index, air density, soil moisture, temperature, humidity and wind, both near the ground and at the very high altitudes of missile flights. User-oriented meteorological support and services provided at WSMR to Army, Navy, Air Force, Defense Nuclear Agency (DNA), National Aeronautics and Space Administration (NASA) and Department of Defense (DOD) contractor projects include meteorological observations on vehicles operating in space, impact predictions and ballistic correction computations specified in approved National Range Documents. Support is provided for on-range rocket firings as well as for off-range firings that impact on range. Army participation in the MRN is provided by the operation of three rocket launching sites at WSMR, NM; Poker Flat, AK; and Fort Sherman, Canal Zone. This network provides upper air measurements of temperature, humidity and winds between 30 and 100 kilometers required by Department of Defense, Defense Nuclear Agency, National Aeronautics and Space Administration, and the National Oceanographic and Atmospheric Administration in support of research and test programs. The Army's prime requirement for these data is for missile design and testing.

RELATED ACTIVITIES: 6.11.02.A, Project B53A, Atmospheric Sciences; 6.21.11.A, Atmospheric Investigations; and 6.47.26.A, Meteorological Equipment and Systems. The Army-operated WSMR 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. The operations of the MRN, in which the Navy, Air Force and NASA also participate, are coordinated by a Scientific Advisory Group of the Interdepartmental Committee on Applied Meteorological Research (ICAMR).

WORK PERFORMED BY: Approximately 80% of the work is performed in-house by the Atmospheric Sciences Laboratory (ASL), US Army Electronics Research and Development Command, and WSMR. There are four contracts: University of Alaska, College, AK; Space Data Corporation, Phoenix, AZ; Calesco Industries, Costa Mesa, CA; and University of Dayton, Dayton, OH.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: Meteorological support was provided to an average of 600 RDTE projects each year to 55 Army RDTE activities at 13 permanent test sites both within and outside the continental United States and at an average of 10 special test sites. The meteorological support includes providing complete weather services at Army test sites, including equipment, supplies and personnel for weather observing, forecasting and advisory services; providing highly specialized instrumentation and meteorological data collection and analyses before, during and after test; and providing professional consultation

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.02.A Title Support of Development Testing

Project #D127 Title Meteorological Support to RDTE

services concerning meteorological data. During FY 197T and FY 1976, meteorological support was provided for 105 RDTE projects at White Sands Missile Range (WSMR) which involved 4129 range missions. A total of 680 meteorological rockets were fired at the Army Meteorological Rocket Network (MRN) sites in support of Universal Documentation System (UDS) and R&D rounds at WSMR, plus the routine three per week MRN synoptic schedule. All meteorological data gathered were reduced, processed and disseminated to interested RDTE activities, World Data Center, and National Climatic Center. Work continued on the improvement of meteorological observational techniques used by the Army RDTE Meteorological Teams.

2. FY 1977 Program: Meteorological support to Army RDTE activities at the 13 permanent test sites, temporary sites and WSMR is continuing at approximately the same level as in FY 1976. This work is predominantly in support of Army Materiel Development and Readiness Command's major program thrusts and is responsive to stated requirements of approximately 600 RDTE programs. Customer-oriented support at the various ranges is given to programs including demilitarization and detoxification, High Energy Laser, Cannon Launched Guided Projectile, Terminal Homing Systems, Improved Cobra Armaments System, Rocket Systems, Nuclear Power Barge, and Remotely Monitored Battlefield Sensor System. Modernization of instrumentation and data acquisition systems will continue including improvement of automatic wind measuring radars and real-time systems. Routine and special event Meteorological Rocket Network firings are continuing at the three Army MRN stations in accordance with Federal Plans and US-USSR cooperative agreement.

3. FY 1978 Planned Program: Continue to provide meteorological services in support of Army RDTE activities. Customer-oriented meteorological data, meteorological rocket and balloonsonde data, and impact prediction ballistic support will continue to be provided to approximately the same number of programs as in FY 1977 at WSMR and as specified in approved UDS. The systematic Army MRN sounding schedule (three per week) will be continued. In addition, special event sounding will be made to support programs such as the Satellite/Rocketsonde Comparison Program, Defense Nuclear Agency programs, and the US/USSR meridianal network data exchange agreement. The increase in funding from FY 1977 to FY 1978 is required for the purchase of urgently needed equipment to replace uneconomical-to-repair equipment and to modernize data acquisition systems.

4. FY 1979 Planned Program: Continue to provide meteorological services in support of Army RDTE activities and to national range users, and to operate MRN sites at approximately the same level of effort as in FY 1978.

5. Program to Completion: This is a continuing program.

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.02.A Title Support of Development Testing

Project #D127 Title Meteorological Support to RDTE

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 4080 | 1150 | 3910 | 4066 | 4374 | Continuing | Not Applicable |

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.57.02.A Title Support of Development Testing

Project #D618 Title Aircraft Development Test Activity

Category Management and Support Budget Activity #6 - Programwide Management and Support

DETAILED BACKGROUND AND DESCRIPTION: This project provides for the fixed and recurring costs incurred by the Aircraft Development Test Activity (formerly part of the Aviation Test Board), Fort Rucker, Alabama, a field element of the US Army Test and Evaluation Command (TECOM), for the conduct of developmental testing of Army aircraft acquisition programs. The technical performance, safety, reliability and maintainability characteristics are measured during developmental tests. 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 a new project, DV02, Test Boards. Effective 1 July 1976, the operational testing activities of the Aviation Test Boards were transferred to TRADOC and this sixth board was also financed under project DV02, while the development test activities of the old Aviation Test Board were assigned to the Aircraft Development Test Activity which remained under TECOM and continued to be financed by project D618.

RELATED ACTIVITIES: Close and continuous coordination exists with other Aviation test and evaluation activities, TRADOC, the Air Mobility Development Center, materiel developers, and the US Army Operational Test and Evaluation Agency to insure optimum effectiveness of developmental and operational testing. The Office of the Deputy Director of Defense Research and Engineering (Test and Evaluation) reviews the management, operation, and maintenance of all Department of Defense test facilities and planned testing activities 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.

WORK PERFORMED BY: Testing is performed by in-house military and civilian personnel. Aircraft maintenance (fixed and rotary) is performed on a contractual basis at a cost of about $2.5 million. Current contractual effort is performed by Hawthorne Aviation.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: The Test Boards conducted engineering and service tests as well as other developmental tests on Army materiel. Examples of items tested in FY 1976 and FY 197T are: Utility Tactical Transport Aircraft System; Improved COBRA Agility and Maneuver; Radar Warning Receiver, ALR-46; Radio Set, AN/ARC-114A; Infrared Suppressors for AH-1/UH-1/RU-21; Crashworthy Fuel System and Closed Circuit Receiver Kit of OH-6; Absolute Altimeter, AN/APN-209; Improved COBRA Armament System; Automatic Inspection, Diagnostic and Prognostic System (AIDAPS).

2. FY 1977 Program: Examples of equipment under testing or planned for testing in FY 1977 follow: Iranian Helicopter 214A; Utility Tactical Transport Aircraft (UTTAS); Product Improvements of T55-L11 and T53-L13 Engines; Synthetic Flight Training System (UTTAS TRAINER); Infrared Suppressor Kits of AH-1, U21-RU21, CH47C, UH-1 and OV-1; Mine Dispenser XM130; Infrared Jammer's AN/ALQ144 and AN/ALQ147; Loran C/D Navigation Set AN/ARN-114.

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.02.A Title Support of Development Testing

Project #D618 Title Aircraft Development Test Activity

3. FY 1978 Planned Program: Examples of equipment planned for testing follow: Utility Tactical Transport Aircraft (UTTAS); Infrared (IR) Suppressor Kits for UH-1, OV-1, AH-1; Radar Jammer AN/ALQ-136; Missile Detector System AN/ALQ-156; Quad Laser Warning Receiver; Radar Warning Receiver AN/APQ-39.

4. FY 1979 Planned Program: Examples of equipment planned for testing follow: UTTAS; CH-47 Modifications; Heliborne Fire and Forget Missile, HELLFIRE.

5. Program to Completion: This is a continuing program.

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 5931 | 1737 | 6037 | 5809 | 6120 | Continuing | Not Applicable |

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.57.02.A Title Support of Development Testing

Project #D620 Title Ammunition Effectiveness

Category Management and Support Budget Activity #6 - Programwide Management and Support

DETAILED BACKGROUND AND DESCRIPTION: This project provides a tri-Service mechanism for the free exchange of technical data on non-nuclear munitions and weapons systems; provides the basis for the definition of and recommendation for corrective action to the Joint Logistic Commanders of problem areas and/or knowledge gaps related to munitions and weapons effectiveness; serves as a focal point for joint-Service efforts to improve the data base and analytical methodology used in the determination and prediction of non-nuclear munitions and weapons effectiveness in a real-world environment; and provides a means for the development, publishing, and updating 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 preparation of JMEM's for air-to-surface, surface-to-surface, and anti-air munitions/weapons systems; close coordination with the Office of Director of Defense Research & Engineerings Evaluation (ODDRE VAL) programs and with the users and operators of weapon systems; and supporting efforts in target vulnerability and survivability selected systems effective ness, and battle-damage assessment. Ad hoc tasks are undertaken as required to assist in the resolution of data deficiencies relative to existing munitions/weapons systems and their effectiveness.

RELATED ACTIVITIES: This project is managed by the Joint Technical Coordinating Group for Munitions Effectiveness (JTCG/ME). It is a Joint-Service group initially established by Joint Chiefs of Staff Directive in 1963, chartered in 1965, and rechartered in 1968. The JTCG/ME responds to directives from the commanders of the US Army Materiel Development and Readiness Command, Navy Materiel Command, Air Force Logistics Command, and 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 JTCG/ME participates on selected projects with the Weapons Systems Evaluation Group, Office of the Secretary of Defense; Officer of Director, Defense Research and Engineering (DDRE) and with various other Joint Technical Coordinating Groups.

WORK PERFORMED BY: Approximately 75 percent of the project work is performed by the following in-house organizations: The US Army Materiel Systems Analysis Activity and USA Armament Research & Development Command (ARRADCOM), Aberdeen, Maryland; Harry Diamond Laboratories, Washington, D. C.; ARRADCOM, Dover, New Jersey; the US Army ARRADCOM, Rock Island, Illinois; the US Army Electronics Research & Development Command (ERADCOM), Command, Fort Monmouth, New Jersey; the US Army Missile Research & Development Command (MIRADCOM), Command, Huntsville, Alabama; Dugway Proving Ground, Utah; ARRADCOM, Edgewood, Maryland; the Air Force Armament Laboratory, Eglin Air Force Base, Florida; the Air Force Flight Dynamics Laboratory, Wright-Patterson Air Force Base, Ohio; the Naval Surface Weapons Centers, White Oak, Maryland and Dahlgren, Virginia; and the Naval Weapons Center, China Lake,

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.02.A Title Support of Development Testing

Project #D620 Title Ammunition Effectiveness

California; Naval Research Laboratory, Washington, D. C.; Naval Weapons Station, Concord, Georgia; and Pacific Missile Test Center, Point Magu, California. The project contractors (each contract having a value of $25,000 or more) are: Oklahoma State University at Eglin Air Force Base and Stillwater, Oklahoma; Falcon Research and Development, Inc., at Albuquerque, New Mexico and Denver, Colorado; Denver Research Institute, Denver, Colorado; Southwest Research Institute, El Paso, Texas; General Electric Co., Bennington, Vermont; New Mexico School of Mines and Technology, Socorro, New Mexico; Booze-Allen Applied Research, Dayton, Ohio.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishments:

a. FY 1975 and prior accomplishments: This project has produced the Joint Munitions Effectiveness Manuals on Air-to-Surface and Surface-to-Surface. The Air-to-Surface precalculated effectiveness data are included in the Visual Delivery Manuals, the Radar Delivery Manuals, the B-52 Manual and the Helicopter Manual (Personnel) and open-end effectiveness methods in the Basic Manual and in the desk-top and hand-held computer methods. Other manuals address delivery accuracy, vulnerability, weapons characteristics, methodology and joint testing procedures. The Surface-to-Surface group has produced effectiveness manuals for twelve Army and Navy weapon systems versus various targets, as well as delivery accuracy, weapons characteristics, fragmentation, reliability, lethal area and safe distance manuals. Air defense models were compared, documented and exercised. The Office of Director of Defense Research & Engineering (ODDRE) Test Program, HITVAL (anti-aircraft gun effectiveness evaluation), was support and the data analyzed. Analysts were detailed to the Air Combat Maneuvering Range (ACMR) to obtain and analyze data and assist the training program. A weapon characteristics manual for anti-air weapons was produced. Air-to-Surface and Surface-to-Surface target acquisition has been studied and approximately 15 reports were written. Testing of anti-personnel and antimateriel munitions in various environments was performed and approximately 50 reports on degradation of effectiveness produced. Real world checks of the analyses were obtained from battle data on personnel and materiel in Vietnam and on materiel from the mid-East conflicts. Combat data are stored and are retrievable in the Combat Data Information Center (CDIC). Several studies were completed on the vulnerability of US Forces in CONUS and OCONUS to chemical and biological attack and most recently on the three services' decontamination requirements and posture in a chemical warfare environment. The Joint Service Explosive Fill Program (JSEFP) was completed with the testing and analysis of various explosive fills and the study of the explosive production facilities. Examples of some of the more important special tasks completed were:

Two tasks on evaluation of 20-30mm ammunition; medical and environmental aspects of the use of depleted uranium in conventional munitions; close air support weapon effectiveness and aircraft survivability; and survivability options for the B-52. Many of the Joint Munitions Effectiveness manual (JMEM) manuals have been prepared for release to friendly foreign countries.

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.02.A Title Support of Development Testing

Project #D620 Title Ammunition Effectiveness

b. The 8 inch Howitzer, 105mm Howitzer and 762mm Rocket effectiveness manuals, the Fragmentation Manual, Test Procedures Manual and the Delivery Accuracy Manual were updated. Three chapters in the Target Vulnerability Manual were revised and a complete revision of the Air-to-Surface Weapons Characteristics Manual was completed. Reports on the data bank of firebomb test results and comparison of minefield models were published. Air to Air Missiles (AIM) 7F, 7E2, and 9 air-to-air missile effectiveness calculations were completed with manual preparation underway. Hand calculator effectivess methods for surface-to-surface were developed. Assistance was provided to Commander in Chief Pacific (CINCPAC) and US Forces in Korea on effectiveness evaluation and target vulnerability and on our computer assisted methods. Visits were made to the Far East to assist US Forces stationed there. Vulnerability of industrial targets was assessed for Strategic Air Command (SAC) and liaison was made with the Navy for inclusion of the results of their Soviet Ship Vulnerability Program in our manuals. Vulnerability assessments of were completed. The Aircraft Gun Comparison Study, supported with funds by the Air Force, produced significant testing which resolved aircraft vulnerability issues among the Services, the potential benefits of delay fuzing were shown and the already mentioned vulnerability was completed.

A major effort to determine the effectiveness of multifragment hits on aircraft was initiated. Tests to obtain information on the ricochet of full scale bombs were completed. Assistance in planning the Office of Defense & Engineering Multiple Aircraft Against Aircraft Firing Both Guns & Missiles Air to Air/Air to Air Missiles (ODDRE ACEVAL/AIMVAL) air-to-air tests was provided. Support and analysis was provided to a Fort Sill smoke test to validate this project's obscuration model and to obtain data on target acquisition and reacquisition of stationary and moving targets. Tests on unit decontamination and degradation in performance because of the burden of chemical equipment were carried out on a Navy Aircraft Carrier. A study on the benefits of fuze delay requirements for High Explosive incendiary (HEI) versus aircraft was completed. Many special Ad Hoc studies were requested and completed as follows: the combat utility of Maverick to interdict tanks in a European environment was completed for ODDRE; the Air Force requested an assessment of different configurations of incendiary material on the 20mm M56 HEI. Tests were completed using zirconium and further testing is to continue into FY 1977; the Joint Logistics Commanders tasked this program to assume the lead role in submitting a consolidated report on Alternate Explosive Fills. All alternate fills were studied and an extensive qualification program was completed. Explosive production facilities were studied and recommendations were made; assessment and analysis of Development Test & Evaluation & Initial Operations Test & Evaluation (DT&E and IOT&E) tank lethality tests was provided to the A-10/GAU-8 SPO; a study was completed for the Air Munitions Requirements and Development Committee (AMRAD) of ODDRE on the usefulness of the 20mm Product Improvement Program; and finally the AMRAD requested an evaluation of the XM714 fuze for which testing is on going and will extend into FY 1977.

2. FY 1977 Program: Current efforts are focused on updating and expanding air-to-surface, surface-to-surface and anti-air weapons effectiveness and related manuals to provide a more realistic assessment of weapons effectiveness in a combat environment. The visual delivery manual is scheduled for a complete revision which may carry over to FY 78 because of the decrement of funds. A slow speed aircraft effectiveness manual will be started. A start on incorporating target acquisition data into the manuals will begin. Fuze shear-off and duding problems with the MK80 bomb series will be studied and test run to obtain reliable data on this problem.

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.02.A Title Support of Development Testing

Project #D620 Title Ammunition Effectiveness

The multifragment program will continue to study denser fragments and fragment size optimization for HAWK and PATRIOT missiles, however, Project Managers and Advanced Research Project Agency (ARPA) will be solicited for funds to keep this program moving. Testing of the XM714 fuze and incendiary materiels in 20mm High Explosive incendirary (HEI) will be completed. Moving targets will be added to the M60 tank pamphlet and effectiveness manuals on the will be started. This project will participate in the Aircraft Against Aircraft Firing Both Guns & Missiles Air to Air/Air to Air Missiles ACEVAL/AIMVAL tests and will assist in analyzing the data. Illumination effectiveness and night fighting will be investigation and reports published. In conjunction with TRADOC and the Air Defense School at Fort Bliss a series of 40mm HEI tests versus F-102 aircraft components will be completed. Analysis of the Fort Sill smoke test will be completed and in addition work on a smoke primer and a smoke users manual will be undertaken. Dry bay fire testing with delay fuzes will continue, the vulnerability of the will be assessed versus Armor Piercing Incendary (API) and point defense data will be generated. Work will begin on assessing the probability of kill (Pk) of the and obtaining baseline data on the HAWK and CHAFARREL. Vulnerability analyses will continue on

hardened targets. Vulnerability analyses of the will be published. Since vulnerability data paces this project a survey of tri-service vulnerability needs was undertaken. Preliminary findings indicate that even though this project has provided approximately one million dollars per year for the past six years and the services considerably more, timely vulnerability data are difficult to obtain vulnerability data are essential to study survivability which is an important factor not considered on this FY 1977 program because of funding cuts. Finally, a study requested in FY 197T by the Project Manager XM-1 Tank on the effects of the use of depleted uranium in the XM774 105mm round will be completed.

3. FY 1978 Planned Program: Continuation of the effectiveness evaluation for air-to-surface, surface-to-surface and anti-air weapons and associated supporting efforts in vulnerability, survivability and battle damage assessments. Enhance the flow of information among the services, emphasize the inter-operability of weapons and ammunition,; and respond to Ad Hoc tasks from higher headquarters and to users requests. The increase is due to expansion of study & ballistic testing, reduction of data, prior to establishing manuals.

4. FY 1979 Planned Program: Since this is a continuing program the efforts outlined for FY 1978 will be continued. Due to the projected increase in funding for FY 1979 special emphasis will be given to survivability analyses of wheeled and tracked vehicles and aircraft; vulnerability analyses of complex targets, addition of smoke effects, target acquisition and illuminating effects into the air-to-surface manuals and selected surface-to-surface manuals and the integration of AIMVAL/ACEVAL (DDRE sponsored) air-to-air combat dog fights, simulated firings of missiles and guns.

5. Program to Completion: This is a continuing program.

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.02.A Title Support of Development Testing

Project #D620 Title Ammunition Effectiveness

6. Major Milestones:

N/A

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 5000 | 1300 | 3700 | 3907 | 5419 | Continuing | Not Applicable |

## FY 1978 RDTE DESCRIPTIVE SUMMARY

**Program Element** #6.57.02.A **Title** Support of Development Testing

**Project** #D623 **Title** Instrumentation Development, Test and Evaluation Command (TECOM)

**Category** Management and Support **Budget Activity** #6 - Programwide Management and Support

DETAILED BACKGROUND AND DESCRIPTION: This project provides for the acquisition of instrumentation needed for testing but which is not available off-the-shelf and, thus, requires either in-house or contractual effort. The end item of all efforts funded by this project is an item of instrumentation with defined capabilities. The complexity of items to be tested and the continuing need to operate more efficiently at lower manning levels increasingly requires establishment of new or more efficient capabilities through development of new or unique items of instrumentation. Effort on development of instrumentation for all TECOM test activities is accomplished with this project. Major efforts are directed toward improving test instrumentation at: Aberdeen Proving Ground, Maryland, Yuma Proving Ground, Arizona, White Sands Missile Range, New Mexico, Electronic Proving Ground, Arizona, Dugway Proving Ground, Utah, Cold Regions Test Center, Alaska, and Tropic Test Center, Panama.

RELATED ACTIVITIES: The TECOM development of instrumentation effort tracks Army weapon developments to the extent of being able to meet the technological demands of these weapon systems for testing. Efforts to improve test procedures and methodology within US Army Test and Evaluation Command (TECOM) are also related to efforts to improve test instrumentation. Improvements in methodology lead to specifications for instrumentation and also lead to the development of new testing and analysis procedures associated with new instrumentation. Upon development of a prototype system under this PE, additional units may be procured from other RDT&E or PEMA programs. The development efforts in this project are coordinated with any similar efforts by the Navy or Air Force through daily liaison activities and are reviewed by the Office of the Deputy Director of Defense Research and Engineering (Test and Evaluation) to further assure integration of related Department of Defense efforts.

WORK PERFORMED BY: New instrumentation is acquired primarily through contractual effort. Potential contractors for the major efforts include: Sanders Associates, Inc., Nashua, New Hampshire; RCA, Inc., Moorestown, New Jersey; General Dynamics, San Diego, California; Datum, Inc., Anaheim, California; Federal Scientific, New York, New York; Kollmorgan, Corp., North Hampton, Massachusetts; K&E, Atlantic Highlands, New Jersey; Raytheon, Inc., Bedford, Massachusetts; Astro-Data, Inc., Camarillo, California; RSL Industries, Inc., Boonton, New Jersey; Stathem Instrumentation, Inc., Oxnard, California; Rosemont Engineer Corp., Minneapolis, Minnesota; Systems Consultants, New York, New York; Tropel, Inc., Fairport, New York; DELFT Corporation of America, Fairfax, Virginia; IBM, Owego, New York; Lockheed Aviation, Ontario, California; Terracom, San Diego, California; University of Michigan, Anne Arbor, Michigan; University of Delaware, Newark, Delaware; Hewlett Packard Co., Palo Alto, California; Contraves-Goertz Corp., Pittsburgh, Pennsylvania; GTE Sylvania, Mountain View, California.

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.02.A Title Support of Development Testing

Project #D623 Title Instrumentation Development, Test and Evaluation Command (TECOM)

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: Development and improvement of test instrumentation of thirteen TECOM test installations were accomplished. Typical of some of the major acquisitions and/or efforts are the following: a one-of-a-kind scoring radar for air defense weapon testing; an advanced, high precision laser tracker; a projectile airburst and impact locating system for artillery testing; a large electromagnetic interference test chamber capable of testing complete vehicles; moving target systems for evaluation of infantry weapons; in-flight monitoring equipment; improved automated data handling systems; specialized infrared test equipment; sensor test instrumentation; range instrumentation command and control; aircraft armament test instrumentation; and vehicle test instrumentation. The program for FY 1975 included improvement in the following areas: hit probability analysis of gyro-stabilized armored vehicle weapons, pressure-time gas tube chamber measurements, sensor test instrumentation, digital radar development, static electricity measurement and temperature measurement. Instrumentation development and improvement effort continued in FY 1976 and FY 197T with major expenditures in the following areas: continuation of development efforts for a projectile airburst and impact locating system; automation of data acquisition and processing; and improved triggering device for multiple-head X-ray; laser measurement instrumentation to evaluate laser system performance; non-cooperative target laser ranging and tracking development; new generation radar velocimeter development; procurement of standardized muzzle velocity radars; and utilization of solar energy and real time video theodolite development. In addition, expenditures were made for improvement of capabilities at the environmental test centers.

2. FY 1977 Program: Major development efforts include continuation of effort on advanced data processing technology, new generation doppler velocimeters and artillery and mortar hit scoring, new efforts to develop a projectile dynamic measurement system, laser ranging/video theodolites, instrumentation for camouflage testing, graphic display interface, improvements to position location systems, antenna test instrumentation, and gun fire control data systems. The project will continue to be responsive both to needed efficiency improvements and new requirements generated by state-of-the-art items under test.

3. FY 1978 Planned Program: A real time videotheodolite will be developed with the cooperation of White Sands Missile Range and Yuma Proving Ground. This will eliminate much of the most labor intensive and costly element of cinethodolite data, the need to develop and read motion picture film. This system will provide an estimated savings of over $14,000 per hour of cinetheodolite data. The system has application at the Electronic Proving Ground and Dugway Proving Ground as well as Yuma Proving Ground and White Sands Missile Range. It is believed that many other Department of Defense ranges which utilize cinethodolites can also benefit. The projectile dynamic measurement system is a device which will accurately measure the nutation, precession, yaw and spin of an artillery projectile in flight. The Army Ballistic Research Laboratories has stated that the ability to routinely make such measurements on a projectile during the development stage could save millions of dollars in fixes that may be required when stability problems are discovered in post-development projectiles. The solar energy task will be conducted in cooperation with Mobility Equipment Research and Development Command, National Aeronatutics and Space Administration and the Jet Propulsion

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.02.A Title Support of Development Testing

Project #D623 Title Instrumentation Development, Test and Evaluation Command (TECOM)

Laboratory. TECOM believes that solar energy has a tremendous potential for eliminating some of the problems of providing power to instrumentation at remote and inaccessible locations. The need to reduce the inefficiency of the one-radar-for-one-target bottleneck as well as customer demands for rapid data turn-around required the development of a phased array instrumentation radar. This multi-target radar is suitable for such programs as the General Support Rocket System. The FY 1978 funding will get this task underway at TECOM. The projectile airburst and impact locating system, PAILS, is a continuing project which will automate the scoring of artillery and mortar impacts and airbursts of improved conventional munitions. PAILS will eliminate the inefficiency and uncertainty of labor-intensive manual scoring now utilized at TECOM artillery firing ranges, and in addition, allow the ranges to be fully utilized in bad weather and darkness. The low altitude tracking augmentation will expand the capability of the position location system at Yuma Proving Ground by providing the means to utilize airborne reference stations. The physiological telemetry system will be a joint development effort that will result in a complete automated monitoring and recording system. It will be utilized at TECOM locations that require data on human physiological parameters for equipment evaluation and safety monitoring. The automated data acquisition and processing technology, ADAPT, is a complete system to provide real time control of various tests at Aberdeen Proving Ground. It will be a system that interacts with the test director on-site and provide both on-site availability of critical information and real time analysis of data. Estimated cost savings for ADAPT are $600,000 per year.

4. FY 1979 Planned Program: During FY 1979, a number of high priority efforts such as the projectile airburst and impact locating system, real time video theodolite, phased array radar and projectile dynamic measurement system will see completion. In addition, new efforts will be initiated in such areas as improving the efficiency of data collection through further automation, providing an interactive real time capability for test conduct, reducing dependence on optical miss-distance methods and improved utilization of microprocessor technology. Since this project seeks to take advantage of the latest technology in practical applications, a reassessment of promising technological areas will be made prior to actual execution of the FY 1979 program.

5. Program to Completion: This is a continuing program.

RESOURCES: ($ in Millions)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 1328 | 734 | 2186 | 2324 | 3600 | Continuing | Not Applicable |

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.57.06.A  Title Materiel Systems Analyses

Category Management and Support  Budget Activity #6 - Programwide Management and Support

RESOURCES (PROJECT LISTING): ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 10682 | 2458 | 9274 | 9224 | 10122 | Continuing | Not Applicable |
| M541 | US Army Materiel Systems Analysis Activity (AMSAA) | 10150 | 2318 | 8661 | 8715 | 9600 | Continuing | Not Applicable |
| M857 | Armed Services Explosives Safety Board | 532 | 140 | 613 | 509 | 522 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: Provides funds for the conduct of materiel systems analyses and cost effectiveness evaluations and for the improvement of explosive and chemical safety standards.

BASIS FOR FY 1978 REQUEST: Continue in-progress systems analysis and explosives safety projects with emphasis on alternatives that might be considered to lower the costs of materiel procurement, operations and support and on maximizing survivability, reliability, availability, and maintainability of developmental items.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: The level of effort for FY 1978 is reduced slightly from FY 1977 for the Armed Services Explosives Safety Board.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement) is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ Employees | 284 | 0 | 284 |
| (2) Contractor Employees | 20 | 0 | 20 |
| TOTAL | 304 | 0 | 304 |

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.06.A Title Materiel Systems Analyses

DETAILED BACKGROUND AND DESCRIPTION: The effort funded by this PE is accomplished within 2 projects. M541, US Army Materiel Systems Analysis Activity (AMSAA) provides the central technical capability in the US Army Materiel Development and Readiness Command (DARCOM) for the conduct of major independent systems analyses and cost effectiveness evaluations. AMSAA serves as the DARCOM center for survivability, reliability, availability and maintainability analyses and maintains direct contact with Army materiel users in the field to ascertain needed improvements. M857, Armed Services Explosives Safety Board, provides for full-scale testing and supporting models and analyses directed toward improvement of tri-service explosives and chemical agents safety standards. The Board assesses blast, fragment, thermal, and toxic hazards to personnel and structures from potential accidental explosions of stored ammunition; develops design procedures for protective construction, drawings, operating standards, and quantity-distance tables; and establishes standards for designs, layouts and materials for storage magazines and explosives operating buildings.

RELATED ACTIVITIES: AMSAA coordinates closely with DARCOM project managers and commodity managers to avoid duplication of effort and to take full advantage of information already available. A portion of AMSAA effort is for the other services or for tri-service activities sponsored by the Joint Logistics Commanders. The Office of the Director Defense Research and Engineering monitors AMSAA efforts to avoid duplication with other service efforts. AMSAA is the Army executive agent for the Joint Technical Coordinating Group for Munitions Effectiveness, financing for which is provided by project D620, Ammunition Effectiveness Testing, in PE 6.57.02.A, Support of Development Testing. AMSAA also designs development tests to support decisions with respect to acquisition of major materiel systems and provides independent evaluations of the worth of these systems; this effort being financed by project D026, Test Design and Evaluation AMSAA, in PE 6.57.02.A. Project M985, Concepts Evaluation of Materiel, was transferred from this PE to PE 6.57.07.A as part of a consolidation of US Army Training and Doctrine Command projects in support of user testing. Project M857 was transferred to this PE from PE 6.57.02.A as part of a restructuring of the latter to include only projects that support development testing.

WORK PERFORMED BY: Approximately 90% of the AMSAA effort is performed in-house by AMSAA personnel, the rest being conducted under contracts. Approximately 80% of Explosives Safety Board effort is accomplished by DOD activities, principally Naval Weapons Center (China Lake), Naval Surface Weapons Center (Dahlgren), and US Army Ballistics Research Laboratories; the rest being conducted under contracts. It is anticipated that no contracts will exceed one-half million dollars.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishments: AMSAA completed analyses and evaluation of production base capability for munitions and explosives, repair parts consumption, truck replacement life, tanks, helicopters, guns, missiles, and mines. The Explosives Safety Board analyzed data from explosion tests of earth-covered magazines; conducted scale-model experiments on arch-type magazines; analyzed air blast within and external to vented cubicles due to internal explosion; evaluated induction devices and magnetometers for detecting buried unexploded ordnance; evaluated fragment hazard from one-point detonation of the high-explosive systems of nuclear weapons using arena fragmentation tests; and completed design of a hand-held calculator for estimating toxic hazards from inadvertent release of chemical agents.

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.06.A Title Materiel Systems Analyses

2. FY 1977 Program: AMSAA is performing analyses and evaluations of combat vehicles, missiles, guns, trucks, theater nuclear forces survivability, night combat, camouflage, and utilization of smoke. A portion of planned effort is to be deferred to succeeding years as funding constraints prevent carrying out a planned expansion. The Explosives Safety Board is continuing on-going efforts to include: extension of theoretical efforts to support prediction of fragment patterns from stacks of weapons; and development of fragmentation test procedures. The Board is initiating studies of incendiary and thermal radiation effects from propellants and pyrotechnic materials with the objective of minimizing hazards and full-scale tests of steel and concrete arch igloos of non-circular cross sections.

3. FY 1978 Planned Program: AMSAA will continue on-going analyses and evaluations, many of these being carried over from FY 1977 including analyses of night operations, survivability, missiles and other weapons, and the properties of obscuring smokes. Emphasis will be placed on system alternatives to lower overall cost of procurement, operations and support. AMSAA work will be at approximately the same level of effort as in FY 1977. Funding constraints will continue to prevent a planned expansion to meet mission workload requirements, so that a portion of previously planned effort will be deferred to succeeding years. The Explosives Safety Board will continue on-going efforts and initiate other efforts to improve safety standards for explosives and chemical agents. Anticipated areas of emphasis are similar to those of FY 1977. Full scale test results obtained in FY 1977 will be exploited by means of model experiments and detailed structural analyses using numerical methods.

4. FY 1979 Planned Program: AMSAA and the Explosives Safety Board will continue on-going work. Anticipated areas of emphasis are similar to those of FY 1978. The level of effort at AMSAA will be increased from FY 1978, but will remain well below the FY 1976 level.

5. Program to Completion: This is a continuing program.

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.57.06.A Title Materiel Systems Analysis

Project #M541 Title US Army Materiel Systems Analysis Activity (AMSAA)

Category Management and Support Budget Activity #6 - Programwide Management and Support

DETAILED BACKGROUND AND DESCRIPTION: AMSAA is a sub-activity of the US Army Materiel Development and Readiness Command (DARCOM). Its primary mission is one of providing the central technical capability in DARCOM for the conduct of major independent systems analyses and cost-effectiveness evaluations. This encompasses assessing the expected worth of and costs of existing and proposed Army materiel systems throughout their life cycle to provide a meaningful basis for major decisions concerning their design, development, acquisition, employment and deployment. AMSAA serves as the DARCOM center for reliability, availability, and maintainability (RAM) methodology and conducts analyses of the RAM aspects of materiel systems. AMSAA serves as the DARCOM lead activity for survivability and conducts survivability analyses of materiel systems. AMSAA maintains direct contact with Army materiel users in the field, ascertains requirements for improvement of fielded materiel, evaluates these requirements, and seeks timely solutions through application of current and emerging technology. AMSAA is located at Aberdeen Proving Ground, MD. Most of AMSAA's overall funding is provided by project M541.

RELATED ACTIVITIES: AMSAA is the Army 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 in coordination with HQ DARCOM as well as the military services. This involves systems analysis as well as testing to determine the effectiveness and performance of the operational weapons/munitions systems of all military services. JTCG/ME is financed by program element 6.57.02.A, project D620, Ammunition Effectiveness Testing. Based on Army Materiel Acquisition Review Committee (AMARC) findings, AMSAA is now tasked with a new mission to design development tests to provide the basis for independent evaluations which contribute to decisions with respect to acquisition of major and selected nonmajor materiel systems, to monitor the tests, and to provide a complete and independent evaluation of the worth of the system. This effort is financed by project D026, Test Design and Evaluation AMSAA, program element 6.57.02.A, Support of Development Testing.

WORK PERFORMED BY: Approximately 10% of the effort is conducted under contract for AMSAA, the rest being performed in-house by AMSAA personnel. Potential contractors cannot be identified at this time. It is anticipated that no contracts will exceed one-half million dollars.

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.06.A Title Materiel Systems Analysis

Project #M541 Title US Army Materiel Systems Analysis Activity (AMSAA)

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: Production base capability for munitions and explosives, production mix requirements, and the impact of plant modernization and expansion were reviewed. Logistics analyses were conducted, including lifetime repair parts consumption compared to parts procurement and wartime versus peacetime repair parts consumption. Evaluations were accomplished in support of the advanced attack helicopter, new main battle tank and SAM-D programs. Studies of useful life of 2 1/2 ton truck indicated that optimum replacement life is 15 years as contrasted with the existing 12 year replacement life policy. This represents a potential cost savings of $100 million. Other analyses completed include: comparison of a foreign gun with the M60 machine gun; analysis of enemy helicopters' vulnerability; HAWK Battery survivability analysis in the light of new vulnerability data; tank main armament evaluations; armored vehicle smoke systems analyses and consultations; studies regarding the use of artillery-delivered mines and aircraft-delivered mines; analysis of the impact of mobility and agility in combat; study of defense against high performance, maneuvering airborne targets; implementation of a progressive smoke program; analysis showing that AN/TSQ-73 (Missile Minder) required 2 rather than 4 prototypes saving $3.1 million; Joint Services Explosives Fill program which had a savings potential of $500 million; and exhaustive work on XM1 alternatives.

2. FY 1977 Program: Examples of current analyses are: XM1 supplemental fire control, combat vehicle vulnerability, cruise missile, M60/TOW fire control, tank gun ammunition analysis for the NATO Working Group on Interoperability, antitank missiles, automotive transmissions (manual vs. automatic), tank gun and ammunition initiatives, theater nuclear forces survivability, antiaircraft weapons for nuclear site defense, night combat assessment, camouflage, utilization of smoke, and basic damage assessment. There has been significant impact as a result of work with operating field units. Several visits have been made and others are scheduled and a number of corrections on field materiel have resulted. A significant amount of data analysis, Weapon Cost Performance Data and effectiveness calculations were conducted in support of US Army Training and Doctrine Command on: NIKE HERCULES, UK light gun, vehicle agility versus missile maneuverability, tank gun versus maneuvering helicopters and target reaction studies.

3. FY 1978 Planned Program: Continued analyses and evaluations will be required for the general families of items such as helicopters, small arms, tank-antitank weapons, missiles, and communications equipment. Many of these will be carried over from the previous year since the developments evolve over a number of years. Tasks will include analyses of night operations, survivability, fire power, mine emplacement concepts, artillery optimization, utilization of missiles and various antiarmor techniques. Emphasis will be placed on reviewing major systems (e.g., COPPERHEAD) and alternatives and tradeoffs that might be considered in order to lower the cost of materiel procurement and systems operations and support. There will also be emphasis on maximizing survivability, reliability, availability and maintainability of developed items. Funding is increased slightly from the FY 1977 level to partially compensate for cost growth,

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.06.A Title Materiel Systems Analysis

Project #M541 Title US Army Materiel Systems Analysis Activity (AMSAA)

4. FY 1979 Planned Program: Continue independent systems analyses and cost-effectiveness evaluations of important developmental materiel systems, with emphasis placed on the same general areas as in FY 1978. Specific tasks will correspond with the status of important materiel acquisitions. Funding is increased approximately 10% from the FY 1978 level to permit conduct of certain essential tasks, but remains well below the FY 1976 level.

5. Program to Completion: This is a continuing program.

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 10150 | 2318 | 8661 | 8715 | 9600 | Continuing | Not Applicable |

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.57.07.A

Title Support User Test, US Army Training and Doctrine Command (TRADOC)

Category Management and Support

Budget Activity #6 - Programwide Management and Support

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 13250 | 4096 | 16926 | 18107 | 19650 | Continuing | Not Applicable |
| DV02 | Test Boards | 6800 | 2171 | 8195 | 8424 | 9300 | Continuing | Not Applicable |
| DV03 | Initial Operational Test and Evaluation (IOTE) | 0 | 0 | 3150 | 4261 | 3650 | Continuing | Not Applicable |
| M985 | Concepts Evaluation of Materiel | 2000 | 500 | 1400 | 1936 | 2200 | Continuing | Not Applicable |
| M986 | Support Equipment | 4450 | 1425 | 4181 | 3486 | 4500 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: Provides for RDTE support of the user testing programs. User testing includes initial operational test and evaluation (IOTE) of developmental materiel prior to commitment to production, subsequent operational test and evaluation of production or fielded materiel, and force development testing and experimentation (FDTE). RDTE,A finances conduct of IOTE while conduct of the other user tests is financed primarily by Operations and Maintenance, Army. FDTE consists of field tests conducted to permit evaluation of new concepts of tactics, doctrine, organization and training. Procurement of commercially available, foreign or other Service items to permit conducting innovative tests that provide insights into feasibility of a materiel concept or system, is also included in the user testing program.

BASIS FOR FY 1978 RDTE REQUEST: TRADOC will conduct operational testing on assigned systems and will continue to develop instrumentation, targets and simulators to enable efficient and effective operational testing and force development testing and experimentation (FDTE). Innovative tests will be conducted by military personnel on items procured from available sources in the areas of tactical displays, remotely piloted vehicles, use of commercial vehicles and improved communications systems.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: An overall increase of 7% is required to provide for increased operational testing activities, primarily in the area of intelligence and electronic warfare equipment and to provide for cost growth due to inflation. The level of effort in development of instrumentation, targets and simulators is reduced in order to help provide for these increased operational testing activities.

PERSONNEL IMPACT: The average number of employees supported with requested FY 1978 funds (RDTE and Procurement) is as follows:

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.07.A Title Support User Test, US Army Training and Doctrine Command (TRADOC)

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ Employees | 340 | 0 | 340 |
| (2) Contractor Employees | 60 | 0 | 60 |
| Total | 400 | 0 | 400 |

DETAILED BACKGROUND AND DESCRIPTION: The efforts funded by this program element are accomplished within four projects. DV02, Test Boards, provides funds for the fixed and recurring costs for six Test Boards for FY 1978. The Test Boards conduct operational testing in their functional areas of responsibility. DV03, Initial Operational Test and Evaluation (IOTE), provides funds to the US Army Training and Doctrine Command (TRADOC) for the direct costs of conducting IOTE of nonmajor materiel systems. "IOTE" refers to tests of the acceptability 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 decisions regarding the development program prior to commitment to production. In FY 1977 and prior years, D952, TRADOC Combined Arms Test Activity (TCATA), formerly Modern Army Selected Systems Test, Evaluation and Review (MASSTER), provided funds for development of instrumentation in support of user testing by TCATA. Project D952 is merged into Project D986 for FY 1978. M985, Concepts Evaluation of Materiel, funds the procurement of commercially available, foreign or other Service items to permit conducting innovative tests that provide insights into the feasibility of a materiel concept or system for which a requirement may exist. Items selected for such innovative testing are those that have high potential for increasing combat effectiveness and/or decreasing operating and support costs, and that entail low acquisition costs. These tests may lead to the development of a new materiel requirement, modification of an existing materiel requirement or development plan, or initiation of a product improvement. D986, Support Equipment, provides funds for development of instrumentation in support of user testing by TRADOC. This project also provides funds for development of threat weapon simulators, tank targets and other targets used to establish a realistic environment for user testing. User testing is conducted primarily at the Test Boards, TCATA and the Combat Developments Experimentation Center (CDEC).

RELATED ACTIVITIES: 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 the US Army Operational Test and Evaluation Agency (OTEA) to insure greatest possible effectiveness of Army testing activities and to avoid duplication of instrumentation development efforts. The Office of the Deputy Director Defense Research and Engineering (Test and Evaluation) carefully reviews planned testing and developments of support equipment to insure integration of testing by the Services, and to avoid duplicate developments of instrumentation. Full time liaison personnel are assigned by each of the Services to appropriate test activity headquarters of other Services. 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 Five Year Test Program represents the Army's plan for IOTE of all materiel items and for testing in support of force development for the following five years. Its execution is supervised by OTEA. Operational tests of the acceptability of major and selected nonmajor developmental materiel

items are conducted by OTEA with funds provided under PE 6.57.12.A. DV02, Test Boards, and M985, Concepts Evaluation of Materiel, were transferred into PE 6.57.07.A starting in FY 1978 from PE 6.57.02.A and PE 6.57.06.A, respectively. The purpose for the transfer was to consolidate, into one PE, TRADOC RDTE activities in support of user testing. As noted above, project D952 was merged into project D986 starting in FY 1978 to consolidate TRADOC instrumentation development activities into one project.

WORK PERFORMED BY: Initial Operational Test and Evaluation (IOTE) is primarily conducted in-house assisted by available local troop support. Instrumentation development is primarily contract effort. Contractors include: TRACOR, Inc., Austin, TX; Martin Marietta, Orlando, FL; Bell Aerospace, Arlington, TX; Texas Instruments, Garland, TX; General Dynamics Corp., San Diego, CA; Braddock, Dunn and McDonald, Inc., Vienna, VA; International Laser Systems, Orlando, FL; Dyna-Sciences, Blue Bell, PA; Electra-Magnetic Systems Lab, Inc., Sunnyvale, CA; Wismer and Becher, Sacramento, CA; and M-B Associates, San Ramon, CA. Some instrumentation development is performed by US Army Electronics Research and Development Command, Fort Monmouth, NJ; and General Services Administration, Fort Worth, TX. Most Concepts Evaluation of Materiel funds are small contracts to procure available materiel items; the remainder is for in-house support of the tests these items. TCATA, CDEC and the Test Boards are staffed by military and civilian personnel. The salaries of TRADOC Combined Arms Test Activity (TCATA) and Combat Developments Experimentation Center (CDEC) civilian personnel are paid by Operations and Maintenance, Army funds, while most of the funding for Test Boards' civilian personnel is provided by project DV02, Test Boards.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishments: A major effort was begun to upgrade instrumentation at Combat Developments Experimentation Center (CDEC) and TRADOC Combined Arms Test Activity (TCATA) (formerly 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 of targets for a live firing range and of a family of threat weapon simulators. TRADOC procured available commercial items or modified Army items to support innovative testing of remotely piloted vehicles, mini-jammers, small-scale computers, laser alarms, armored signal command vehicle, hostile aircraft identification, mortar smoke, antiaircraft guns, and TOW under armor. The mission of the Test Boards was revised and the Boards were transferred from US Army Test and Evaluation Command (TECOM) to TRADOC starting in FY 1976 in order to provide clearer separation of development testing and operational testing, and to provide the operational tester with unqualified independence of the developing agency.

2. FY 1977 Program: Starting in FY 1977 the conduct of IOTE by TRADOC was funded by RDTE, A; it was funded by Operations and Maintenance, Army in prior years. TRADOC is conducting IOTE of 90 (nonmajor) materiel items in FY 1977. Ongoing instrumentation developments are continuing with emphasis on improving efficiency and effectiveness of tests of developmental systems at the Test Boards, CDEC, and TCATA. TRADOC is procuring available items for innovative testing with emphasis on helicopter night operations (e.g., artificial illumination for COBRA/TOW), effectiveness of unbuttoned and buttoned-up tanks, and airborne infantry survivability (e.g., free-fall parachute goggles).

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.07.A Title Support User Test, US Army Training and Doctrine Command (TRADOC)

3. FY 1978 Planned Program: US Army Training and Doctrine Command will continue to conduct Initial Operational Test and Evaluation (IOTE) on assigned nonmajor materiel systems. Efforts will continue to develop improved instrumentation, targets, and simulators with the objective of reducing test time, manpower, and costs and providing the capability to test the developmental systems of the time frame; emphasis will be on tactical displays, remotely piloted vehicles, use of commercial vehicles, and improved communications systems. Beginning in FY 1978, TRADOC will assume responsibility for IOTE of communications, intelligence and electronic warfare equipment (formerly the responsiblity of US Army Communications Command and US Army Security Agency). A programed expansion of intelligence and electronic is scheduled for IOTE in FY 1978 and a corresponding increase in IOTE funding is programed. Funds are provided for this purpose by decreasing the level of effort in instrumentation development (stretching the long term improvement program) and by increasing overall PE funding.

4. FY 1979 Planned Program: Activities in support of user testing by TRADOC will continue, the overall level of effort increasing approximately 8% over FY 1978 to correspond with the operational tests scheduled in FY 1979 and to complete a significant part of the long term program to improve instrumentation, targets, and simulators at the Test Boards, Combat Developments Experimentation Center and TRADOC Combined Arms Test Activity.

5. Program to Completion: This is a continuing program.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.57.07.A Title Support User Test, US Army Training and Doctrine Command (TRADOC)

Project #DV02 Title Test Boards

Category Management and Support Budget Activity #6 - Programwide Management and Support

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), a subordinate element of the US Army Materiel Development and Readiness Command, were financed by project D618, now Aircraft Development Test Activity, in PE 6.57.02.A, now Support of Development Testing. These six test activities, or test boards, performed testing of developmental Army materiel prior to commitment to production with emphasis on service tests (i.e., on the soldier-materiel interface). Each test board has a distinct function and responsibility which is indicated by its name. The six test boards are: US Army Airborne and Communications-Electronics Board, Ft Bragg, North Carolina; US Army Air Defense Board, Ft Bliss, Texas; US Army Aviation Test Board, Ft Rucker, Alabama; US Army Armor and Engineer Board, Ft Knox, Kentucky; US Army Field Artillery Board, Ft Sill, Oklahoma; US Army Infantry Board, Ft Benning, Georgia. 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 is intended to provide the test agency with unqualified independence of the Army materiel developing agency. The transfer is also intended to provide clearer separation of development testing and operational testing. The term "operational testing" is now used to distinguish those tests of materiel conducted under conditions as close as possible to those encountered in actual field use with troops representive of those trained to employ the materiel. Operational testing is usually conducted by a test agency independent of the materiel developing agency. The term "development testing" is now used to distinguish tests of the acceptability of developmental materiel other than operational tests, prior to commitment to production. Development tests emphasize the measurement of technical performance, safety, reliability, and maintainability characteristics. The operational tests of developmental materiel by the TRADOC test boards are financed by this project, DV02, starting in FY 1976. The Aviation Test Board was formed by TRADOC in Fall 1976 to conduct operational testing of aviation systems. Formerly, such testing was performed by a TECOM test activity, now called Aircraft Development Test Activity, funded by project D618 in PE 6.57.02.A, Support of Development Testing. Each board relies upon Temporary Duty personnel during the conduct of tests. The collocated combat arms center and school is the principle source of those personnel.

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 test 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 Office of the Deputy Director Defense Research and Engineering (Test and Evaluation) carefully reviews management, operation and maintenance of all Department of Defense test facilities and planned testing to avoid unnecessary duplication of capabilities, to insure that highest priority capabilities are established expeditiously and suitably maintained, and to insure integration of testing by the Services. In addition to the

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.07.A Title Support User Test, US Army Training and Doctrine Command (TRADOC)

Project #DV02 Title Test Boards

operational testing activities funded by this project, TRADOC 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 TRADOC and other Army commands 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) (formerly MASSTER) and the Combat Developments Experimentation Center CDEC. The salaries of TCATA and CDEC civilian personnel are paid by Operations and Maintenance, Army, as these are not primarily RDTE,A facilities. Operational tests of the acceptability of major and selected nonmajor developmental materiel are conducted by OTEA with funding provided under PE 6.57.12.A. 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, funds (PE 6.57.07.A).

WORK PERFORMED BY: Testing is performed by in-house personnel (primarily from the collocated combat arms center and school). The salaries of civilian personnel assigned to the Test Boards are paid primarily from this project. A minor 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.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishments: In FY 1975 and prior years, the Test Boards were under TECOM and conducted engineering and service tests of Army developmental materiel. Funding was provided by project D618, Aircraft Development Test Activity, PE 6.57.02.A, Support of Development Testing. At the start of FY 1976, five boards were transferred from US Army Test and Evaluation Command (TECOM) to TRADOC. These boards conducted operational tests and evaluations as planned in the Five Year Test Program. Examples of items tested include: Extended Range TOW, Handheld Laser Rangefinder, Lightweight Mortar System, and Individual Weapon Starlite Scope.

2. FY 1977 Program: At the start of FY 1977, a sixth board was formed by TRADOC, the Aviation Test Board, to assume responsibility for operational testing of aviation systems formerly performed by a TECOM test activity, now called the Aircraft Development Test Activity (project D618, Aircraft Development Test Activity, in PE 6.57.02.A, Support Development Testing). Examples of items being tested in FY 1977 are: CH-47 Synthetic Flight Training System, Small Unit Transceiver, Position and Azimuth Determining System, Personnel Armor System for Ground Troops, Radiacmeter, Communications Technical Control Center, COBRA Improved Rotor Blade, and Troposcatter Communications System.

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.07.A Title Support User Test, US Army Training and Doctrine Command (TRADOC)

Project #DV02 Title Test Boards

3. FY 1978 Planned Program: Items planned for test or evaluation include: Ground Emplaced Mine Scattering System, Surface-Launched Unit Fuel-Air Explosive, Drone System, Low Altitude Parachute Extraction System, and Multiple Integrated Laser Engagement System. The level of effort of Test Boards' RDTE activities is approximately the same as in FY 1977. A small increase in funds is programed to partially offset cost growth.

4. FY 1979 Planned Program: Plans include testing of Gas Turbine Engine-Driven Generator Set, Universal Engineer Tractor, Remotely Monitored Battlefield Sensor System, Multi-Fuel Heater and Protective Mask.

5. Program to Completion: This is a continuing program.

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 6800 | 2171 | 8195 | 8424 | 9300 | Continuing | Not Applicable |

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.57.07.A Title Support User Test, US Army Training and Doctrine Command (TRADOC)

Project #DV03 Title Initial Operational Test and Evaluation (IOTE)

Category Management and Support Budget Activity #6 - Programwide Management and Support

DETAILED BACKGROUND AND DESCRIPTION: Provides funding for the conduct of IOTE by the US Army Training and Doctrine Command (TRADOC). IOTE refers to tests of the acceptability of developmental materiel that are conducted under conditions as close as possible to those encountered in actual field use with troops representative of those trained to employ the materiel, and that provide information to assist in making important decisions regarding the development program prior to commitment to production. TRADOC plans and actively participates in the conduct of IOTE of nonmajor materiel systems; prepares an independent evaluation of a prospective system's military utility, operational effectiveness and suitability; and provides this evaluation to the appropriate materiel acquisition decision authority. This project provides funding only for the costs directly attributable to the conduct of any individual test, generally including: pay and benefits of any civilian personnel engaged in the test; data collection and reduction services; training and temporary duty of test personnel; communications services; development, procurement, installation and operation of special measurement/diagnostic equipment or range instrumentation required for the test; costs of modifying a test end item or support equipment for test purposes, and of subsequent rehabilitation of the item required to restore it to its proper configuration and specifications; and costs of transporting test items.

RELATED ACTIVITIES: Close and continuous coordination exists between TRADOC, US Army Operational Test and Evaluation Agency (OTEA), development test activities, and materiel developing agencies to insure optimum effectiveness of Army testing activities. OTEA coordinates and is responsible for approval of the Army's Five Year Test Program which represents the Army's plan for IOTE of all materiel items and for testing in support of force development during the following five years. The Office of the Deputy Director Defense Research and Engineering (Test and Evaluation) carefully reviews planned testing to insure integration of testing by the Services and appropriate liaison activities are maintained with the other Services. OTEA is also responsible for conduct of IOTE of major and selected nonmajor developmental materiel items; with funding for this purpose provided by PE 6.57.12.A., Support User Test, OTEA. The fixed and recurring costs incurred by the Test Boards whose primary mission is to conduct IOTE, are financed by project DV02, Test Boards, in PE 6.57.07.A. Only the direct costs incurred by the Test Boards and any other test activities in support of TRADOC IOTE programs are financed by project DV03.

WORK PERFORMED BY: IOTE is primarily conducted in-house by military personnel. Department of the Army civil service personnel also support IOTE in such areas as test design, data collection and analysis, and report preparation.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 1977, FY 1976, and Prior Accomplishments: RDTE funding was initiated in FY 1977. 62 IOTE's were conducted prior to FY 1977 and funded by Operations and Maintenance, Army (OMA).

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.07.A Title Support User Test, US Army Training and Doctrine Command (TRADOC)

Project #DV03 Title Initial Operational Test and Evaluation (IOTE)

2. FY 1977 Program: TRADOC is conducting IOTE on 90 materiel items in FY 1977. These include tests on CH-47 Synthetic Flight Training System, Automated Telephone Switchboard, Position and Azimuth Determining System, Personnel Armor, Communications Control Center, Radar Jammer and Satellite Communications Manpack.

3. FY 1978 Planned Program: The FY 1978 program will include tests of Ground Vehicle Dispersal Mine System, Drone System, Multiple Integrated Laser Engagement System, Direction Finding System, and Burst Communications System. TRADOC has been assigned responsibility for IOTE of communications, intelligence and electronic warfare equipment beginning in FY 1978, formerly the responsibility of US Army Communications Command and US Army Security Agency. A programmed expansion of intelligence and electronic warfare equipment is scheduled for IOTE in FY 1978. An increase has been provided in IOTE funding for FY 1978 to correspond with the resulting overall increase in required testing activities.

4. FY 1979 Planned Program: The FY 1979 program will include tests of a Gas Turbine Engine Driven Generator, Universal Engineer Tractor, Remotely Monitored Battlefield Sensor System, Missile Launch Detector Data Transmission System and Protective Mask. The funding level decreases compared to FY 1978 because most IOTEs of intelligence and electronic warfare equipment are scheduled to have been completed in FY 1978.

5. Program to Completion: This is a continuing program.

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 0 | 0 | 3150 | 4261 | 3650 | Continuing | Not Applicable |

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.57.07.A Title Support User Test, US Army Training and Doctrine Command (TRADOC)

Project #D986 Title Support Equipment

Category Management and Support Budget Activity #6 - Programwide Management and Support

DETAILED BACKGROUND AND DESCRIPTION: This project provides funds for development of instrumentation for user testing. Primarily, the project funds for improvements of instrumentation at the US Army Training and Doctrine Command (TRADOC) Combined Arms Test Activity (TCATA), Combat Developments Experimentation Center (CDEC), and TRADOC Test Boards. User testing includes initial and subsequent operational testing of developmental materiel and force development testing and experimentation (FDTE). FDTE is conducted to permit evaluation of new concepts of tactics, doctrine, organization and training. This project also funds for development of evasive target tanks, other targets and air defense array threat simulators used at various operational testing and FDTE facilities to establish a realistic test environment. (A brief description of the current Army approach to testing of development materiel is included in the background information for project DV02, Test Boards.) TCATA conducts user tests on a large scale through Army Corps while CDEC is a highly instrumented field laboratory to produce high resolution data involving individual soldiers and combat units below company level.

RELATED ACTIVITIES: Program element 6.57.12.A, Support User Test OTEA, provides funds for special instrumentation, targets and simulators for US Army Operational Test and Evaluation Agency (OTEA) operational tests of major systems. Program element 6.57.02.A, Support of Development Testing, provides funds for development of instrumentation for broad application at development test facilities. Close coordination is maintained by the various activities involved to avoid duplication of efforts. OTEA also supervises the Five Year Test Program which includes the plans and schedules for user testing (both operational testing and FDTE). Procurement of instrumentation for user testing is in the Other Procurement, Army (OPA) account. In FY 1977 and prior years, Project D952, MASSTER, in this same program element (PE 6.57.07.A), provided funds for development of instrumentation for TCATA. Project D952 has been merged into D986 starting in FY 1978 in order to facilitate TRADOC management of the entire effort. The Office of the Deputy Director of Defense Research and Engineering (Test and Evaluation) reviews instrumentation developments to avoid duplication.

WORK PERFORMED BY: CDEC and Test Board instrumentation development is performed both in-house and under contract. Contractors include: Braddock, Dunn and McDonald, Inc., Vienna, VA; General Dynamics Corp., San Diego, CA, International Laser Systems, Orlando, FL; Dyna-Sciences, Blue Bell, PA; Electra-Magnetic Systems Lab, Inc., Sunnyvale, CA; Wismer and Becher, Sacramento, CA; and M-B Associates, San Ramon, CA. In-house effort is performed by US Army Electronics Research and Development Command, Fort Moumonth, NJ, and General Services Administration, For Worth, TX.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishments: A major effort was begun to develop and/or upgrade instrumentation at CDEC and at TCATA (under project D952 in the case of TCATA). A data entry system was completed at CDEC and development was initiated on an improved position location system, central test data processing system and live-fire stationary/moving personnel/vehicle range

targets for a variety of weapons. Similar integrated field instrumentation was developed at TRADOC Combined Arms Test Activity (TCATA) designed especially to expedite large scale tests. A long term program was also begun to develop a family of enemy weapon simulators to represent a slice of the threat to Army aircraft flying in the Forward Edge of the Battlefield (FEBA). Instrumentation developed for the Test Boards included radars, impact locating systems, miss-distance indicators, data-links, tracking cameras, range instrumentation control system for air defense, moving-man targets, radio frequency data transmission system, remote-controllable vehicle moving target, and theodolities. A prototype intervisibility system was also developed to indicate duration of target visibility to the gunner.

2. FY 1977 Program: Development of an improved integrated live fire range is continuing. Performance of the position location system will be improved through reduced noise levels and better filtering techniques. Other developments include an integrated sensor system, a vehicle recording system and a direct fire casualty assessment/suppression system for real time sensing of player posture/fire events and assessment of player casualty (hit or kill) probabilities. Miss-distance indicators, data recording systems, data display and sensing systems are being developed for the Test Boards. The overall level of effort is reduced about 10% from FY 1976 and several planned instrumentation developments are delayed in order to help provide RDTE,A funds for urgently required operational testing (DV02, Test Boards, and DV03, Initial Operational Test and Evaluation).

3. FY 1978 Planned Program: The threat weapon simulator development program will continue. Improvements will be made in the position location system at Combat Developments Experimentation Center (CDEC) to permit its utilization for more than one test at a time. Realistic computer-controlled targets and data collection and processing systems will be developed for the Test Boards in order to reduce required test manpower. A separate project, D952, MASSTER, provided for development of instrumentation for TCATA in FY 1977 and prior years. Starting in FY 1978, project D952 is eliminated and the effort merged into project D986, Support Equipment, in order to facilitate management of instrumentation development for user testing. Examples of instrumentation to be developed at TCATA are indirect fire weapon simulator, data integration system, miniature warfare engagement scoring system and surface-to-air missile scoring system. The overall level of effort will be reduced an additional 20% (after providing for cost growth) from FY 1977 causing other delays to instrumentation developments in order to help fund urgently required operational testing (DV02 and DV03).

4. FY 1979 Planned Program: On-going developments of instrumentation, targets and simulators for CDEC, TCATA and the Test Boards will continue and new projects will be initiated. Emphasis will be placed on automation to reduce test time, manpower and costs. The level of effort will be increased over FY 1978 in order to partially reinstate the level that will be required to achieve test facilities capable of efficient and effective user testing in FY 1980 and succeeding years.

5. Program to Completion: This is a continuing program.

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.07.A Title Support User Test, US Army Training and Doctrine Command (TRADOC)

Project #D986 Title Support Equipment

RESOURCES ( in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 4450 | 1425 | 4181 | 3486 | 4500 | Continuing | Not Applicable |

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.57.08.A Title Theater Nuclear Force Survivability

Category Management and Support Budget Activity #6 - Programwide Management and Support

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 1000 | 400 | 483 | 1373 | 3200 | | |
| AH41 | Analyses-US Army Materiel Development and Readiness Command | 800 | 150 | 483 | 0 | 0 | Continuing | Not Applicable |
| A987 | Analyses-US Army Training and Doctrine Command | 200 | 250 | 0 | 1373 | 3200 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: This Program Element, the planning for which was conducted in FY 1976 and FY 197T, will provide a quantitative assessment of the survivability of dispersed theater nuclear elements. The residual combat capability of the Theater Nuclear Forces (TNF) when subjected to the full range of actions and environments both before and after the outbreak of hostilities will be determined. Feasible alternatives for increasing the survivability of the nuclear delivery capability will be developed.

BASIS FOR FY 1978 RDTE REQUEST: Continuing analysis of the survivability of dispersed theater nuclear forces and identification and implementation of technical, procedural, and doctrinal improvements that will lead to a more survivable nuclear delivery force structure.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: The study program was defined in late FY 1976 and FY 197T, began with FY 1977 funds including some additional funding added within reprogramming limitations. The increase in FY 1978 therefore is modest, and reflects an orderly, time-phased program plan.

PERSONNEL IMPACT

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ Employees | 25 | 0 | 25 |
| (2) Contractor Employees | 9 | 0 | 9 |
| Total | 34 | 0 | 34 |

DETAILED BACKGROUND AND DESCRIPTION: The objectives of the study are to (a) determine the residual combat capability of the Theater Nuclear Forces (TNF) in Europe where subjected to the full range of actions and environments that may be encountered both

before and after the outbreak of hostilities, with emphasis on the residual nuclear delivery capability; (b) Develop feasible alternatives for increasing the survivability of the nuclear delivery capability; (c) Evaluate the relative contribution of various alternatives; and (d) Evaluate force survivability as a function of hardening levels and tactics. Relate levels of survivability to impact of Theater Nuclear Force on outcome of WP/NATO conflict.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: The TNF Survivability Program Master Plan was written, coordinated and approved. A quick look at cost effective ways to improve survivability was initiated with results due 2QFY77.

2. FY 1977 Program: This is the first major effort under the program. The available data in various sub-programs will be collated and evaluated. The lead element for each sub-program will make first estimates of TNF Survivability using existing data. Data voids will be identified and plans to fill the voids made. A common Europe-based scenario gives a common basis for the effort.

3. FY 1978 Planned Program: Having made initial recommendations on improvements to survivability in FY 77, this FY additional data will be obtained and the first comprehensive assessment made considering appropriate operational, tactical, and logistical factors of the residual combat capability of the TNF. Definitive recommendations to improve survivability will be made. The results of implementation of the FY 77 recommendations will be addressed. Funding increase over FY 77 reflects significant, time-phased increase in level of effort and represents an orderly program plan.

4. FY 1979 Planned Program: Completion of the full theater level assessment model is planned. Detailed sensitivity studies will be completed. Modifications required to reduce running time and or improve efficiency will be identified and begun. The overall objective is the development of a model that the force planners can readily use that will give an integrated statement about the survivability of theater nuclear forces as a function of the threat.

5. Program to Completion: This is not envisioned as a continuing development program. It is anticipated, however, that the program will continue to identify changes which can significantly improve the survivability of the TNF. The emphasis will gradually shift to the implementation and testing, to include troop field tests, of proposed changes to improve survivability.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.57.09.A Title Evaluation of Foreign Components

Category Management Support Budget Activity #6 - Programwide Management and Support

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 1285 | 255 | 2013 | 3389 | 3500 | Continuing | Not Applicable |
| D054 | DRUID GROVE | 852 | 0 | 0 | 0 | 0 | | Not Applicable |
| D650 | Evaluation of Foreign Components | 433 | 255 | 2013 | 1453 | 1500 | Continuing | Not Applicable |
| D655 | Foreign Weapons Evaluation | 0 | 0 | 0 | 1936 | 2000 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: This is a continuing project covering acquisition and evaluation of foreign materiel and related technical knowledge in support of RDTE projects/tasks, the evaluation of foreign state-of-the-art, and the production of detailed engineering models. To provide independent analysis, evaluation, acquisition, and test of Allyweapon systems either in development or in production to assess, for possible US adoption, materiel that appears to meet approved or generally perceived Army ground forces requirements. Particular attention will be devoted to those items which would provide the additional advantage of logistics commonality with multi-nation adoption or which incorporate a unique technical approach.

BASIS FOR FY 1978 RDTE REQUEST: This funding will support programmed evaluations of the ; items obtained as and will support efforts to acquire and evaluate new items; e.g., Armored Vehicles (FRG-UK); Nuclear Weapons Effects Vulnerability of Tactical Equipment (Soviet); and Hyperbar Diesel Engine (France). Project D655, Foreign Weapons Evaluation, will support independent evaluation efforts on selected foreign weapons showing greatest potential for US adoption.

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.09.A Title Evaluation of Foreign Components

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: Funding increase in FY 1978 provides resources to significantly increase evaluations of equipment developed by our Allies for potential adoption by the US Army. This activity is supportive of the increased emphasis within DOD to achieve a significantly higher degree of standardization and interoperability with our NATO Allies and permits more efficient use of RDT&E resources by eliminating unecessarily duplicative R&D woth our Allies. A new Project Number, D655, has been created to focus attention to this objective.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 92 | 0 | 92 |
| (2) Contractor Employees | 0 | 0 | 0 |
| Total | 92 | 0 | 92 |

DETAILED BACKGROUND AND DESCRIPTION: Evaluation of foreign materiel is conducted to determine the state-of-the-art of foreign technology, assess the military potential of materiel from allied countries for possible US adoption, and evaluate the capabilities, characteristics, and vulnerabilities of foreign materiel that the Army must be prepared to exploit or defeat. The objective of this Program Element (PE) is accomplished through acquisition of the materiel, development of copies from intelligence data when the acquisition of the actual hardware is not feasible, or on site examination of materiel outside continental United States. Project DRUID GROVE provides a coordinated Army program for the implementation, management, and execution of system definition and performance evaluation of foreign materiel obtained as All evaluation efforts are based on requirements of Army RDTE, intelligence and force development communities other Services and US agencies as appropriate. Results of evaluation are published in reports and disseminated to all interested parties throughout the Department of Defense. As a result of increased emphasis by the Congress and the Administration on improving NATO Standardization and Interoperability, the Army has created a new project under this Program Element and has budgeted additional funds to focus and increase current efforts toward evaluations supportive of this objective.

RELATED ACTIVITIES: Scientific and technical information requests from intelligence production activities, and the development and operational testing of US hardware are related to evaluation efforts under this program element. Work supported under DRUID GROVE is coordinated with the Defense Intelligence Agency, all Services, and other interested Agencies. Commencing in FY 1978, evaluation of foreign weapons systems will be conducted as a separate project. Evaluation of Foreign Alternatives to US developments is generally funded under the program element established for the US development progrsm. For example, the Leopard 2 Tank being evaluated in the XM-1 Program Element.

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.09.A Title Evaluation of Foreign Components

WORK PERFORMED BY: The actual evaluation of materiel is normally assigned to the commodity command or separate laboratory within the US Army Materiel Development and Readiness Command having developmental responsibility for counterpart US materiel. Other resources are tasked in a support role depending upon evaluation requirements and area of expertise. In the case of bi or tri-service evaluation, where the Army acts as the Executive Agent, the Army is responsible for implementing the evaluation to insure that the objectives and requirements of all services and agencies are satisfied. The US Army Test and Evaluation Command, Aberdeen Proving Grounds, MD, has overall management responsibility for Project D655, Foreign Weapons Evaluation, and the US Army Foreign Science and Technology Center, Charlottesville, VA, has overall management responsibility for Project D650, Evaluation of Foreign Components.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishments:

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.09.A Title Evaluation of Foreign Components

2. FY 1977 Program: Evaluation of DRUID GROVE items continues.

3. FY 1978 Planned Program:

4. FY 1979 Planned Program: Testing and evaluation of foreign weapon systems and components will continue. It is anticipated that all systems and/or components acquired as will be tested and evaluated. The FY 1979 program will be flexible so that as foreign weapons of the free world and adversaries become available, they will be tested and evaluated in a timely manner.

5. Program to Completion: This is a continuing program.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.57.12.A Title Support User Test, US Army Operational Test & Evaluation Agency (OTEA)

Category Management and Support Budget Activity #6 - Programwide Management and Support

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 4105 | 795 | 7390 | 7501 | 7455 | Continuing | Not Applicable |
| MN01 | US Army Operational Test & Evaluation Agency (OTEA) Support Equipment | 0 | 0 | 650 | 0 | 1900 | Continuing | Not Applicable |
| M001 | Initial Operational Test and Evaluation | 4105 | 795 | 6740 | 7501 | 5555 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: This program element provides funding to the US Army Operational Test and Evaluation Agency (OTEA) for the conduct of Initial Operational Test and Evaluation (IOTE) and for development of support equipment related to IOTE.

BASIS FOR FY 1978 RDTE REQUEST: OTEA will conduct operational tests on major and selected nonmajor systems.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: Provides for increased expenses due to cost growth and for an increase in test work load. Support equipment development is curtailed in order to permit carrying out the FY 1978 test program within the constrained resources available.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees * | 0 | 0 | 0 |
| (2) Contractor Employees | 4 | 0 | 4 |
| Total | 4 | 0 | 4 |

* Personnel are paid by O&MA

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.12.A Title Support User Test, US Army Operational Test & Evaluation Agency (OTEA)

DETAILED BACKGROUND AND DESCRIPTION: This program element consists of two projects. M001, Initial Operational Testing and Evaluation (IOTE), provides funding for costs incurred by the US Army Operational Test and Evaluation Agency (OTEA in the conduct of Initial Operational Test and Evaluation (IOTE) on selected major and nonmajor systems. US Army Operational Test & Evaluation Agency (OTEA) actively participates in the conduct of tests and provides independent evaluations of a prospective system's military utility, operational effectiveness and suitability directly to the appropriate decision review. MN01, OTEA Support Equipment, provides funds for special instrumentation and targets to support IOTE conducted by OTEA.

RELATED ACTIVITIES: Close and continuous coordination exists between the US Army Operational Test and Evaluation Agency (OTEA), development test activities, materiel developing agencies, and the US Army Training and Doctrine Command (TRADOC) agencies responsible for test and use of related materiel items, to insure optimum effectiveness of Army testing activities, and to avoid duplication of instrumentation development efforts. The Office of the Deputy Director of Defense Research and Engineering (Test and Evaluation) carefully reviews planned testing and developments of support equipment to insure integration of testing by the Services and to avoid duplication of instrumentation developments. Full time liaison personnel are assigned by each of the Services to appropriate test activity headquarters of the other Services. OTEA supervises the Army's Five Year Test Program which includes Initial Operational Testing and Evaluation (IOTE) and Force Development Testing and Experimentation (FDTE) programs. IOTEs of most nonmajor developmental materiel items are conducted by TRADOC with funding provided under project DV03 in PE 6.57.07.A. The fixed and recurring costs incurred in connection with IOTE by the TRADOC Test Boards are financed by project DV02, in PE 6.57.07.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 M001 funds.

WORK PERFORMED BY: Primarily 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 each test is conducted.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: RDTE funding was initiated in FY 1976. The 19 tests performed in FY 1975 and prior years were funded with OMA. 14 operational tests were conducted on such systems as the new Army main battle tank, lightweight company mortar system, mechanized infantry combat vehicle, utility tactical transport aircraft system, lightweight artillery systems, advanced attack helicopter, artillery locating radar, and air defense command and control system.

2. FY 1977 Program: OTEA is participating in a total of 10 operational tests on such systems as tactical fire direction system, advanced medium short-take-off-and-landing transport, NAVSTAR global positioning system, mortar locating (countermortar) radar, and ground laser locator designator.

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.12.A Title Support User Test, US Army Operational Test & Evaluation Agency (OTEA)

3. FY 1978 Planned Program: US Army Operational Test & Evaluation Agency (OTEA) will participate in a total of 14 operational tests on such systems as 105mm towed light howitzer, manportable air defense system, cannon launched guided projectile, new Army main battle tank, all-weather missile system, and family of military engineer construction equipment. Support equipment development is curtailed in order to provide for increased test workload compared to FY 1977 and for increased expenses due to cost growth.

4. FY 1979 Planned Program: OTEA will participate in a total of 15 operational tests on such systems as 155mm towed medium howitzer, lightweight company mortar system, air defense guided missile system, utility tactical transport aircraft system, mechanized infantry combat vehicle system, automatic communications central office, single channel ground and airborne radio system, general support rocket system and improved light antitank/assault weapon.

5. Program to Completion: This is a continuing program. Operational tests are scheduled for each materiel acquisition program so as to provide information needed for major decisions prior to commitment to production.

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.57.12.A Title Support User Test, US Army Operational Test & Evaluation Agency (OTEA)

Project #M001 Title Initial Operational Testing and Evaluation (IOTE)

Category Management and Support Budget Activity #6 - Programwide Management and Support

DETAILED BACKGROUND AND DESCRIPTION: This project provides funding for the conduct of Initial Operational Testing and Evaluation (IOTE) by the US Army Operational Test and Evaluation Agency (OTEA). IOTE refers to tests of the acceptability of developmental materiel that are conducted under conditions as close as possible to those encountered in actual field use with troops representative of those trained to employ the materiel, and that provide information to assist in making important decisions regarding the development program prior to commitment to production. OTEA plans and actively participates in the conduct of IOTE of major and selected nonmajor materiel systems. OTEA prepares an independent evaluation of a prospective system's military utility, operational effectiveness and suitability. OTEA provides this evaluation to the appropriate materiel acquisition decision authority.

RELATED ACTIVITIES: Close and continuous coordination exists between OTEA, development test activities, materiel developing agencies, and the US Army Training and Doctrine Command (TRADOC) agencies responsible for test and use of related materiel items, to insure optimum effectiveness of Army testing activities. OTEA supervises the Army's Five Year Test Program which includes IOTE programs. IOTEs of most nonmajor developmental materiel items are conducted by TRADOC with funding provided under PE 6.57.07.A, Support of User Testing, TRADOC. When test agencies support OTEA in the conduct of IOTE, costs incurred are reimbursed by OTEA with project M001 funds. The Office of the Deputy Director Defense Research and Engineering (Test and Evaluation) carefully reviews planned testing to insure integration of testing by the Services. Full time liaison personnel are assigned by each of the Services to appropriate test activity headquarters of the other Services.

WORK PERFORMED BY: Military and civil service personnel at OTEA and by personnel assigned to the facility at which the various tests are conducted.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: RDTE funding was initiated in FY 1976. The 19 tests performed in FY 1975 and prior years were funded with OMA. 14 operational tests were conducted on such systems as the new Army main battle tank, lightweight company mortar system, mechanized infantry combat vehicle, utility tactical transport aircraft system, lightweight artillery systems, advanced attack helicopter, artillery locating radar, and air defense command and control system.

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.12.A Title Support User Test, US Army Operational Test & Evaluation Agency (OTEA)

Project #M001 Title Initial Operational Testing and Evaluation (IOTE)

2. FY 1977 Program: The Operational Test and Evaluation Agency (OTEA) is participating in a total of 10 operational tests on such systems as tactical fire direction system, advanced medium short-take-off-landing transport, NAVSTAR global positioning system, mortar locating (countermortar) radar, ground laser locator designator, DRAGON night tracker, and improved TOW vehicle system.

3. FY 1978 Planned Program: OTEA will participate in a total of 14 operational tests on such systems as 105mm towed light howitzer, manportable air defense system, cannon launched guided projectile, new Army main battle tank, manportable common thermal night sight, all-weather missile system, and family of military engineer construction equipment. Funding is increased compared to FY 1977 in order to provide for increased test workload and for increased expenses due to cost growth.

4. FY 1979 Planned Program: OTEA will participate in a total of 15 operational tests on such systems as 155mm towed medium howitzer, lightweight company mortar system, air defense guided missile system, utility tactical transport aircraft system, mechanized infantry combat vehicle system, heliborne fire-and-forget missile, automatic communications central office, single channel ground and airborne radio system, general support rocket system, and improved light antitank/assault weapon. Overall test workload and materiel to be consumed (e.g., targets) for tests schedule in FY 1979 are reduced compared to FY 1978, resulting in a reduced forecast for test costs and a corresponding decrease in funds programed.

5. Program to Completion: This is a continuing program.

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 4105 | 795 | 6740 | 7501 | 5555 | Continuing | Not Applicable |

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.57.13.A Title Battlefield Systems Integration

Category Management and Support Budget Activity #6 - Programwide Management and Support

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 0 | 0 | 4812 | 4551 | 7000 | Continuing | Not Applicable |
| DF 26 | Battlefield Systems Integration | 0 | 0 | 4812 | 4551 | 7000 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: This program element provides funding for creative, interdisciplinary design work treating the Army in the field as a total cohesive system with each combat subsystem (e.g., ground forces, organic aerial units) configured to maximize the full combat capability of the force.

BASIS FOR FY 1978 RDTE REQUEST: Continue contract and in-house effort to develop master battlefield systems integration plan as basis for identifying improvements necessary to the total Army system by demonstrating incompatibilities between or within its functional subsystems. Focus on cost versus performance options for increasing the combat effectiveness of the 1980-1985 Army. Conduct hardware experiments testing ability of Division Tactical Operations Center and TACFIRE-equipped Division Artillery to process operational and intelligence data from existing and programed sensors/sources.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: Moderate program reduction in study and analysis efforts.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement) is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ Employees | 13 | 0 | 13 |
| (2) Contractor Employees | 60 | 0 | 60 |
| Total | 73 | 0 | 73 |

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.13.A Title Battlefield Systems Integration

DETAILED BACKGROUND AND DESCRIPTION: Commander, US Army Materiel Development and Readiness Command (DARCOM), formed his Directorate for Battlefield Systems Integration (DBSI) as a dynamic new approach to identifying new research and development initiatives that will produce the highest payoff in combat capability. The effort was initiated and strongly supported by the Under Secretary of the Army and officials in the Office of the Secretary of Defense. The DBSI formulates broad mission area objectives and plans which take into account existing and planned operational capabilities, technology forecasts, and threat assessment studies. These objectives and plans serve as guidelines in the effort to identify and close gaps in Army battlefield capabilities, provide guidance in the formative stages of systems development, eliminate duplication in materiel acquisition programs, improve the bridge between technological opportunities and operational requirements, promote the interoperability of existing and planned capabilities within the Army and with the other Services, and insure that weapons systems development is synchronized and consistent with doctrinal concepts development by the US Army Training and Doctrine Command (TRADOC). The DBSI also identifies new materiel needs and recommends the initiation of materiel development programs to fill these needs, and recommends the revision or termination of those programs that do not promise sufficient contributions to the overall combat systems capability.

RELATED ACTIVITIES: Exploratory work involving a detailed analysis of existing capabilities in the areas of communications links, data processing, and response transmission was accomplished in FY 1976 under contractual effort funded in Program Element 6.37.23.A, Command and Control. Related background studies involving functional description of combat subsystems were accomplished by the US Army Materiel Systems Analysis Agency (AMSAA), also in FY 1976. Close coordination is maintained with the other Services to discuss solutions to problems of overlapping interest or responsibilities. Both hardware and doctrinal solutions to these problems are then tested in the joint environment to assure their viability across the total battlefield.

WORK PERFORMED BY: Supported by contractors and Government agencies. MITRE Corporation, a Federal Contract Research Center located in McLean, Virginia, will do about one third of the FY 1978 contractual work. The balance will go to a number of other contractors. Government agencies such as AMSAA, Harry Diamond Laboratories, Human Engineering Laboratory and Night Vision Laboratory, Fort Belvoir, Virginia, with expertise in areas requiring research and evaluation, also support this effort.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishments: Not Applicable.

Budget Activity #6 - Programwide Management and Support

Program Element #6.57.13.A Title Battlefield Systems Integration

2. FY 1977 Program: Reviews and analyses were accomplished in the areas of Air Defense, Fire Support, Electronic Warfare (EW), US Army Operations in the Soviet EW Environment, and Corps Echelon Integration and Experimentation Analysis. The basic architecture effort has been framed by the Directorate for Battlefield Systems Integration (DBSI) staff with support from MITRE Corporation. Mission areas and functional groups of systems have been identified and approved by Headquarters, Department of the Army. Spyder charting of the US Army Materiel Development and Readiness Command (DARCOM) "Base Technology Program" has begun and will be completed in 2d Quarter FY 1977. This project provides a catalog at the work unit level of the technology base related to Army Mission Areas and Functional Groups of Systems by specific capabilities. Furthermore, it provides the basis for continuous data exchange between US Army Training and Doctrine Command schools and DARCOM laboratories. DBSI is participating with TRADOC in developments related to military operations in built-up areas, in System Program Reviews, and in other projects that identify existing battlefield gaps, and recommends solutions to these problems. Workshop experimentation to demonstrate graphics and software capabilities to achieve tactical real-time functions are being conducted.

3. FY 1978 Planned Program: Continue effort of master battlefield systems integration plan. Complete analyses of functional subsystems necessary to this plan, including target acquisition, communications command and control ($C_3$), weapon engagement, intelligence, surveillance, command systems, and logistics. Complete the formulation of the basic structure of the overall Army system architecture, and begin design of experiments to test its validity and functionality. Analyze the Army technology base and its contribution to overall effectiveness.

4. FY 1979 Planned Program: Complete master battlefield systems integration plan (Army system architecture) and commence experiments to verify that it is a valid representation of the Army in the field. These experiments will necessarily include both computer simulations and comparative field testing. Field experimentation will be oriented toward testing the comparability between the architectural system and automated command operations, fire control, target acquisition, and weapon engagement systems currently under development. Cost versus performance evaluations will be conducted on developing systems to determine the most cost-effective options for the Army's combat capabilities during the 1980-1985 time-frame. Funding programed for FY 1979 is increased compared to prior years in order to provide for efficient accomplishment of these essential tasks.

5. Program to Completion: This is a continuing program.

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.58.01.A

Title Programwide Activities

Category Management and Support

Budget Activity #6 - Programwide Management and Support

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 53322 | 13168 | 60978 | 70131 | 72176 | Continuing | Not Applicable |
| MM88-01 | Command Headquarters | 34411 | 9258 | 37517 | 43539 | 44310 | Continuing | Not Applicable |
| MM88-02 | General Administrative Activities | 5758 | 1733 | 7587 | 8378 | 7915 | Continuing | Not Applicable |
| MM88-03 | Special Purpose and ADP Equipment | 11974 | 2059 | 11114 | 16964 | 18696 | Continuing | Not Applicable |
| MM88-04 | Minor Construction | 1179 | 118 | 760 | 1250 | 1255 | Continuing | Not Applicable |
| MM88-05 | Development Centers Moves | 0 | 0 | 4000 | 0 | 0 | 0 | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: This is a continuing program providing resources for that portion of the Army research and development in-house effort that cannot practically be identified to specific RDTE projects financed under other program elements. These resources finance the general and administrative RDTE expenses at major command headquarters (except Department of the Army headquarters); operation and maintenance of selected general purpose research and development activities; procurement of minor construction, special purpose equipment (SPE), to include automatic data processing (ADP) equipment for RDTE use.

BASIS FOR FY 1978 RDTE REQUEST: Continue to provide essential management, maintenance and operation support required for the accomplishment of the RDTE program.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: The increase is partially due to cost growth (inflation) but primarily relates to establishment of headquarters for new research and development commands and the restoration of funds for SPE to the level necessary to maintain modern research and development facilities. The SPE funds were decimated in preceding fiscal years because of change in policy that required RDTE to pay for ADP equipment that had previously been procured from the Procurement appropriation. No FY 1978 funds are budgeted for the development centers moves. It is planned to distribute these costs to various Army RDTE programs in the same manner that all overhead costs are distributed.

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.01.A Title Programwide Activities

PERSONNEL IMPACT: The average number of employees supported with requested FY 1978 funds (RDTE and Procurement) is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civilian Employees | 1491 | 0 | 1491 |
| (2) Contractor Employees | 0 | 0 | 0 |
| Total | 1491 | 0 | 1491 |

DETAILED BACKGROUND AND DESCRIPTION: This continuing program finances that portion of the Army research and development effort that cannot practically be identified to specific RDTE projects financed under other program elements. These resources finance the general and administrative expenses required in the performance of RDTE functions at major command headquarters below the level of the Department of the Army. This element also finances the operation, management and maintenance costs of selected general purposes research, development, test, and evaluation activities where effort is not logically distributable to a specific project being conducted in one of the other budget activities. The financing of minor construction, automatic data processing (ADP) equipment, and special purpose equipment (SPE) costs benefiting more than one research and development project are also included.

RELATED ACTIVITIES: The command headquarters perform staff management functions for work performed by RDTE laboratories and test facilities.

WORK PERFORMED BY: Army command headquarters and other activities of the US Army Materiel Development and Readiness Command (DARCOM) (formerly Army Materiel Command), the US Army Medical Research and Development Command, and the Office Chief of Engineers. This effort is not duplicated in any other Army program and is described in the project descriptive summaries that follow.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishments: Provided expenses incident to general and administrative costs at command headquarters general and administrative activities identified with the formulation and execution of the Army RDTE program. This program element financed the Research and Development directorates of the major subordinate command headquarters and the Research and Development subordinate commands of DARCOM. Selected general purpose type administrative installations whose efforts are not identified to a specific RDTE project were supported. Funds were also provided for procurement of SPE and minor construction (under $75,000) required by Army RDTE financed laboratories and facilities (excluding major test ranges) where more than one RDTE project would benefit. Effective in FY 1976 the RDTE appropriation was directed to fund the procurement of ADP equipment for

automatic data processing (ADP) units at facilities funded by RDTE. These additional costs were absorbed in the funds included in this account for special purpose equipment (SPE). RDTE minor construction ($75,000 or less) requirements were also financed.

2. FY 1977 Program: To provide continuing essential management and support required for the accomplishment of the RDTE program. The large increase results from the following:

(1) Cost growth at headquarters and general administrative activities resulting from inflation.

(2) The new laboratory assessment mission of all 6.1 and 6.2 programs by the US Army Research Office (ARO), Research Triangle Park, North Carolina and increased emphasis on letting contracts for a larger portion of the 6.1 program.

(3) The procurement of a new computer for the Ballistic Research Laboratory, Maryland.

3. FY 1978 and FY 1979 Planned Program: Continue to provide support as described in previous paragraphs. The number of headquarters increased as a result of the US Army Materiel Development and Readiness Command (DARCOM) reorganization which resulted from Army Materiel Acquisition Review Committee (AMARC) recommendations. Several of the new separate headquarters were previously Research and Development directorates within a major headquarters. The requested program will provide sufficient SPE funds to maintain modern laboratories and facilities and ADP equipment. These SPE funds had to be drastically reduced in FY 1976 and FY 1977 to provide for procurement of necessary ADP equipment.

4. Program to Completion: This is a continuing program.

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.58.01.A Title Programwide Activities

Project #MM88 Title Programwide Activities

Task 01 Title Command Headquarters

Category Management and Support Budget Activity #6 - Programwide Management and Support

DETAILED BACKGROUND AND DESCRIPTION: This task provides the resources to cover expenses incident to general and administrative costs of the major command headquarters identified with the formulation and execution of the Army RDTE program. Expenses of operating research and development installations/activities headquarters are not included. Examples of the recurring costs incurred by these headquarters include pay and related costs of civilian personnel, travel, transportation, utilities, supplies, equipment, and contractual support.

RELATED ACTIVITIES: The command headquarters perform staff management functions for work performed by RDTE laboratories and test facilities.

WORK PERFORMED BY: In-house personnel at various RDTE command headquarters plus related service contracts. Organizational components receiving support from this task are listed below:

($ in Thousands)

| Command Headquarters | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 |
|---|---|---|---|---|---|
| Army Materiel Development and Readiness Command (DARCOM), Alexandria, VA | 7497 | 1778 | 7291 | 4315 | 4315 |
| Aviation Research and Development Command (AVRADCOM), St. Louis, MO | 2127 | 530 | 2650 | 7528 | 7528 |
| Tank-Automotive Research and Development Command (TARADCOM), Warren, MI | 954 | 245 | 952 | 2258 | 2258 |
| Electronics Command, Ft. Monmouth, NJ | 4500 * | 1125 * | 4797 * | 0 | 0 |
| Electronics Research and Development Command (ERADCOM), Adelphi, MD | 0 | 0 | 0 | 1626 | 1876 |
| Armaments Research and Development Command (ARRADCOM), Picatinny, NJ | 4819 | 1325 | 5615 | 6016 | 6482 |
| Communications Research and Development Command (CORADCOM), Ft. Monmouth, NJ | 0 | 0 | 0 | 3210 | 3210 |

* The former Electronics Command at Ft. Monmouth, NJ is split between CORADCOM and ERADCOM in FY 1978 and out years.

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.01.A Title Programwide Activities

Project #MM88 Title Programwide Activities

Task 01 Title Command Headquarters

($ in Thousands)

| Command Headquarters | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 |
|---|---|---|---|---|---|
| Missile Research and Development Command (MIRADCOM), Redstone Arsenal, AL | 2035 | 532 | 2364 | 4257 | 4257 |
| Test and Evaluation Command (TECOM), Aberdeen, MD | 10200 | 2980 | 11285 | 11930 | 11930 |
| Medical Research and Development Command, Washington, DC | 1829 | 588 | 2034 | 2037 | 2098 |
| Office Chief of Engineers, Washington, DC | 450 | 155 | 529 | 362 | 356 |
| Total | 34411 | 9258 | 37517 | 43539 | 44310 |

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishments: Provided support for general and administrative costs at headquarters, US Army Materiel Development and Readiness Command, US Army Medical Research and Development Command, the Office Chief of Engineers and major subordinate commands identified with the formulation and execution of the Army RDTE program.

2. FY 1977 Program: Continue to provide support for the purposes outlined above. Increase shown in FY 1977 are to compensate for inflation. Prior to cost growth add-on, headquarters task profile reflects decreases to reflect headquarters personnel reductions.

3. FY 1978 and FY 1979 Planned Program: Continue to provide support for purposes outlined above. The separate research and development command headquarters will be operational during this period. This separation results from the reorganization of the US Army Materiel Development and Readiness Command based on the approved recommendation of the Army Materiel Acquisition Review Committee. The establishment of these headquarters results in additional headquarters being identified. These separate and independent headquarters result in additional cost being identified for their operation.

4. Program to Completion: To provide continuing essential management functions required for the accomplishment of the RDTE program

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.01.A Title Programwide Activities

Project #MM88 Title Programwide Activities

Task 01 Title Command Headquarters

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 34411 | 9258 | 37517 | 43539 | 44310 | Continuing | Not Applicable |

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.58.01.A Title Programwide Activities

Project #MM88 Title Programwide Activities

Task 02 Title General and Administrative Activities

Category Management and Support Budget Activity #6 - Programwide Management and Support

DETAILED BACKGROUND AND DESCRIPTION: This task provides resources to finance expenses in connection with the local operation and management of selected general purpose administrative activities funded by RDTE where it is not practicable to identify these costs with specific RDTE projects; namely, Army Research Offices, Air Mobility Research and Development Complex, Liaison Offices. Also several general and administrative fixed cost programs such as Patent Office fees, the Army portion of a Tri-Service and the National Aeronautics and Space Administration program on Failure Rate Data (FARADA), the penalty mail program that reimburses the US Postal Service for RDTE official mailings, and leasing of various facilities.

RELATED ACTIVITIES: None.

WORK PERFORMED BY:

($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 |
|---|---|---|---|---|---|
| Army Research Office, Research Triangle Park, NC | 2688 | 600 | 2738 | 3055 | 3045 |
| Air Mobility R&D Laboratory, Moffett Field, CA | 451 | 120 | 639 | 690 | 690 |
| Harry Diamond Laboratories, White Oak, MD (Relocation and Restoration Costs) | 371 | 339 | 852 | 731 | 230 |
| Construction Engineering Research Laboratory, Urbana, IL | 425 | 100 | - | - | - |
| Standardization Groups (Australia, United Kingdom, and Canada) | 190 | 183 | 670 | 755 | 803 |
| Army Research Institute | 386 | 100 | 363 | 390 | 410 |
| Defense Systems Management College | 23 | 1 | 100 | 100 | 100 |
| Patent Office Fees | 85 | 22 | 85 | 85 | 85 |
| Penalty Mail | 625 | 156 | 500 | 625 | 625 |
| Leases | 213 | 12 | 61 | 355 | 355 |
| Liaison Offices (various locations at Air Force and Navy installations) | 170 | 44 | 186 | 197 | 206 |
| Other (Field Offices, Productivity Enhancing and Other Miscellaneous Costs) | 131 | -56 | 1393 | 1395 | 1366 |
| Total | 5758 | 1733 | 7587 | 8378 | 7915 |

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.01.A Title Programwide Activities

Project #MM88 Title Programwide Activities

Task 02 Title General and Administrative Activities

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishments: To cover expenses resulting from local operation and management of research and development facilities as outlined above.

2. FY 1977 Program: Continuation of operation and management support for the facilities listed above. Increase provides for cost growth and an expanded Army Research Office (ARO) role to properly manage the quantity, productivity and relevance of the whole of the Army Materiel Development and Readiness Command's 6.1 program. A small increase is also required at ARO to manage an expanded 6.1 contractual program as a result of the Army's effort to phase down in-house research effort. Additional funds are provided for consolidation of the Standardization Group and Research Office in the United Kingdom.

3. FY 1978 and FY 1979 Planned Program: Continuation of operation and management support for the facilities listed above. The additional funds requested for FY 1978 results in part from cost growth since the preparation of the FY 1977 Army RDTE budget. In addition, the expanded role of the Army Research Office will continue. The Phase III cost for the Harry Diamond Laboratory (HDL) move to Adelphi, MD accounts for the HDL increase. The increase in leases is to cover the litigation currently in progress concerning disposal or buy of Blossom Point previously used as a firing range by HDL.

4. Program to Completion: To provide continuing essential operation and management support functions required by the facilities and programs listed above required in the accomplishment of the RDTE program.

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 5758 | 1733 | 7587 | 8378 | 7915 | Continuing | Not Applicable |

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.58.01.A Title Programwide Activities

Project #MM88 Title Programwide Activities

Task #03 Title Special Purpose and Automatic Data Processing Equipment

Category Management and Support Budget Activity #6 - Programwide Management and Support

DETAILED BACKGROUND AND DESCRIPTION: This program funds the procurement of and installation of scientific, technical, and laboratory equipment peculiar to research and development functions not identifiable with specific RDTE programs. This program also funds the acquisition of automatic data processing (ADP) equipment for ADP units at RDTE funded facilities. Procurement of special purpose equipment (SPE) and ADP equipment is required to replace outmoded and obsolete equipment at existing activities and permits procurement of new equipment required to meet new research and development equipment requirements. The purchase of equipment required to initially support newly constructed research and development facilities, excluding installed equipment is also included. Requirements for new equipment must be evaluated by the commands against such considerations as the adequacy of existing equipment, the cost of modernization versus the cost of replacement, and the proximity, availability and cost of borrowing equipment from other laboratories. Effort is made to insure that the new equipment requirements include only those items essential to the mission and program assigned to each installation. Foreign state-of-the-art trends and potential threats to present and future materiel or systems are also considered.

RELATED ACTIVITIES: None.

WORK PERFORMED BY: RDTE Army laboratories and facilities of the US Army Materiel Development and Readiness Command (DARCOM), US Army Medical Research and Development Command (TSG), and Office Chief of Engineers (OCE). Command distribution of these funds follows:

($ in Thousands)

| Command Headquarters | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 |
|---|---|---|---|---|---|
| ADP Equipment - DARCOM | 4000 | 0 | 8000 | 7500 | 7500 |
| SPE Equipment - DARCOM | 6324 | 1644 | 1754 | 7557 | 8959 |
| SPE Equipment - TSG | 1239 | 315 | 960 | 1450 | 1700 |
| SPE Equipment - OCE | 411 | 100 | 400 | 457 | 537 |
| Total | 11974 | 2059 | 11114 | 16964 | 18696 |

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.01.A Title Programwide Activities

Project #MM88 Title Programwide Activities

Task #03 Title Special Purpose and Automatic Data Processing Equipment

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishments: Provided support for the purpose outlined in "Background and Description" above. However, the definition as to the RDTE appropriation content was revised by the Office, Secretary of Defense. This revised definition stated that effective in FY 1976 the financing of automatic data processing (ADP) costs at RDTE funded facilities should be financed by RDTE. Previous ADP funding was by the Other Procurement, Army appropriation. Thus, the FY 1976 special purpose equipment (SPE) requirement includes ADP equipment for the Harry Diamond Laboratories. This is the first year mainframe ADP equipment has been financed by the RDTE, Army appropriation.

2. FY 1977 Program: Continue as above. The increase is primarily due to a requirement for the procurement of ADP equipment for the Ballistics Research Laboratories.

3. FY 1978 and FY 1979 Planned Program: Continue to provide essential SPE and ADP equipment for Army RDTE facilities as described above. The increase in FY 1978 is primarily to restore SPE to the level necessary to maintain up-to-date research and development facilities.

4. Program to Completion: Provide essential new, replacement, and collateral equipment required for the accomplishment of the RDTE program.

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 11974 | 2059 | 11114 | 16964 | 18696 | Continuing | Not Applicable |

## FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.58.03.A  Title Technical Information Activities

Category Management and Support  Budget Activity #6 - Programwide Management and Support

RESOURCES /PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 3101 | 974 | 3873 | 3426 | 4559 | Continuing | Not Applicable |
| MY11 | Modernized Army Research & Development Information System (MARDIS) Support | 0 | 0 | 0 | 314 | 469 | Continuing | Not Applicable |
| MY29 | Integrated Software | 300 | 75 | 230 | 290 | 300 | Continuing | Not Applicable |
| M367 | Automated Engineering Document Preparation System | 536 | 200 | 690 | 678 | 850 | Continuing | Not Applicable |
| M720 | Technical Information Functional Activities | 536 | 125 | 1038 | 706 | 800 | Continuing | Not Applicable |
| M728 | Information Technology | 567 | 249 | 853 | 595 | 830 | Continuing | Not Applicable |
| M729 | Symposia-Conferences | 375 | 100 | 305 | 387 | 450 | Continuing | Not Applicable |
| M761 | Technical Information Analysis Centers | 687 | 200 | 682 | 359 | 760 | Continuing | Not Applicable |
| M903 | Signals Intelligence/Electronic Warfare Technical Information | 100 | 25 | 75 | 97 | 100 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: Encompasses management and support projects for the US Army Scientific and Technical Information Program and includes research, development, test and engineering in the computer science, information science and library science fields. Planning, execution, and efficiency of the entire RDTE program benefit through improved accuracy, availability, and accessibility of scientific, technical, and management information.

BASIS FOR FY 1978 RDTE REQUEST: Continue: development and coordination of the Army integrated computer software program, support for computer and information science applications, applications of the selective information dissemination system, Conference and Symposia Program for technical information exchange and support for Junior Science activities, efforts to automate access to Technical Information Centers, operational support for Army Technical Information Analysis Centers and for the Government/Industry Data Exchange Program and development and implementation of the system to provide a timely and accurate data base for RDTE program management.

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.03.A Title Technical Information Activities

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: Technical information exchange activities are to be expanded in FY 1978 as part of Army implementation of Public Law 94-282 (National Science, Engineering and Technology Policy and Priorities). A new FY 1978 start provides funding for management, operation and maintenance of the Modernized Army R&D Information System (MARDIS). Other ongoing levels of effort in this program element are reduced substantially from FY 1977 levels in order to provide funds for these two areas of effort.

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civ. Employees | 57 | 0 | 57 |
| (2) Contractor Employees | 29 | 0 | 29 |
| Total | 86 | 0 | 86 |

DETAILED BACKGROUND AND DESCRIPTION: Objective is to improve scientific, technical and related management information activities required for the support of the Army RDTE Program, to include the derivation, acquisition, analysis, interpretation, storage, retrieval, processing, forwarding, dissemination, primary and secondary publishing, and use of all classes of technical and RDTE-related management information needed by Army scientists, engineers, R&D managers, and other technical professional personnel. Another objective is to improve the relevance, accuracy, timeliness and accessibility of technical information flowing to and from the Army. This involves automatic data processing, microforms, graphic and analog information forms, information store and forward techniques, continuing information access, economies of information stores, data banks and networks.

RELATED ACTIVITIES: The Army participates in inputs and outputs of the Defense Documentation Center, Army Library Study, and 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.

WORK PERFORMED BY: Battelle Memorial Institute, Columbus, Ohio; Oncelcor, Incorporated, Denver, Colorado; Applied Data Research, Vienna, Virginia; Duke University, Durham, North Carolina; Planning Research Corporation, Huntsville, Alabama; and Dyna Corporation, Corona, California. In-house developing agencies include: Office, Chief of Engineers, Washington, DC; The Surgeon General, Washington, DC; US Army Computer Systems Command, Fort Belvoir, Virginia; US Army Materiel Development and Readiness Command, Alexandria, Virginia; US Army Communications Command, Fort Huachuca, Arizona; and US Army Research Institute, Washington, DC.

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.03.A Title Technical Information Activities

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976, and Prior Accomplishments: The following efforts were conducted: application of holography to data storage and retrieval systems; expansion of automated medical system techniques; testing of improved procedures for Army technical libraries and information centers; utilization of microforms and remote terminals for timely processing of information required for RDTE program management; software research to develop improved techniques for multicommand data systems, including system simulation and modeling, computer system evaluation, interactive programming, and regional data processing; automated engineering document preparation and data handling systems; establishment of automated chemical information center; Conference and Symposia Program for information exchange and Junior Science and Humanities Symposia and Science Fair Programs; remote computer terminals to provide direct access to Defense Documentation Center; automated procedures for technical information analysis centers; automated interlibrary reference system; and development of computer-aided selection of materiels. Seven technical information analysis centers were established and are now active, the latest being the Cold Regions Research and Engineering Technical Information Analysis Center. An eighth center, the Nondestructive Testing Information Analysis Center, was transferred from the Army to the Defense Supply Agency.

2. FY 1977 Program: Continue to develop a scientific and technical information (STINFO) program for the Army, integrating individual task efforts (e.g., converting dialogue and graphic information into digital format) into total program needs. Implement completed stages of such tasks as: development of a data base for automated preparation of documentation for procurement of nonstandard parts, chemical information system and selective dissemination of information. Continue coordination of RDTE in computer software and centralization of computer program information; conference and symposia program for technical information exchange and support for youth science information activities; support for the Government/Industry Data Exchange Program; development of specialized bibliographies and glossaries and techniques for computer handling of materials information; providing timely, accurate, computer-generated data for RDTE program management; efforts to automate information access to technical information centers; operational support for Army Technical Information Analysis Centers and trial operation of proposed centers; and development of technical information for the specialized needs of the Army intelligence community.

3. FY 1978 Planned Program: Continue FY 1977 efforts at a reduced level of effort in order to provide for higher priority RDTE,A requirements, except for the following two efforts which are to be expanded (or initiated in part). Resources information for all levels of R&D management will be improved by automation, beginning with the data source. This will be accomplished by implementation of the Modernized Army R&D Information System (MARDIS) under a new project, MY11, and by updating of RDTE data bank procedures (Work Unit Summary, DD 1498 and DD 1634 forms). Basic development of MARDIS was accomplished under project M720 in this PE and under PE 6.27.25.A, Computer and Information Sciences. Second, the Army STINFO program will be reorganized to be compatible and complementary with other major STINFO efforts (e.g., UNESCO UNISIST, DARPA Net). Technical information exchange activities will be expanded as required by Public Law 94-282 (National Science, Engineering and Technology Policy and Priorities).

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.03.A Title Technical Information Activities

4. FY 1979 Planned Program: Ongoing efforts will be continued. Emphasis will be directed to tasks which logically follow tasks previously completed (e.g., on-line access to widely spaced library collections, forwarding information via carriers such as satellites).

5. Program to Completion: This is a continuing program.

FY 1978 DESCRIPTIVE SUMMARY

Program Element #6.58.04.A

Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Category Management and Support

Budget Activity #6 - Programwide Management and Support

RESOURCES/PROJECT LISTING/: ($ in Thousands)

| Project Number | Title | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|---|
| | TOTAL FOR PROGRAM ELEMENT | 130815 | 35227 | 159117 | 158657 | 173785 | Continuing | Not Applicable |
| DE90 | Yuma Proving Ground | 13822 | 3370 | 16636 | 16858 | 17883 | Continuing | Not Applicable |
| DE91 | Aberdeen Proving Ground | 15748 | 4740 | 17258 | 16653 | 17753 | Continuing | Not Applicable |
| DE92 | Dugway Proving Ground | 10988 | 3252 | 12606 | 12627 | 13441 | Continuing | Not Applicable |
| DE93 | White Sands Missile Range | 78645 | 21039 | 99556 | 99404 | 110778 | Continuing | Not Applicable |
| DE94 | Army Electronic Proving Ground | 6208 | 1582 | 6989 | 7045 | 7530 | Continuing | Not Applicable |
| DE95 | Cold Regions Test Center | 3304 | 710 | 3458 | 3458 | 3650 | Continuing | Not Applicable |
| DE96 | Tropic Test Center | 2100 | 534 | 2614 | 2612 | 2750 | Continuing | Not Applicable |

BRIEF DESCRIPTION OF ELEMENT: The projects of this program element provide funding for the recurring installation operating costs at seven major development testing activities of the Department of the Army, including the indirect costs of conducting tests and improvement and modernization of instrumentation.

BASIS FOR FY 1978 RDTE REQUEST: Each facility will plan, conduct, and support engineering tests, check tests and initial production tests. The types of materiel to be tested are aircraft armament systems, tube artillery, artillery munitions, vehicles, chemical warfare and biological defense, missiles, communications equipment, and high energy lasers. The support provided will include improvement and modernization of instrumentation to provide a test capability compatible with new weapons technology, shorten test time and reduce cost through automation, and replace uneconomical-to-repair equipment.

BASIS FOR CHANGE IN FY 1978 OVER FY 1977: In FY 1978, severe economic measures must be applied in certain cost areas in order to provide funds to instrument a new high energy laser systems test facility and to minimally cope with real cost growth, although total funds remain approximately the same as in FY 1977.

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.04.A Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

PERSONNEL IMPACT:

The average number of employees supported with requested FY 1978 funds (RDTE and Procurement), is as follows:

| | RDTE | PROCUREMENT | TOTAL |
|---|---|---|---|
| (1) Federal Civilian Employees | 4139 | 0 | 4139 |
| (2) Contractor Employees | 1186 | 0 | 1186 |
| Total | 5325 | 0 | 5325 |

DETAILED BACKGROUND AND DESCRIPTION: This program element consists of seven separate projects, each of which provides funding for a major development testing activity operated by the US Army Test and Evaluation Command, a subordinate command of the US Army Materiel Development and Readiness Command (DARCOM). All seven of these projects support testing required annually and do not directly support a single item or weapon system. These projects provide funding to four proving grounds, White Sands Missile Range, and the Cold Regions Test Center and Tropic Test Center 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. The four proving grounds and White Sands Missile Range now operate under the Department of Defense Uniform Funding Policy. Under this policy, users of these facilities pay for direct costs of testing. At the two test centers, the program element finances all costs of operating and maintaining the centers.

RELATED ACTIVITIES: These seven test facilities plus 19 other Army, Navy and Air Force test facilities make up the Department of Defense Major Range and Test Facility Base. Two other Army facilities are included in these 19: Kwajalein Missile Range, financed by P.E. 6.53.01.A and Jefferson Proving Ground, which is not financed by the RDTE appropriation. This element with its emphasis on testing is related to all the other Army test facilities, the 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 Deputy Director of Defense Research and Engineering (Test and Evaluation) carefully reviews management, operation and maintenance of all Department of Defense 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.

WORK PERFORMED BY: Primarily the work is performed by in-house personnel (civilian and military) assigned to the US Army Test and Evaluation Command. Approximately 33 million dollars of contractor efforts will also be supported during FY 1978. Potential contractors include Lockheed, RCA, Dynalectron, Bell Aero Systems, and many others with smaller contracts.

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.04.A Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 1976 and Prior Accomplishments: FY 1975 testing included the following: Yuma Proving Ground - Improved AH-IG COBRA Helicopter Armanent; and AMATEX-20 Explosive Filler for 105mm. Aberdeen Proving Ground - Development of an automatic target scoring system for large and small caliber direct fire weapon test and evaluation. Dugway Proving Ground - Defensive Test Chamber Procedures, M-51, Chemical/Biological Shelter; support of USAF HAVE BEE Projects. White Sands Missile Range - PATRIOT, STINGER, LANCE, TACFIRE. Army Electronic Proving Ground - Central Office, Automatic Telephone, AN/TTC-38; Gyromagnetic Compass Set, AN/ASN-43. Cold Regions Test Center - CH-47 Helicopter, XM47 DRAGON Guided Missile System, XM124 Demolition Firing Device. Tropic Test Center - Camouflage Screening System, Non-metallic Fuel Tanks for M151 and M715 Trucks. FY 1976 and FY 197T testing included: Yuma Proving Ground - acceptance testing of 105mm tank cartridges and components, M113A1 Armored Personnel Carrier, M48A5 Tank and Hostile Sounding System, AN/UMQ-7; Platoon Early Warning System; US Air Force Drone Program and Project Combat Angel; Electromagmetic Environmental Test Facility support to the National Aeronautics and Space Administration. Cold Regions Test Center - Driver's Night Vision Viewer, Mine Field Marking Set, Thermoelectric Power Source. Tropic Test Center - Demolition Kits and Individual Served Weapons (Small Starlight Scope). Austere funding levels in FY 1976 and prior years forced delay of modernizing and replacing equipment with the result that occasional delays in testing have been unavoidable and the capabilities of the test facilities did not keep pace with the technology of the systems to be tested. Maintenance and repair of test facilities fell drastically behind; only critical repairs dictated by safety or legal requirements could be accomplished within funding provided.

2. FY 1977 Program. Test programs include: Yuma Proving Ground - Mechanized Infantry Combat Vehicle (XM723); XM-1 Tank; M48A5 Tank; and TOW Missile Configured COBRA Helicopter. Aberdeen Proving Ground - Family of Military Engineer Construction Equipment. Dugway Proving Ground - Smoke Obscuration and Characterization System. White Sands Missile Range - PATRIOT, ROLAND and USAF Standard Air Intercept Missiles. Army Electronic Proving Ground - TACFIRE, Modification to CHAPPARAL and STINGER. Cold Regions Test Center - Mortar Locating Radar AN/TPQ-36, Radar Signal Detection, and Night Vision Goggles. Tropic Test Center - Lightweight Company Mortar. The funding level was increased relative to FY 1976 permitting, to a limited extent, test facility instrumentation modernization and a slight reduction in the huge backlog of long overdue essential maintenance and repair.

3. FY 1978 Planned Program. Major tests scheduled include: Yuma Proving Ground - Air Force Global Positioning System, Family of Military Engineer Construction Equipment; XM-1 Tank; Improved TOW Vehicle. Aberdeen Proving Ground - Universal Engineer Tractor, Tank Thermal Sight and 105mm Howitzer Training Cartridge. Dugway Proving Ground - Cannon Launched Guided Projectile, Support of USAF testing. White Sands Missile Range - PERSHING, ROLAND, TACFIRE, and Improved HAWK. Army Electronic Proving Ground - CHAPARRAL and TRI-TAC Componentry. Cold Regions Test Center - Rigid Wall Shelters and Command Post Shelter. In order to continue the modest instrumentation modernization made possible in FY 1977, to provide instrumentation for a new high energy laser system test facility at White Sands Missile Range, and to provide for cost growth, severe economic measures will be applied to other cost areas (e.g., personnel operations, contractor support, supplies and equipment, and maintenance and repair). The objective will be to provide the Army with the essential capability to test its more important systems.

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.04.A Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

4. FY 1979 Planned Program: Major tests scheduled include: Yuma Proving Ground - 105mm Incendiary Cartridge SM765; Electronic Fuze XM785 for 155mm Nuclear Projectile; 155mm Projectiles XM692/XM731 and XM718/XM741. Aberdeen Proving Ground - 150mm Cartridges M456 and XM735, Tank Thermal Sight and ROLAND Air Defense System. Dugway Proving Ground - Projectile, GB-2; Smoke Cinetheodolite Modernization. White Sands Missile Range - Missile Lethal Warhead, CHAPARRAL and Naval Weapons Stest. Army Electronic Proving Ground - Advanced Radar Jammer, and TEMPEST. Cold Regions Test Center - Mechanized Infantry Combat Vehicle, Electrokinetic Fuel Decontaminator, and TOW Anti-tank Guided Missile System. Tropic Test Center - ROLAND II, Bio Agents Alarm, Smoke Screening. The funding level will be increased to provide for a reduction in the backlog of long overdue essential maintenance and repair, to complete establishment of the new high energy laser systems test facility, and to permit operations without continuing economic restrictions that cannot be sustained. Improvement and modernization will be continued with the objectives of providing a test capability compatible with new weapons technology, shortening test time and reducing test costs and manpower through automation.

5. Program to Completion: This is a continuing program.

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.58.04.A

Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Project #DE90

Title Yuma Proving Ground

Category Management and Support

Budget Activity #6 - Programwide Management and Support

DETAILED BACKGROUND AND DESCRIPTION: In April 1951, Yuma Test Station was established as a Class I Installation under the Commanding General, Sixth US Army. In August 1962, concurrently with establishment of the US Army Test and Evaluation Command under the US Army Materiel Command, now the US Army Materiel Development and Readiness Command, Yuma Test Station was designated as a Class II installation under the US Army Test and Evaluation Command (TECOM). It was redesignated as Yuma Proving Ground in August 1963. Yuma Proving Ground is one of 26 major ranges of the Department of Defense Major Range and Test Facility Base under Department of Defense Directive 3200.11. The assigned mission is to plan, conduct, evaluate, report on, and support developmental and other tests of aircraft armament, long-range artillery, air delivery and mobility systems; and desert environmental tests. Yuma Proving Ground also provides personnel to support arctic environmental tests of the US Army Cold Regions Test Center, Fort Greely, Alaska, as directed by the Headquarters, US Army Test and Evaluation Command. Land area comprises more than 1 million acres with restricted airspace ranging from surface to 80,000 feet. Major facilities include a 420,000 acre artillery firing range with 21 firing positions, a maximum range capability to 74,000 meters and three fully instrumented impact areas; a 442,000 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 a mobility test area comprising 78,000 acres which includes 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. It has three broad task areas: Procurement of instrumentation, base operations and test support.

RELATED ACTIVITIES: Project DE90, Yuma Proving Ground, is one of seven projects established in FY 1975 comprising PE 6.57.11.A, Major Research and Development, Test and Evaluation Facilities. In FY 1976, these projects were transferred to PE 6.58.04.A. Four of the projects finance costs at White Sands Missile Range, New Mexico; The Army Electronic Proving Ground, Fort Huachuca, Arizona; Dugway Proving Ground, Utah; and the Materiel Testing Directorate, Aberdeen Proving Ground, Maryland. These four installations/activities, Yuma Proving Ground and 13 other test and evaluation facilities operate under a uniform policy within the Department of Defense Major Range and Test Facility Base. Under this policy, these facilities finance all indirect testing costs with the users or test proponents at these facilities paying all direct testing costs, Yuma Proving Ground is also one of three Army installations/activities responsible for natural environmental testing. The other two, the US Army Cold Regions Test Center, Fort Greely, Alaska, and the US Army Tropic Test Center in the Panama Canal zone, are funded on a level-of-effort basis (direct and indirect costs) by two of the projects in Program Element 6.58.04.A. Assignment and monitoring of projects by HQ TECOM, assures that appropriate coordination takes place with related activities to minimize duplication. Further, the Office of the Deputy Director of Defense Research and Engineering (Test and Evaluation) carefully reviews the management, operation and maintenance of all Department of Defense test facilities and planned testing activities 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.

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.04.A Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Project #DE90 Title Yuma Proving Ground

WORK PERFORMED BY: Work is performed by Department of Army civilian and military personnel with associated contractual support. Telecommunications services are provided by the US Army Communications Command. Navajo Army Depot, Flagstaff, Arizona, provides ammunition storage support. Potential contracts during FY 1978 include: Taylor Days Cleaning Service, Tucson, Arizona; Melody Cleaners, Yuma, Arizona; National Astro Labs, Los Angeles, California, Houston Photo Products, Yuma, Arizona, and RCA. There will be 41 contracts totaling $2,200,000 and miscellaneous small contracts together totaling less than $25,000.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishments: Yuma Proving Ground has been responsible for the planning, conduct and evaluation of (or has supported) the following types of tests since 1975: Research and Development, Production, Post Production, Product Improvement Armament Systems, Mobility Systems and a Variety of Troop Support Equipment. In FY 1971 the mission of development and production testing of aircraft armament subsystem and components was transferred to Yuma Proving Ground from Aberdeen Proving Ground. Research and development tests performed include: AH 58 Cheyenne Helicopter; Improved AH-IG, COBRA Helicopter Armament; 8-inch and 155mm Rocket Assisted Projectiles; Artillery Selected Ammunition; Improved Conventional Artillery Munitions; 155mm XM198 Howitzer Systems; AMATEX-20 Explosive Filler for 105mm; 155mm and 8-inch Artillery Projectiles; Desert Tests of M60A1E3 Tank and M88 Recovery Vehicle; Tire Retread Program; Personnel, equipment and supply dtop systems for Army and Air Force. Major test and instrumentation improvement and modernization tasks conducted under FY 1975 and prior fiscal year instrumentation procurement programs included, as part of an overall program for automation of data acquisition and analysis systems for testing of aircraft, weapons and vehicles, acquiring a High Frequency Digital Measurement System, a Precision Laser Tracking System, a Graphic Display System, a Position Locating System with remote solar-powered interrogator/ranging system, and other associated Transportation-Vibration testing equipment and instrumentation. In FY 1976 and FY 197T, Yuma Proving Ground completed 182 test programs; 65 development, 22 production, 49 post production, 33 product improvement, 13 other. Their work performance was considerably above the projected workload. The primary increases were in the areas of munitions and weapons, air drop and air delivery testing. Tests completed during the year include: Acceptance Testing of 105mm Tank Cartridges and Components; M113A1 Armored Personnel Carrier; M48A5 Tank; Mortar Locating Radar AN/TPQ-36; Hostile Weapons Locating Systems (HWLS); Air Transport of TACFIRE Shelter; AMATEX-20 Loaded Artillery Projectiles; 155mm Projectiles, M116, M454, XM6291/XM731, XM708, M761; 8-inch Projectiles M106, M422, M424, M509, XM650, XM711, XM736, XM753; Fuze XM587/XM724; Howitzer Fixture for Large Caliber Soft Recoil Weapons System; 105mm Howitzer XM204; 155MM Howitzer XM198; 8-inch Howitzer M110E2; Improved COBRA Armament System (ICAS); Navy Maneuver Glide Vehicle; Infared Suppression for OH-58A Hilicopter; Air Drop of M551 Vehicle on Joint Service Platform (JSOR); Families of Helicopter External Stings and Cargo Carrying Devices; Upgraded 2.75 inch Rocket System; M23 Helicopter Armament Subsystems; Air Force Global Position System (GPS); Night Vision Sights for Individual and Crew Served Weapons; Aircraft Mine Dispensing Subsystem, M56; Range Measurement System/Simulated Combat Operations Range Equipment (RMS/SCORE) Evaluation. Significant instrumentation procurement actions during FY 76 included upgrading of the existing telemetry system to provide for real time processing of telemetry data, an additional Precision Laser Tracking System, improvements to existing Cinetheodolite and Radar Tracking Systems, and Environmental Effects Calibration System, an Aircraft Armament Video System and Ammunition Conditioning Chambers.

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.04.A Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Project #DE90 Title Yuma Proving Ground

2. FY 1977 Program: Scheduled tests include: Mechanized Infantry Combat Vehicle (XM723); XM1 Tank; M48A5 Tank; Air Transportability of Air Cushion Vehicle (LACV-30); Improved TOW Vehicle (ITV); Mortar Locating Radar AN-TPQ-36; 8-inch Projectiles XM735, Nuclear, and XM650, Rocket Assisted; 155mm Projectile XM718/XM741, Anti-tank; Howitzer, 155mm, XM198; Air Transportability of Howitzer, 105mm, XM204; Desert Storage of STINGER Missile, Common Thermal Night Sight; Tow Missile Configured COBRA Helicopter; Reserve Personnel Parachute; Air Force Global Positioning System and Range Measurement System/Simulated Combat Operations Range Equipment (RMS/SCORE) evaluation; High Speed Low Altitude and High Altitude Parachute Extraction Systems. During this period, Yuma Proving Ground will continue prior fiscal year efforts to modernize and update the instrumentation data and acquisition capabilities with primary effort directed toward meeting developmental testing requirements of aircraft armament and artillery systems and associated components. Major instrumentation procurement actions include an aircraft Armament Video System, which is a continuation of a prior fiscal year effort, Instrumentation Automatic Data Processing Equipment which will be directly linked to all major instrumentation data acquisition systems in a ring network configuration, a High Frequency Digital Measurement System and other associated general support and calibration equipment and instrumentation.

3. FY 1978 Planned Program: Test data acquisition and reduction requirements will continue to increase in complexity requiring achievement of increased accuracy and precision. Scheduled tests include: Air Force Global Positioning System, Family of Military Engineer Construction Equipment; XM1 Tank; Improved TOW Vehicle; M48A5 Tank; Tank Thermal Sight for M60 Tanks; Battery Computer System; 105mm Cartridges XM548; XM710; M444, M84, 8-inch Projectiles XM753, XM711, XM650; 155mm Projectiles XM692, XM718.XM741; PATRIOT Missile; Desert Storage of STINGER Missile; Utility Tactical Transport aircraft; Joint Service Platform; Heliborne Laser Fire and Forget Missile; Personnel Parachute Systems. Major test instrumentation improvement and modernization tasks planned for this period will continue prior fiscal year efforts and include a Digital Video Tracking System, a Radiographic Inspection System, additional Ammunition Conditioning Chambers, Dynamic Testing and Test Support equipment and instrumentation, automated Physical Measurement and Calibration equipment, and a Versatile Precision Tracking Mount for obtaining in-flight data on helicopter launched missiles. Funding will remain at approximately the same level as in FY 1977. Severe economic measures will be applied during this fiscal year in certain cost areas in order to cope with cost growth.

4. FY 1979 Planned Program: Scheduled tests for FY 1979 include: 105mm Incendiary Cartridge XM765; Electronic Fuze XM785 for 155mm Nuclear Projectile; 155mm Projectiles XM692/XM731 and XM718/XM741; 8-inch Projectiles XM753 and XM711; PATRIOT Missile; Advanced Attack Helicopter; Infared Jammer for Helicopters; Explosive Submunition Warhead for 2.75 inch Aerial Rocket. During FY 1979, instrumentation improvement and modernization tasks will continue prior fiscal year efforts to modernize, update, and automate existing data acquisition and analysis capabilities by replacing obsolete and inefficient equipment and instrumentation and procuring new automated instrumentation required to meet the demands of testing advanced weapons systems. Major instrumentation procurement actions during this period include: Additional Ammunition Conditioning Chambers, an Advanced Precision Laser Tracking System, a Versatile Precision Tracking Mount, Cintheodolite Modernization and Dynamic Test and Test Support equipment and instrumentation.

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.04.A Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Project #DE90 Title Yuma Proving Ground

5. Program to Completion: This is a continuing program.

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 13822 | 3370 | 16636 | 16858 | 17883 | Continuing | Not Applicable |

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.58.04.A

Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Project #DE91

Title Aberdeen Proving Ground (Materiel Test Directorate)

Category Management and Support

Budget Activity #6 - Programwide Management and Support

DETAILED BACKGROUND AND DISCUSSION: Aberdeen Proving Ground, Maryland, is an installation of the US Army Test and Evaluation Command, which is a major subordinate command of the Army Materiel Development and Readiness Command (DARCOM). The Materiel Test Directorate of Aberdeen Proving Ground has the assigned mission of conducting tests of weapons; weapon systems; rocket and missile systems; munitions and components; survey and target acquisition equipment; combat, special and general purpose vehicle and ancillary automotive equipment; combat engineer equipment; troop support equipment; and other materiel as assigned. With its 75,000 acres, half of which are under water, instrumented firing of weapons up to ranges of 34,000 meters is possible and 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 Materiel Test Directorate of Aberdeen Proving Ground and those indirect costs for testing not reimbursed by users. It has three broad task areas: procurement of test instrumentation, base operations, and test support.

RELATED ACTIVITIES: Project DE91, Aberdeen Proving Ground (Materiel Test Directorate), is one of seven projects established in FY 1975 that comprise PE 6.57.11.A. In FY 1976, this project was transferred to PE 6.58.04.A, Major Research and Development Test and Evaluation Facilities (DARCOM). Four of the other projects finance costs at Yuma Proving Ground, AZ; Dugway Proving Ground, UT; White Sands Missile Range, NM; and the Army Electronic Proving Ground, AZ. These five test facilities, plus 13 additional test and evaluation facilities of the Department of Defense, operate under a uniform funding policy for test and evaluation services within the overall test facility base of the Department of Defense. The other two DARCOM projects in this element are the two environmental test centers, Cold Regions Test Center and Tropic Test Center, which are funded on a level-of-effort basis. Assignment and monitoring of projects by Test and Evaluation Command assure that appropriate coordination takes place with related activities to minimize duplication. Further, the Office of the Deputy Director of Defense Research and Engineering (Test and Evaluation) carefully reviews the management, operation, and maintenance of all Department of Defense test facilities and planned testing activities 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.

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.04.A Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Project #DE91 Title Aberdeen Proving Ground (Materiel Test Directorate)

WORK PERFORMED BY: All effort prescribed herein is performed by Department of the Army civilian and military work force of US Army Aberdeen Proving Ground, together with some associated contractual support. Telecommunication services for Aberdeen Proving Ground are provided by US Army Communications Command. Only a small portion of the Materiel Test Directorate's work is done by contractors. Potential contractors for FY 1978 are: Davis Boat Works, National Microfilm Systems, Inc., and Raytheon Corporation. The estimated cost for support contracts for FY 78 is $160,000.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishments: On 1 July 1971, the Materiel Testing Directorate was reassigned most of the mission of the General Equipment Testing Activity disestablished at Ft. Lee, VA. The consolidation of this activity resulted in substantial savings both in personnel and facilities. The long range artillery mission is in process of being transferred to Yuma Proving Ground, with completion scheduled by FY 1980. Notable accomplishments include: testing of most current and recent Army tactical vehicles on the world famous Munson and Perryman automotive test courses; sophisticated, highly instrumented, ballistic testing of Army weapons and the families of munitions fired from them; proof and acceptance tests of munitions (prior to FY 1975) and weapons; establishing electromagnetic interference instrumentation and generating capability to enable measuring electromagnetic compatibility or interference as part of vehicular, electronic or communication equipment testing; development of an automatic target scoring system for large and small caliber direct fire weapon test and evaluation; development of vehicle test instrumentation to measure vehicle performance and course severity. Major test instrumentation improvement and modernization tasks conducted under FY 1975 and prior fiscal year instrumentation procurement programs included the establishment of an Electromagnetic Interference Instrumentation and Generating Capability for the accurate measurement of the electromagnetic interference/capability during testing of electronic and communications equipped tanks and vehicles; an Automatic Target Scoring System for test and evaluation of small to large caliber direct fire weapons systems; Vehicle Test Instrumentation for measuring test vehicle performance and test course severity; Flash X-Ray equipment for artillery weapons performance analysis; a High Accuracy Digital Tracking Radar; modernization of data processing and analysis equipment and instrumentation; and cost reduction in munitions fragmentation tests by acquisition of automated data acquisition and analysis equipment and techniques. During FY 1976 and FY 197T, the Materiel Testing Directorate completed 440 tests; 150 development, 100 production, 51 post production, 54 product improvement and 85 other. Testing programs completed included: XM1 Tank Armor System Protection; Aluminum Armor for M113A1 Vehicle Family; Acceptance of aluminum and steel armor; simplified test equipment for internal combustion engines; XM1 Tank; Product-Improved M60 Tanks, Mechanized Infantry Combat Vehicle (XM723); 105mm Tank gun cartridges M392A2 (Armor-Piercing Discarding Sabot); 152mm cartridge M409A1E1; 105mm data base program for kinetic energy penetration performance; fire resistant hydraulic fluids; Tank Thermal Sight for M60 tank; exploration of various foreign vehicles; GOER vehicles; Truck M746 and Tractor M747 (heavy equipment transporter);

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.04.A Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Project #DE91 Title Aberdeen Proving Ground (Materiel Test Directorate)

Tripartite ammunition evaluation with Germany and Great Britain; 105mm gun M68 for M60, M48A5, and XM1 tanks; 20mm gun M139; AMATEX-20 loaded artillery projectiles; joint DOD/ERDA soft recovery test of 8-inch, M422, projectile; Fuzes M728 and M732; 105mm Howitzer XM204; 8-in Howitzer M110E3, 155mm cannons, tube assemblies and mounts; Gun Low Altitude Air Defense System (GLAADS); ribbon bridge; 200 KW, 60HZ generator set; multi leg mooring system; light weight company mortar and ammunition. Significant instrumentation improvement and modernization efforts conducted during this fiscal year included the initial procurement of Automated Data Acquisition and Processing Technology (ADAPT) equipment and instrumentation for support of all types of armament, vehicle and weapons tests; procurement of solid-state Skyscreens for artillery and mortar testing; and updating and replacement of existing ballistic data and photogrammetric equipment and instrumentation.

2. FY 1977 Program: Intermediate and long-range artillery systems testing are decreasing as Yuma Proving Ground assumes a greater portion of such testing, while testing of armored and general purpose vehicles is increasing. Scheduled test programs include: Family of Military Engineer Construction Equipment; armor plate for M113A1 family of vehicles; acceptance of steel and aluminum armor plate; overhauled M113A1 armored personnel carrier; XM1 Tank; Leopard II Tank (German); M48A5 Tank; Product-Improved M60 Tank; Exploitation of Foreign Vehicles; M551 Armored Reconnaissance Vehicle; M809 series of trucks; Air Cushion Vehicle (LACV-30); M88E1 Recovery Vehicle; XM856 Tanker Semi-trailer; Bushmaster Weapons System; 105mm guns and mounts for M60 and M48A5 tanks; Cartridge, 105mm, XM735; Firing Port Weapon for Mechanized Infantry Combat Vehicle; Projectile, 8-inch, XM711; XM587E2 fuze; XM204 Howitzer; STINGER Missile; Roland Air Defense System; PATRIOT (SAM-D) Missile; Hand-held Laser Range Finder; Bridge Pier and Span set; Personnel Armor System for general troops; Squad Automatic Weapon. During this period, Aberdeen Proving Ground has continued prior fiscal year effort to modernize and update instrumentation data acquisition and analysis capabilities with primary instrumentation procurement efforts directed toward Automated Data Acquisition and Processing Technology (ADAPT), FLASH X-Ray (TRIGGERS), High Accuracy Digital Tracking Radars and additional physical test and photogrammetric instrumentation.

3. FY 1978 Planned Programs: Scheduled programs include: Driver's Night Viewer, AN/VVS-2; Universal Engineer Tractor; 105mm cartridges M494, M456, XM735 and XM774; Turret Integrated enon Illuminator; Tank Thermal Sight; XM1 Tank; 8-10 ton high mobility truck; blank firing adaptors for machine guns; gun and mount combination for M60 and M48A5 tanks; 105mm howitzer training cartridge; 105mm cartridges M1 and XM622; 175mm projectile M437; 105mm screening smoke projectile; fuze XM587; 8-inch M201 Cannon assembly; ROLAND Air Defense System; a variety of air conditioners; ribbon bridge; a variety of generator sets; lightweight boot; slurry explosive system; 4.2 inch cartridge M329A2; Squad Automatic Weapon; Lightweight Company Mortar System; Ground Vehicle Mine Dispensing System. Major test instrumentation improvement and modernization tasks planned for this period will continue prior fiscal year efforts and include ADAPT, physical test and photogrammetric instrumentation, solid-state ballistics data acquisition systems and noise pollution detection system equipment and instrumentation. Funding is decreased to provide for higher priority requirements.

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.04.A Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Project #DE91 Title Aberdeen Proving Ground (Materiel Test Directorate)

4. FY 1979 Planned Program: Scheduled programs include: Family of Military Engineer Construction Equipment; simplified test equipment for internal combustion engine powered materiel; 105mm cartridges M456 and XM735; Tank Thermal Sight; XM1 Tank; Air cushion vehicle (LACV-30); Surveying Instrument, Azimuth Gyro; Mortar Locating Radar, AN/TPQ36; M78 fuze; cannon for XM198 Howitzer; ROLAND Air Defense System; PATRIOT (SAM-D) Missile; Army radar gun air defense system; ribbon bridge; a variety of generator sets; Infantry combat boots; components for Medical Unit, Self-contained, Transportable (MUST). Instrumentation improvement and modernization tasks will continue prior fiscal year efforts to modernize, update and automate existing data acquisition and analysis capabilities by replacing obsolete and inefficient equipment and instrumentation and procuring new automated instrumentation required to meet the demands of testing advanced weapons systems. Major instrumentation procurement actions during this period include: Augmentation, extension and supplementation of the existing automated data acqusition, reduction and analysis capabilities to provide real-time test data monitoring and control of wheeled and tracked vehicles, armament and weapon systems undergoing testing.

5. Program to Completion: This is a continuing program.

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 15748 | 4740 | 17258 | 16653 | 17753 | Continuing | Not Applicable |

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.58.04.A

Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Project #DE92

Title Dugway Proving Ground

Category Management and Support

Budget Activity #6 - Programwide Management and Support

DETAILED BACKGROUND AND DESCRIPTION: Dugway Proving Ground, Utah, is an installation of the US Army Test and Evaluation Command, a major subordinate command of the US Army Materiel Development and Readiness Command (DARCOM). With the entry of the United States into World War II, the Chemical Warfare Service chose the area on the edge of the Great Salt Lake Desert, southwest of Salt Lake City, Utah, for use as a chemical warfare range. Dugway has a unique mission to plan, conduct, and report on tests that assess the military value of chemical weapons and chemical/biological defense systems and related procedures during and after exposure, as well as flame incendiary and smoke munitions systems. They also conduct research development, laboratory tests, field tests, and investigations necessary to support the assigned mission, including meteorology, ecology, epidemiology and test technology. Effective 1 July 1974, Dugway Proving Ground was designated a major test facility within the Department of Defense Major Range and Test Facility Base. It operates under a uniform Department of Defense funding policy under which users are required to pay the direct costs of testing with funds in Project DE92, Dugway Proving Ground, paying the indirect costs of conducting tests or other assigned workload (that which cannot be readily be readily identified to users of the facility).

RELATED ACTIVITIES: In FY 1975 this project was in Program Element 6.57.11.A and it was transferred to Program Element 6.58.04.A, Major Research and Development Test and Evaluation Facilities, (DARCOM), in FY 1976. Dugway Proving Ground is one of seven Test and Evaluation Command installation/activities in this program element. Four of the others also operate under the uniform Department of Defense (DOD) funding policy. These are: White Sands Missile Range, NM; Yuma Proving Ground, AZ; Army Electronic Proving Ground, Ft Huachuca, AZ; and the Materiel Test Directorate at Aberdeen Proving Ground, MD. The other two projects in this element which are funded on a level-of-effort basis (direct and indirect cost) are the CRTC and Tropic environmental test centers. Assignment and monitoring of projects by Test and Evaluation Command (TECOM), assure that appropriate coordination takes place with related activities to minimize duplication. Further, the Office of the Deputy Director of Defense Research and Engineering (Test and Evaluation) carefully reviews the management, operation, and maintenance of all Department of Defense test facilities and planned testing activities to avoid unnecessary duplication of capability to insure that the highest priority capablities are established expeditiously and suitably maintained, and to insure integration of testing by the services.

WORK PERFORMED BY: The testing and evaluation services are performed by assigned Department of the Army civilian and military personnel with associated contractual support. Potential contractors for FY 1978 include: Xerox, Harrison E. Cramer, Inc., Hawthorne Aviation, Charleston, SC, and Utah Power and Light, Salt Lake City, UT. There will be a total of approximately 25 contracts valued at $2,600,000.

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.04.A Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Project #DE92 Title Dugway Proving Ground

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishments: During FY 1975 and prior, major emphasis was on the 155mm and eight-inch binary projectiles. Suitability and environmental surveillance tests were conducted on various chemical/biological protective equipment such as protective clothing, and on chemical/biological dispensors. Other activities included testing of the collective protector for the AN/TSQ-73 Air Defense Command and Control System, US Forest Service insecticide spray system and the US Air Force AQM-34H Drone Launch and Recovery System. During FY 1975 some of the tests of major significance were: tests of chemical/biological protective clothing for Explosive Ordnance Disposal (EOD) personnel, Defensive Test Chamber Procedures, M-51 Chemical/Biological Shelter, US Air Force AQM-34H Drone Launch and Recovery System, the XM687, 155mm GB-2 Projectile, support for US Air Force Have Bee projects, Foreign Bio-threat studies, tests of protective equipment for the HAWK system, and investigations of environmental quality and ecological problems. Improvement and modernization during this period included test control communication equipment and replacement of other obsolete voice communications equipment. Major test instrumentation improvement and modernization efforts under FY 1975 and prior fiscal year instrumentation procurement programs included a Defensive Test Chamber for conducting inclosed chemical test programs and replacement of obsolete voice communications equipment, telemetry receivers, multiplexers and test data interface equipment. In FY's 1976 and 197T, projects include: Chemical/Biological (CB) demilitarization support (DEMIL), development tests of binary projectiles (155mm and 8 inch), protective shelters/clothing, chemical/biological detectors, protective masks, M-4 incendiary field burster, 16 tube tactical CS launcher, M17 colored smoke grenade and 66mm incendiary rocket; support of US Air Force remotely piloted vehicles (RPV); baseline ecological surveys of demil and manufacturing sites; development of diffusion models and concepts; atmospheric investigations; foreign bio-threat and target vulnerability assessment studies; study of migration of hazardous substances through the soil Environmental Protection Agency (EPA). The workload accomplished in FY 1976 was 368,000 Direct Labor Man-Hours. This was in increase of 14.25% over the FY 1975 workload. This increase resulted primarily from increases in the chemical munitions demil and the US Air Force RPV programs. Significant instrumentation procurement actions included establishment of an initial Particulate and Smoke Field instrumentation capability for determining the quantity, quality and obscuration characteristics of Army smoke munitions improvement of the Defensive Test Chamber, the modernization of the Range Safety and Control System and replacement of obsolete high speed surveillance cameras, film readers and chemical and calibration laboratory equipment, together with updating of existing telemetry data systems.

2. FY 1977 Program: Major chemical/weapons projects being conducted include: Projectile, 155mm, XM687 (Binary); projectile, 8 Inch XM736 (Binary); 155mm, 1VA (Binary); projectile, 155mm, XM761 (Smoke); cartridge, 60mm (Smoke); projectile, 64mm, XM742 (Incap); Rocket, 66mm, XM96 (Incap). Protective test programs include: Detector Kit, XM256; Detector Paper XM9; Biological Alarm, XM19; Smoke Obscuration and Characterization System; and Study of Effectiveness of Collective Protector Systems. Miscellaneous test projects are: Explosive Testing of Pre-engineered Building; Demilitarization of CB Munitions; Ultra High Frequency Manpack, AN/PSC-1; Atmospheric Investigations, AH-71; Test Methodology studies for testing of defensive items; Joint Contact Point and Test Projects; major projects for other than Army include: US Air Force RPV Drone tests; support for US Navy Tomahawk weapons tests;

stockpile to target verification tests of US Air Force (USAF) Aero 14-B spray tank; USAF MC-1 Bomb Explosive Ordnance Disposal (EOD) tests; Environmental Protection Agency (EPA), Investigation of Migration of Hazardous Substances through the soil. The projected workload for FY 1977 is 426,000 direct labor man-hours. This is a projected increase of 16% over the workload accomplished during FY 1976. This increase is due mostly to USAF remotely piloted vehicles (RPV) testing and in testing of smoke items. Instrumentation procurement actions provide for additions to the basic Particulate and Smoke Field Instrumentation capability, improvement and modernization of existing cinetheodolites to provide more accurate space position data during tests of Army munitions and weapons, and modernization and replacement of Chemical, Photographic, Life Sciences and Calibration Laboratory instrumentation, together with updating and replacement of Technical Support Instrumentation and Physical Test Equipment.

3. FY 1978 Planned Program. Projects currently scheduled for this timeframe include continuation of most of the FY 77 effort and in addition tests of the Cannon Launched Guided Projectile XM712; Rocket, 2.75 inch, White Phosphorus Screening Smoke, XM259; Warhead, Binary, for SEAS Missile; SHF TACSATCOM, AN/TSC85; Mask, M17A1 W/M13A2 Filter Element; New protective Mask, XM29. The projected workload for FY 1978 is slightly higher than in FY 1977 due primarily to increase in support of USAF RPV testing and continued rise in chemical weapons, defense and smoke items. Major test instrumentation improvement and modernization efforts during this period will address continuation of the Particulate and Smoke Field Instrumentation, System, Cinetheolite Rehabilitation, and Modernization and Replacement of Range Safety, Surveillance and Control Instrumentation, Chemical, Photographic, Life Sciences and Calibration Laboratory equipment and instrumentation, together with updating and replacement of Technical Support Instrumentation and Physical Test Equipment.

4. FY 1979 Planned Program. Projects currently scheduled for the FY 1979 time frame include many of the major programs begun in FY 1977 and FY 1978 and the following additions: Alarm, Bio agent, Automatic, XM19; Projectile, GB2, XM687E and the Passive Lopair Alarm. The projected workload for FY 1979 is approximately the same as FY 1978. During FY 1979, instrumentation improvement and modernization tasks will continue prior fiscal year efforts to modernize, update and automate existing data acquisition and analysis capabilities by replacing obsolete and inefficient equipment and instrumentation and procuring new automated instrumentation required to meet the demands of testing advanced weapons systems. Major instrumentation procurement actions during this period include: Continuation of the Smoke, Particulate and Aerosol Field Instrumentation System, Cinetheodolite Modernization and Rehabilitation, and Modernization, Automation and Replacement of existing Chemical, Life Sciences, Photographic and Calibration Laboratory equipment and instrumentation.

5. Program to Completion: This is a continuing program.

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.04.A

Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Project #DE92

Title Dugway Proving Ground

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 10,988 | 3,252 | 12,606 | 12,627 | 13,441 | Continuing | Not Applicable |

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.58.04.A

Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Project #DE93

Title White Sands Missile Range

Category Management and Support

Budget Activity #6 - Programwide Management and Support

DETAILED BACKGROUND AND DESCRIPTION: White Sands Missile Range, New Mexico, is an installation of the US Army Test and Evaluation Command, a major subordinate command of the Army Materiel Development and Readiness Command (DARCOM), with the primary mission of supporting missile, aircraft, and space vehicle tests of various national programs which include the Defense Advanced Research Projects Agency (DARPA), the National Aeronautics and Space Administration (NASA), and the Energy Research and Development Administration (ERDA). White Sands was established in 1945, renamed White Sands Missile Range in 1958, and classified by Department of Defense as a national range in 1961. To meet increasingly complex and stringent range user requirements, a modernization program was established in FY 1964 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. Guidance systems for long missile flights are fired from launch sites such as Green River, Utah, 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 new mission to support laser testing has been added.

RELATED ACTIVITIES: Project DE93, White Sands Missile Range, was established in FY 75 under PE 6.47.11.A, Major Research and Development Test and Evaluation Facilities (DARCOM), and transferred to PE 6.58.04.A, Major Research and Development Test and Evaluation Facilities (DARCOM), in FY 1976. Seven projects comprise PE 6.58.04.A, Major Research and Development Test and Evaluation Facilities, DARCOM. Four of these projects finance indirect costs of operating Yuma Proving Ground, Arizona, Materiel Test Directorate, Aberdeen Proving Ground, Maryland; Dugway Proving Ground, Utah; and the Army Electronic Proving Ground, Ft Huachuca, Arizona. These five test facilities plus 13 additional test and evaluation facilities of the Department of Defense operate under a uniform funding policy within the overall Major Range and Test Facility Base of the Department of Defense established by DOD 3200.11. White Sands Missile Range is also one of two national ranges managed by the Army, the other being Kwajalein Missile Range (KMR). There is close and continuous coordination between White Sands Missile Range and other national ranges, other service test and evaluation activities, and developing agencies to insure optimum support to all DOD programs and avoid duplication and inefficiency. The Cold Regions Test Center and Tropic Test Center are the remaining two facilities in the program element and do not fall within the uniform funding policy. Assignment and monitoring of projects by Test and Evaluation Command assure that appropriate coordination takes place with related activities to minimize duplication. Further, the Office of the Deputy Director of Defense Research and Engineering (Test and Evaluation) carefully reviews the management, operation, and maintenance of all Department of Defense test facilities and planned testing activities 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 Services.

Budget Activity #5 - Programwide Management and Support

Program Element #6.58.04.A Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Project #DE93 Title White Sands Missile Range

WORK PERFORMED BY: Military, civil service, and contractor personnel. Contract support to the mission of White Sands Missile Range will total approximately $29 million during FY 1978. Potential contractors for FY 1978 include RCA; Physical Science Laboratory, New Mexico University; DLM, Patrick AFB; IBM; and Dynalectron Corporation. Government agencies providing support include the US Army Electronics Research and Development Command, Fort Monmouth, New Jersey; US Army Communications Command, Ft Huachuca, Arizona; Defense Mapping Agency, Washington, DC; US Army Research Office, Durham, North Carolina; US Army Corps of Engineers, Albuquerque, New Mexico; Lexington Army Depot, Lexington, Kentucky; US Air Force Special Weapons Test Center, Kirkland and Holloman Air Force Bases, New Mexico; and Department of Commerce, National Bureau of Standards, Washington, DC.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishments: Notable test instrumentation improvement and modernization accomplishments under FY 1975 and prior fiscal year instrumentation procurement programs have included the extension of instrumentation coverage to several off-range corridors, the provision of real-time data support, greater accuracy of flight information data, improved communications, more timely and accurate data analysis reports to range users, and improved telemetry reception capabilities. Essential improvements to range sensors, equipment and instrumentation were accomplished with emphasis on optical measurement and tracking, radar and telemetry equipment improvements, communications, timing, and improved data handling and processing. Major instrumentation procurement actions included Drone Formation Control System equipment and instrumentation, a semi-active laser tracker, site coordinate convertors for increasing the capability of the environmental monitoring and control system, nuclear effects test equipment and instrumentation, and TV and sensor replacement. Major test projects supported include: Improved HAWK, LANCE, PERSHING, AEROBEE, TACFIRE, ATHENA, CHAPARRAL, Short Range Attack Missile (SRAM), PATRIOT (SAM-D), STINGER, MAVERICK, and the Advanced Balistic Defense Program. In FY 1976 and 197T, the range supported approximately 260 Department of Defense and National Aeronautics and Space Agency programs providing test and evaluation services to developers of missile and related systems. The major test projects included PATRIOT (SAM-D), SRAM, HAWK, LANCE, CHAPARRAL, DICE THROW, US ROLAND, PERSHING, AEROBEE, TACFIRE, STINGER, Navy weapon tests, and the Air Defense Command and Control System, AN/TSQ-73, and Navy Tomahawk Cruise Missile. The total workload performed in FY 76 was within 10% of the FY 1975 level. Significant instrumentation procurement actions during this fiscal year included Quick Response Instrumentation, Drone Formation Control System (DFCS) equipment and instrumentation, Solid State Angle Measurement Equipment, versatile tracking mount modifications, Three Object Angle Measurement Equipment, fixed camera modifications, FPS-16 radar improvements, Range Video System improvements, cinetheodolite modifications and Vega TCS.

2. FY 1977 Program: The projected workload requirements in FY 1977 exceed that accomplished in FY 1976 by approximately 28%. The major projects to be supported in FY 1977 include PATRIOT (SAM-D), PERSHING II, HAWK, ROLAND, CHAPARRAL, LANCE, TACFIRE, USAF Standard Air Intercept Missiles, B-1 Bomber Avionics, and Navy air weapons. A major White Sands Missile Range instrument,

a MPS-36 tracking radar, will be loaned to the US Air Force to support the Navy TRIDENT I program for approximately 7 to 9 months. During this period, White Sands Missile Range has continued prior fiscal year efforts to modernize and update existing test capabilities by replacing obsolete and inefficient equipment and procuring new instrumentation to meet the demands of advanced weapons systems. Major instrumentation procurement actions during this period include $2.9 million for new range and laboratory test capabilities to support laser testing, most of which is for instrumentation for laser weapons system testing (mobile tracking mount with radiometric and spectrographic recording instruments required for obtaining laser weapons effects data on dynamic target engagement tests). Other major procurement actions include continuation of the multi-year procurement of Drone Formation Control System (DFCS) equipment, a hybrid computer system, a Low Altitude Tracking System, cinetheodolite modernization, fixed camera modernization, Distant Optical Altitude Measurement System equipment, Radio Frequency Generating equipment and Versatile Tracking Mount modifications.

3. FY 1978 Planned Program: White Sands Missile Range will continue to operate the national range and provide test and evaluation services in support of missile system and other materiel developers. The workload for FY 1978 is projected to exceed FY 1977 by approximately 6%. Major projects to be addressed during the period include the Nuclear Weapons Effects Program, the General Support Rocket System, PERSHING, HAWK, PATRIOT (SAM-D), TACFIRE, ROLAND and Navy weapons and missile tests. A major segment of the FY 1978 program will be construction of and procurement of instrumentation and equipment for the Tri-Service High Energy Laser System Test Facility (HELSTF). Major test instrumentation improvement and modernization tasks planned for this period will basically continue prior fiscal year efforts and include Low Altitude Tracking System Equipment, cinetheodolite modernization, DOAMS equipment, Launch Area Scan Track System and a High Resolution Radar. Overall funding will remain at approximately the same level as in FY 197T. In order to continue the modest instrumentation modernization program, to expand the high energy laser test facility effort, and to provide for cost growth, severe economic measures will be applied to other cost areas (e.g., personnel operations, contractor support, supplies and equipment, and maintenance and repair).

4. FY 1979 Planned Program: Test support services will be continued. The FY 1979 workload is projected to decrease by approximately 10% compared to FY 78 but will still significantly exceed (by approximately 19%) the White Sands Missile Range capability. Major test projects to be supported during FY 1979 include the General Support System, PERSHING, Missile Lethal Binary Warhead, Aerial Targets, CHAPARRAL, HAWK, PATRIOT (SAM-D), Naval Weapons tests and SRAM. Instrumentation improvement and modernization requirements for this period include additional new instrumentation capabilities for support of laser testing, instrumentation and equipment for maintenance of essential existing test capabilities including replacement of uneconomical to repair equipment, improvements to increase test operations efficiency, expansion of existing test capabilities and replacement of outmoded or obsolete instrumentation. Funding will increase to complete the high energy laser test facility, to reduce the backlog of long overdue essential maintenance and repair, and to permit operations without continuing economic restrictions which cannot be sustained.

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.04.A Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Project #DE93 Title White Sands Missile Range

5. Program to Completion: This is a continuing program.

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 78645 | 21039 | 99556 | 99404 | 110778 | Continuing | Not Applicable |

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.58.04.A

Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Project #DE94

Title US Army Electronic Proving Ground

Category Management and Support

Budget Activity #6 - Programwide Management and Support

DETAILED BACKGROUND AND DESCRIPTION: The US Army Electronic Proving Ground, Fort Huachuca, Arizona, is an installation of the US Army Test and Evaluation Command, a subordinate command of the US Army Materiel Development and Readiness Command (DARCOM). The primary mission of the proving ground is to plan, conduct, evaluate and report on and/or support developmental and other tests of Army communications and electronic systems and materiel. Testing support is also provided to the other Military Services. Other major missions include to plan, conduct and report on electromagnetic compatibility and electronic countermeasure test analysis and to operate and maintain three major test facilities: Electromagnetic Environmental Test Facility, Electronic Countermeasure Vulnerability Test Facility, and System Test Facility. The proving ground was established in 1954, and since that time has become involved in the testing of such materiel as airborne surveillance systems, inertial navigation system devices, telephone switchboards, jamming and anti-jamming systems, surveillance sensors, electro-optical devices, tactical transceivers, and radiological survey instruments; and in evaluation of the electromagnetic compatibility of all types of materiel. The naturally quiet electromagnetic environment, the ample real estate and the low annual rainfall of the area together with the special facilities developed over the years make this area ideal and the capability unique within the Department of Defense. The majority of this facility's work is conducted within its laboratories, on the System Test Facility, an outdoor electronic range, and in the Electronic Environmental Test Facility which is specially designed to create the intended electromagnetic environment, including the Army systems and equipment, and to permit analysis of equipment in this operating environment under actual or simulated conditions.

RELATED ACTIVITIES: The Electronic Proving Ground is one of seven installations/activities that are financed by PE 6.58.04.A, Major Research and Development Test and Evaluation Facilities (DARCOM). This project was transferred from PE 6.57.11.A, Major Research and Development, Testing and Evaluation Facilities (FY 1975) to 6.58.04.A, Major Research and Development Test and Evaluation Facilities (DARCOM) in FY 1976. Four of the other projects finance costs at White Sands Missile Range, NM; Yuma Proving Ground, AZ; Dugway Proving Ground, UT; and the Materiel Test Directorate of the US Army. These four, Electronic Proving Ground, and thirteen other Department of Defense (DOD) test and evaluation facilities operate under a uniform DOD funding policy that provides funding for indirect costs of test and evaluation to the facility and which requires test proponents (or users) to pay all direct test costs. The other two projects in this element are the Cold Regions Test Center and Tropic Test Center. These provide funds for direct test costs at these two facilities as well as indirect costs. Assignment and monitoring of projects by Test and Evaluation assure that appropriate coordination takes place with related activities to minimize duplication. Further, the Office of the Deputy Director of Defense Research and Engineering (Test and Evaluation) carefully reviews the management, operation and maintenance of all Department of Defense test facilities and planned testing activities 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.

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.04.A Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Project #DE94 Title US Army Electronic Proving Ground

WORK PERFORMED BY: Testing is performed and supported by military, civil service and contractor personnel. Major contractor effort includes the operation and maintenance of the Electromagnetic Environmental Test Facility (EMETF) (Bell Aerospace Company), and the System Test Facility (Lockheed Electronics Corporation). Contractual effort programmed under this project during FY 1978 totals $1,148,000. Users of the Electronic Proving Ground will also fund $1,380,000 in contractor effort during FY 1978.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishments: Major test programs conducted in FY 1975 and prior years include the Central Office Automatic Telephone, AN/TTC-38; the Direction Finder Set, AN/ARN-89B; the Multiplexer, TD-660A/G; the Gyromagnetic Compass Set, AN/ASN-43; the Forward Area Tactical Teletypewriter Assemblages, AN/GRC-122/-142, AN/MSC-25 and AN/VSC-2/-3; the Tactical Control Facility, AN/TSQ-85; the Joint Services Interior Intrusion Detection System (JSIIDS), and the Radio Set, AN/PRC-77. Major Electromagnetic Environmental Test Facility (EMETF) tests conducted included REMBASS, INTACS Phase II, the Artillery Locating Radar, AN/TPQ-37; PATRIOT (SAM-D), the Long-Range Position Determining System, and the Tactical Radio Communication System. Tests on the System Test Facility (STF) include the US Air Force Drone Program, Project COMBAT ANGEL, and the Grit/Sand Antenna Pattern Measurements. In addition OV-1 photography and imagery support was provided to the Corps of Engineers, and a TEMPEST testing capability was established. Basic test instrumentation improvement and modernization tasks conducted under FY 1975 and prior fiscal year instrumentation procurement programs included Automation of EMETF Data Acquisition/Analysis Capabilities, Automation of Range Data Collection Systems, Establishment of a Crypto-analysis Test Capability, Communications Deception Devices, Satellite Ground Terminal Instrumentation and Automation of the Environmental Data Acquisition and Analysis Instrumentation Systems. All of these tasks provide direct support for Test and Evaluation of Army and other Department of Defense Services communications-electronics equipment and systems. The testing workload accomplished in FY 1976 was 24% higher than that performed in FY 1975. Tests on major projects included the Met Data Sounding System, AN/UMQ-7; the Absolute Altimeter, AN/APN-209; the Landing Control Center, AN/TSQ-71A; the Tactical Landing System; the Joint Service Test and Tactical Wideband Secure Equipment, TSEC: KY-57/-58 KY-67 (BANCROFT); the Tactical Satellite Communications (TACSATCOM) Equipment, MSC-59 and TSC-85; the Platoon Early Warning System (PEWS); the Digital Transmission Application Project; Exploitation Testing of EW equipment; and, the RPV Drone Program. TEMPEST testing was conducted on the KY-67 Secure Voice Device (BANCROFT); Project Assist; AN/GYQ-21; the SHF Satellite Communications Ground Terminal, AN/MSC-59; the Facsimile Equipment/AN/GXC-7 and AN/GXC-7A; the Tactical Narrow Band Secure Voice System, TSEC/KY-65 (PARKHILL). Test support by the System Test Facility was continued on the USAF Drone Program, Project Combat Angel, to the Army Security Agency and testing was conducted on OV-ID componentry. EMETF testing included the INTACS Phase II, support to Johnson Space Center, support to the Satellite Communications Agency, Project SEMI, SINCGARS and support to ECAC. Significant instrumentation procurement actions included a mobile Automatic Data Collection System, Surveillance Test Equipment and Instrumentation, Remote Sensor Test Equipment and Instrumentation, Digital Voice Scoring Instrumentation, and Infrared (IR) Vulnerability Test Instrumentation.

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.04.A Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Project #DE94 Title US Army Electronic Proving Ground

2. FY 1977 Program: Test workload requirements for 1977 are projected to be 15% higher than the FY 1976 performance. Major test projects include the TACFIRE DMD; IFF Modification to CHAPARRAL; STINGER; Radar Warning Receiver, AN/APR-39; Flight Coordination Central, AN/TSC-61; Microwave Landing System; AQUILA Remotely Piloted Vehicle; Ground Surveillance Radar, AN/PPS-15; Single Channel Ground Air Radio Systems (SINCGARS): Telephone Terminal Sets, AN/TTC-61, AN/TTC-69, AN/TTC-72, AN/TTC-65 and AN/TTC-73; the Digital Transmission Application Project; and the Family of Digital General Purpose Multiplexers, Pulse Restorers, and Modems; and components of the TRI-TAC system. Testing support on the System Test Facility, the Electromagnetic Environmental Test Facility (EMETF) and TEMPEST testing on various systems will continue. Major instrumentation procurement actions during this period will provide for improvement and modernization of existing Laser Communications Test Instrumentation, Microwave Signal Distribution System Equipment and Instrumentation and General Purpose Automatic Test Equipment and Instrumentation.

3. FY 1978 Planned Program. The test workload requirements projected for FY 1978 are essentially at the same level as FY 1977. Major test projects include ROLAND; CHAPARRAL; TRI-TAC Componentry; the Remotely Monitored Battlefield Sensor System (REMBASS); the Copperhead System; the Single Channel Ground Air Radio System (SINCGARS) I; TACSATCOM equipment; and the Family of Digital General Purpose Multiplexers, Pulse Restorers and Modems. Testing Support on the System Test Facility, the EMETF, and TEMPEST testing on various systems will continue. Significant test instrumentation improvement and modernization efforts during this period will address such tasks as Infrared Vulnerability Test Equipment and Instrumentation, Antenna Pattern Measurement Equipment, EMETF Test Equipment and Instrumentation and Updating of Radar Data Acquisition Systems.

4. FY 1979 Planned Program: Major test projects include the Advanced Radar Jammer, the SINCGARS II system, the Pulse Form Restorer TD-206/G, the Position Location Reporting System, the Facility Intrusion Detection System, the Remotely Monitored Battlefield Sensor System (REMBASS and TRI-TAC Components). Testing support on the System Test Facility, the EMETF, and TEMPEST testing will continue. During FY 1979, instrumentation improvement and modernization tasks will continue prior fiscal year efforts to modernize, update and automate existing data acquisition and analysis capabilities by replacing obsolete and inefficient equipment and instrumentation and procuring new automated instrumentation required to meet the demands of testing advanced weapon systems.

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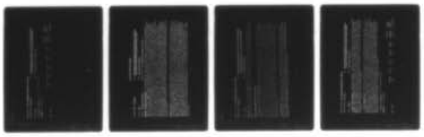

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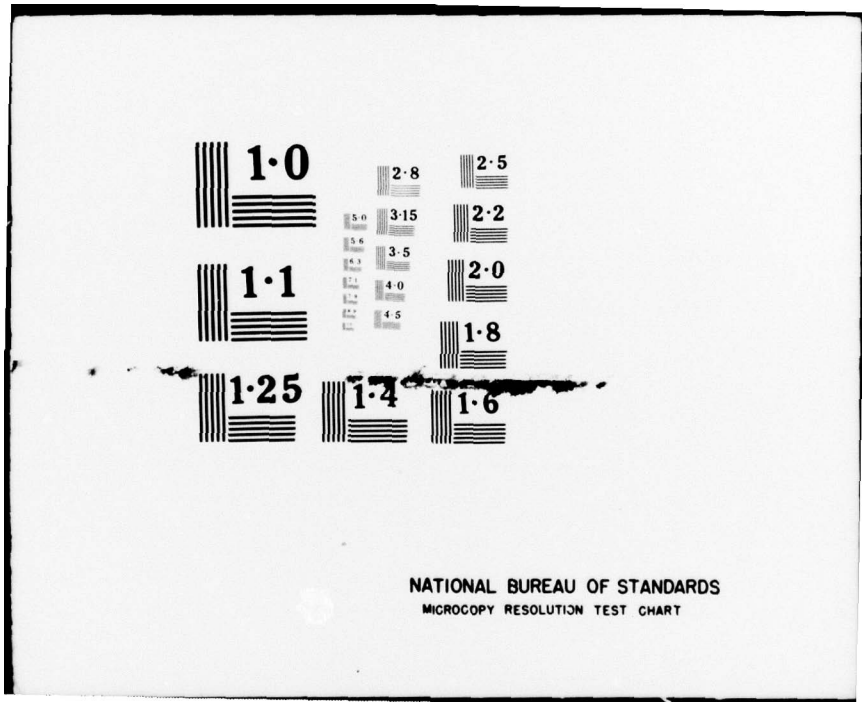
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**Budget Activity** #6 - Programwide Management and Support

**Program Element** #6.58.04.A Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Project #DE94 Title US Army Electronic Proving Ground

5. Program to Completion: This is a continuing program.

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 6208 | 1582 | 6989 | 7045 | 7530 | Continuing | Not Applicable |

FY 1978 RDTE DESCRIPTIVE SUMMARY

Program Element #6.58.04.A

Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Project #DE95

Title Cold Regions Test Center

Category Management and Support

Budget Activity #6 - Programwide Management and Support

DETAILED BACKGROUND AND DISCUSSION: The Cold Regions Test Center, Fort Greely, Alaska, is a cold weather environmental test activity. In 1945, the Department of the Army ordered the organization of the Arctic Test Branch at Big Delta Air Force Base (now known as Fort Greely), Alaska. A cadre for the organization was activated at Fort Knox, Kentucky, by the transfer of personnel from each of the Army Field Force Boards. Test operations were initiated in 1949 and the facility was named Arctic Test Center (ATC), redesignated as the Cold Regions Test Center (CRTC). In 1957, the mission was expanded to include the conduct of arctic service tests of all Army field equipment. In August 1962, as a result of the reorganization of the Army, the Cold Regions Test Center was established as a Class II activity under the US Army Test and Evaluation Command, a major subordinate command of the US Army Materiel Command (AMC), now designated US Army Materiel Development and Readiness Command (DARCOM). The Center lies within the Central Valley and hill area of Alaska between the Brooks Mountain Range on the north and the Alaska Range on the south. Delta Junction, the nearest village to Fort Greely, is approximately 100 miles southeast of Fairbanks, 335 miles northeast of Anchorage and 175 miles south of the Arctic Circle. The CRTC plans, conducts and reports on environmental phases of developmental type tests; and provides support to Department of Defense (DOD), Department of the Army (DA) and DARCOM for Arctic environmental test and evaluation services. The CRTE has been designated as a major test facility within the purview of the DOD Major Range and Test Facility Base (MRTFB). Project DE95, Cold Regions Test Center, provides for the operation and maintenance of the CRTC on a level-of-effort basis to include normal direct costs of conducting environmental type tests of Army materiel items/systems, as well as indirect costs.

RELATED ACTIVITIES: Project DE95, Cold Regions Test Center, is one of seven projects established in FY 1975 that comprise PE 6.57.11.A, Major Test and Evaluations Facilities, DARCOM. In FY 1976, this project was transferred to PE 6.58.04.A, Major Research and Development Test and Evaluation Facilities, DARCOM. The CRTC is one of three environmental test facilities under the US Army Test and Evaluation Command. These are, in addition to CRTC, the US Army Tropic Test Center at Fort Clayton, Canal Zone, and Yuma Proving Ground, AZ, which conducts desert environmental testing. If specifically designed for an extreme environment, developmental items/systems are normally tested first under temperate zone conditions with subsequent testing in the special extreme environments. Prior to testing in the natural environments, most items/systems are subjected to testing in environmental chambers located within the continental United States. Assignment and monitoring of projects by Test and Evaluation Command assures that appropriate coordination takes place with related activities to minimize duplication. Further, the Office of the Deputy Director of Defense Research and Engineering (Test and Evaluation) carefully reviews the management, operation, and maintenance of all Department of Defense test facilities and planned testing activities 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.

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.04.A Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Project #DE95 Title Cold Regions Test Center

WORK PERFORMED BY: The testing and evaluation services prescribed above are performed by assigned DA civilian and military personnel, supplemented by borrowed temporary duty military personnel as required for conduct of specific test projects. The host activity, US Army Forces Command (FORSCOM), provides real estate and utilities and other administrative services on a reimbursable basis.

PROGRAM ACCOMPLISHMENTS AND FUTURE PROGRAMS:

1. FY 197T, FY 1976 and Prior Accomplishment: Some of the major items tested in FY 1975 and prior were: CH47 Helicopter, XM47 DRAGON Guided Missile system, Improved HAWK, 1/2-ton Articulated Cargo Carrier, Emergency Repair Shelter for CH47, M51 Chemical/ Biological Shelter system, Air Transportable Shelter for Extreme Cold Climate, XM124 Demolition Firing Device, Mobile Field Kitchen Trailers, and XM203 40mm Grenade Launcher. Basic instrumentation capabilities established under FY 1975 and prior fiscal year instrumentation procurement programs include a Remote Control Moving Target System for arctic testing of direct fire weapons, a three position Digital Theodolite System for accurate determination of air burst and space position data during testing of ground-fired weapons systems and a Calibration Facility for proving basic accuracy certification of instrumentation used for all arctic test programs. Some of the major items tested during FY 1976 and FY 197T include: Driver's Night Vision Viewer AN/VVS-2, Modular Collective Protection Equipment, Lightweight Camouflage System-Radar Scattering Screen (Snow), Lightweight Company Mortar System, Minefield Marking Set XM133, Night Vision Goggles AN/PVS-5, Grenade Launcher System XM239, Thermoelectric Power Source PP-6075, Insulated Lightweight Boot, Lightweight Overshoe, Demolition Firing Device XM122. Significant instrumentation procurement actions included an Infrared (IR) Temperature Measurement System for precise determination of arctic cold environmental temperature gradients on vehicles, weapons and combat support materiel and additional photographic capabilities for recording all categories of critical test events.

2. FY 1977 Program: Items for test in FY 77 include: Liquid Chemical Agent Detector Paper, Mortar-Locating Radar AN/TPQ-36, Ground Laser Locator-Designator, Platoon Early Warning System, Radar Signal Detector, Mountain Crampons, Personnel Armor System, Night Vision Goggles, Forward Area Alerting Radar, Man-Portable Air Defense System (STINGER), Mountain Ski Boot, Minefield Marking Set XM133. Instrumentation procurement actions provide for improvements to existing test data acquisition systems and to the centralized Range Test Timing System as well as an additional Digital Theodolite System and Snow Strength Measuring Equipment which provides data on the arctic trafficability capabilities of wheeled and tracked vehicles.

Budget Activity #6 - Programwide Management and Support

Program Element #6.58.04.A Title Major Research and Development Test and Evaluation Facilities, US Army Materiel Development and Readiness Command (DARCOM)

Project #DE95 Title Cold Regions Test Center

3. FY 1978 Planned Program: Systems/Items scheduled for testing include: Family of Military Engineering Construction Equipment (FAMECE), Armored Illuminator Searchlight Set AN/VVS-4, Liquid Chemical Agent Detector Paper, Tactical Fire Direction System (TACFIRE), Fail-Safe Fuel Quality Monitor, Tactical Rigid Wall Shelter, Lightweight, Cold-Wet Boot, Mountain Crampons, Slurry Explosive system, Command Post Shelter, Ground Vehicle Mine Dispensing System, Mortar-Locating Radar, Cannon Launched Guided Projectile M712, Ground Laser Locator/Designator. Major test instrumentation improvement and modernization efforts during this period will address rapid data collection and analysis, additional improvement to the Range Test Timing System and modernization and replacement of existing test data acquisition systems.

4. FY 1979 Planned Program: Items/Systems scheduled for testing include: Mechanized Infantry Combat Vehicle (MICV), XM1 Tank System, Electrokinetic Fuel Decontaminator, Screening Rocket 2.75" XM-259, Incendiary 105mm TPA Cartridge XM765, Protective Field Mask with Filter Element, TOW Anti Tank Guided Missile System, SHILLELAGH Missile System, Chemical Agent Detector Kit, 105mm Soft-recoil Howitzer XM204, Regenerative Repeater XM-933, Integrated FM Radio/Wide Band Secure Voice Device KY-67, Tactical Wide Band Secure Equipment KY-57/58 (VINSON), Medium Duty Membrane. During FY 1979, instrumentation improvement and modernization tasks will continue prior fiscal year efforts to modernize, update and automate existing data acquisition and analysis capabilities by replacing obsolete and inefficient equipment and instrumentation and procuring new automated instrumentation required to meet the demands of testing advanced weapons systems. Major instrumentation procurement actions during this period include: Continuation of the Rapid Data Collection and Analysis System, together with TV System, Infrared (IR) Temperature Measurement, photographic and vehicular test instrumentation and equipment.

5. Program to Completion: This is a continuing program.

RESOURCES: ($ in Thousands)

| | FY 1976 | FY 197T | FY 1977 | FY 1978 | FY 1979 | Additional to Completion | Total Estimated Cost |
|---|---|---|---|---|---|---|---|
| RDTE: Funds | 3304 | 710 | 3458 | 3458 | 3650 | Continuing | Not Applicable |