

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

June 2001

BUDGET ACTIVITY
6 - MANAGEMENT SUPPORT

PE NUMBER AND TITLE
0604759A - Major Test & Evaluation Investment

COST (In Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	38089	43616	49897	0	0	0	0	0	0	0
983 MAJOR T&E INVEST-USAKA	7236	8121	7771	0	0	0	0	0	0	0
984 MAJOR TECH TEST INSTR	26303	29007	33817	0	0	0	0	0	0	0
986 MAJ USER TEST INST	4550	6488	8309	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification:

PLEASE NOTE: This administration has not addressed FY2003-2007 requirements. All FY 2003-2007 budget estimates included in this book are notional only and subject to change.

This program funds development and acquisition of major developmental test instrumentation for the U.S. Army Test and Evaluation Command (ATEC) and Developmental Test Command (DTC) test activities: White Sands Missile Range (WSMR), NM; Yuma Proving Ground, (YPG), AZ; Aberdeen Test Center (ATC), MD; Dugway Proving Ground (DPG), UT; Redstone Technical Test Center (RTTC), AL; Aviation Technical Test Center (ATTC), AL; and for the US Army Kwajalein Atoll (USAKA), which is managed by the U.S. Army Space and Missile Defense Command. Program also funds development and acquisition of Operational Test Command (OTC) major field instrumentation. Requirements for instrumentation are identified through a long range survey of project managers, Research Development and Engineering Centers (RDECs), and Battle Laboratories developing future weapon systems and the test programs that require these systems. Army testing facilities are also surveyed to determine major testing capability shortfalls.

FY 2002 funding will continue development of Kwajalein Missile Range Modernization and Remoting (KMAR), Test Support Network (TSN), Range Digital Transmission System (RDTS), Hardened Subminiature Telemetry and Sensor System (HSTSS), Phase II Objective Mobile Infrared Scene Projector (MIRSP), Mobile Automated Instrumentation Suite (MAIS) Pre-Planned Product Improvement (P3I), completes installation of Automotive Communication Network (ACN) instrumentation, and initiates development of Subsystem Test and Evaluation with Virtual Application (STEWVAC), and Versatile Information Systems Integrated Online (VISION).

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<u>B. Program Change Summary</u>	FY 2000	FY 2001	FY 2002	FY 2003
Previous President's Budget (FY2001 PB)	39095	44019	49594	0
Appropriated Value	39380	44019	0	
Adjustments to Appropriated Value	0	0	0	
a. Congressional General Reductions	0	0	0	
b. SBIR/STTR	-1006	0	0	
c. Omnibus or Other Above Threshold Reductions	-155	0	0	
d. Below Threshold Reprogramming	0	0	0	
e. Rescissions	-130	-403	0	
Adjustments to Budget Years Since FY2001 PB	0	0	303	
Current Budget Submit (FY 2002/2003 PB)	38089	43616	49897	0

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BUDGET ACTIVITY 6 - MANAGEMENT SUPPORT				PE NUMBER AND TITLE 0604759A - Major Test & Evaluation Investment				PROJECT 983		
COST (In Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
983 MAJOR T&E INVEST-USAKA	7236	8121	7771	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification: This project funds the purchase of major Improvement and Modernization (I&M) equipment for the US Army Kwajalein Atoll/Kwajalein Missile Range (USAKA/KMR) in the Marshall Islands. USAKA/KMR is a national test range supporting Army, Ballistic Missile Defense Organization (BMDO), US Air Force, National Aeronautics and Space Administration (NASA), and other customers. Program upgrades radars, telemetry, optics, command/control and other equipment required to maintain USAKA as a national test range. The Kwajalein Missile Range (KMR) Modernization and Remoting (KMAR) project which is a concurrent, range-wide modernization effort to maximize the use of common, standardized commercial off-the-shelf (COTS) technology to replace obsolete components; implement common hardware/software architectures and automation; and "remote" the operation of range sensors and instrumentation to the island of Kwajalein. This effort will upgrade range capabilities that are critical to the success of Theater Missile Defense (TMD) and National Missile Defense (NMD) test missions as well as reduce USAKA/KMR annual operating costs by \$18M per year beginning in FY 2003. Army has recouped savings from USAKA PE 0605301A.

FY 2000 Accomplishments

- 7236 Continued KMR Modernization and Remoting (KMAR) - Installed remaining Intermediate Frequency (IF) receiver, digital pulse compression, computer and recording system equipment for ARPA-Lincoln C-Band Observable Radar (ALCOR). ALCOR radar modernization was completed in October 2000. Completed three T3 circuits from Kwajalein to the Kiernan Re-entry Measurement Site (KREMS) radars on Roi-Namur in addition to mission voice circuit upgrades to allow full automation of KREMS radar complex at Roi-Namur as each radar system completes modernization. Relocated Gagan Island 3m antenna to Roi-Namur. Began installation of Millimeter Wave (MMW) modernized radar transmit control, antenna control and radiation monitor interface equipment. Upgraded MMW system shipped to Kwajalein. Completed mission planning workstation and simulation capabilities to allow for automated mission planning. Updated Recording Automatic Digital Optical Tracker (RADOT) optics computers.

Total 7236

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PROJECT
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FY 2001 Planned Program

- 7879 Continue KMR Modernization and Remoting (KMAR) - Complete installation of IF receiver, computer, digital pulse compression and recording equipment for MMW Radar. After validation and verification, MMW radar modernization will be complete on 1 June 2001. Begin installation of ARPA Long Range Tracking and Instrumentation Radar (ALTAIR) modernization transmit control, antenna control, radiation monitor interface subsystems. Construct the KMR Space Surveillance Center addition to the KMR Mission Control Center and install, verify and validate operation of computer and consoles prior to relocating spacetrack operators from Roi-Namur Island to Kwajalein Island. Install three Telemetry (TM) antennas at Roi TM Site and procure four antennas for Kwajalein and Roi. Install one SuperRADOT servo system and procure four additional servo systems. Complete pre-siting development of ALTAIR KMAR systems; initiate on-site installation. Initiate pre-siting development of Target Resolution and Discrimination Experiment (TRADEX) KMAR systems.
 - 242 Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Programs.
- Total 8121

FY 2002 Planned Program

- 5171 Continue KMR Modernization and Remoting (KMAR) - Complete installation of IF receiver, computer, digital pulse compression and recording equipment for ALTAIR Radar. After validation and verification, ALTAIR radar modernization will be complete on 1 May 2002. Complete pre-siting development of TRADEX KMAR systems; begin installation of TRADEX transmit control, antenna control, radiation monitor interface subsystems. Complete installation of four TM antenna systems at Kwajalein TM site.
 - 2100 Common Range Visualization - Prepare for Systems Integration Test (SIT)/family of systems/live-fire tests by creating ground truth situational awareness facilities in the KMR Mission Control Center.
 - 500 Initiate TM recording, processing, and distribution equipment upgrade.
- Total 7771

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BUDGET ACTIVITY 6 - MANAGEMENT SUPPORT			PE NUMBER AND TITLE 0604759A - Major Test & Evaluation Investment					PROJECT 984		
COST (In Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
984 MAJOR TECH TEST INSTR	26303	29007	33817	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification: This project develops and acquires major test instrumentation to perform developmental testing of weapon systems at U. S. Army Test and Evaluation Command (ATEC) Developmental Test Command (DTC) activities which include: Yuma Proving Ground (YPG), AZ; Aberdeen Test Center (ATC), MD; Dugway Proving Ground (DPG), UT; White Sands Missile Range (WSMR), NM; Redstone Technical Test Center (RTTC), AL; and Aviation Technical Test Center (ATTC), AL. Projects are designated as a major program based on their visibility, assessed relative technical risk (medium-high), schedule risk, cost (generally greater than \$1M/yr or \$5M for the total project) and applicability to other mission areas or services. These projects are technically demanding, pushing the state-of-the-art, unique instrumentation assets or suites to meet the technology shortfalls, and generally result from development programs managed by a professional project management team. The Test Support Network (TSN) at WSMR provides complete secure coverage of voice, data and video in a single integrated, transport system. The TSN will provide advanced encryption capabilities and remote control of switching capabilities for test configuration and total network data arrangement control. The Land Combat Instrumentation (LCI) provides for upgrade and expansion for ATC's suite of instrumentation required for performance testing of combat and tactical vehicles, advanced armor, and advanced munitions. The Frequency Surveillance System (FSS) provides remote capabilities to daily operations of radio frequency spectrum surveillance at WSMR in support of all Service and non-DoD agency tests. The Dynamic Infrared Scene Projector (DIRSP) conducts performance testing of night vision sensors and infrared (IR) imaging seekers at RTTC, and will provide the capability to fully simulate and synthesize present and future battlefields with a mix of real and simulated objects. The Hardened Subminiature Telemetry and Sensor System (HSTSS) is developing, miniaturizing, and hardening an instrumentation/telemetry package at YPG that will provide continuous direct measurement of internal functioning and flight data for cannon-launched munitions, smart submunitions, and small missiles/rockets. The Range Digital Transmission System (RDTS) will improve test operations and will reduce test costs allowing for efficient data collection and remote operations at YPG. The Mobile Infrared Scene Projector (MIRSP) project will conduct performance testing of imaging infrared and FLIR sensors while installed on the weapon system under test at ATTC.

FY 2002 funding will continue development of TSN, RDTS, HSTSS, Phase II Objective MIRS, completes installation ACN instrumentation, and initiates development of STEWVAC, and VISION.

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984**FY 2000 Accomplishments**

- 13190 Completed WSMR TSN Phase II installation effort to include fiber optic service extension and additional network/sub-network capability. Completed Phase I and achieved IOC.
- 754 Continued installation of Automotive Communication Network (ACN) instrumentation at the Perryman and Churchville test areas of ATC.
- 381 Completed integration and final system acceptance test of FSS equipment at WSMR.
- 735 Completed Dynamic Infrared Scene Projector (DIRSP) system integration and factory acceptance testing at contractor's facility. Completed site acceptance testing at Redstone Technical Test Center (RTTC).
- 6135 Awarded GPS Sensor Contract for HSTSS. Incorporated HSTSS into Tank Extended Range Munition Kinetic Energy (TERM-KE) tactical configuration. Test flights of HSTSS telemetry for MLRS stockpile reliability were successful.
- 2147 RDT&E initiated installation plan and system engineering for all outside digital fiber optic cable and inside plant electronics for the YPG West Kofa test ranges supporting telecommunications systems.
- 2961 Completed Phase I pathfinder MIRSP system fabrication, integration and testing at RTTC. Completed Phase I installation and testing at ATC. Initiated requirements definition and concept development for Phase II objective MIRSP.

Total 26303

FY 2001 Planned Program

- 16431 Combine WSMR TSN Phase II/III into single TSN build-out phase for extension of fiber optic service to additional WSMR test sites.
- 933 Continue installation of ACN instrumentation at Perryman and Churchville test areas of ATC.
- 4096 Continue development and acceptance testing of HSTSS components. Continue work in TERM-KE and MLRS integration.
- 5068 Continue installation of digital fiber optic cable to support YPG RDT&E Phase I.
- 1388 Continue development and acquisition of Phase II objective MIRSP.
- 185 Final system acceptance test of FSS equipment at WSMR.
- 81 DIRSP system integration and factory acceptance testing at contractor's facility. Finalize site acceptance testing at Redstone Technical Test Center (RTTC).
- 825 Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR) Programs.

Total 29007

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984**FY 2002 Planned Program**

- 13040 Complete Test Support Network (TSN) build-out for fiber optic cable installation. Continue transmission electronics and system integration and testing efforts.
- 11644 Range Data Transmission System (RDTS): Will complete installation of digital fiber optic cable for the West Kofa test ranges. Initiate installation of digital fiber optic cable for the South Cibola and East Kofa test ranges.
- 4379 Hardened Subminiature Telemetry and Sensor System (HSTSS) component deliveries complete, continue prototype system testing.
- 1085 Complete the installation of ACN Instrumentation at the Perryman and Churchville test areas of ATC.
- 1240 Continue the development and acquisition of Phase II objective MIRSP.
- 1029 Initiate development of the high fidelity and low fidelity simulation/test acceptance chambers for the Subsystem Test and Evaluation With Virtual Applications Capabilities (STEWVAC).
- 1400 Initiate test items to data center and database systems development of Versatile Information Systems Integrated Online (VISION) project at ATC.

Total 33817

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COST (In Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
986 MAJ USER TEST INST	4550	6488	8309	0	0	0	0	0	0	0

A. Mission Description and Budget Item Justification: This project supports the development of major field instrumentation for Operational Testing (OT), Force Development Testing and Experimentation (FDTE), and Army Warfighting Experiments (AWE) for the U.S Army Test and Evaluation Command (ATEC) which includes operational test directorates at Fort Hood, TX, Fort Bragg, NC, Fort Sill, OK, Fort Bliss, TX and Fort Huachuca, AZ. Each initiative set forth in this program is directly tied to tactical systems that support each of the five Army Modernization Objectives: Project and Sustain; Protect The Force; Win Information War; Conduct Precision Strikes; and Dominate The Maneuver Battle.

Cornerstone of this effort is the Mobile Automated Instrumentation Suite (MAIS) which provides users a high fidelity, realistic, real-time capability to measure the performance of hardware and personnel under tactical conditions for small and large-scale operations (up to 1,830 players). MAIS is the US Army's only Real Time Casualty Assessment (RTCA) capability and is used to test all current and future U.S. Army weapons and weapon systems in a force-on-force operational environment. This project includes two major thrust areas: MAIS Pre-Planned Product Improvements (P3I) and Instrumentation XXI. Without these capabilities, the Operational Test community will encounter shortcomings in its ability to adequately assess the Interim Brigade Combat Team and Army Transformation developments.

MAIS P3I RDTE develops the instrumentation required, but not funded, under the basic MAIS program. MAIS P3I RDTE develops performance enhancements and technology upgrades to the MAIS Command, Control and Communications (C3) Center, Communications Network, weapons system interfaces, and miniaturization of the vest peripherals, GPS System, and encryption components. These improvements will enable MAIS to measure and record accrued damage, levels of exposure, effects of countermeasures, evasive action, and instrument threat vehicles, while significantly reducing system intrusiveness and increase the safety of current instrumentation for both vehicle and dismounted instrumentation. MAIS P3I provides insertion of enhancements to the RTCA algorithms; simulation of Opposing Force (OPFOR) weapon systems and player units for newly acquired weapon systems; and development of player units for new weapon systems.

These core system enhancements are required as part of the basic program enabling the operational test community to effectively emulate current and future battlefield weapons in a high fidelity environment. Weapon system unique MAIS components are funded by the weapon system program. The Instrumentation XXI thrust area of MAIS develops instrumentation that does not presently exist to monitor, record, stress, and analyze the effects of the digital information battlefield in a realistic operational scenarios.

Instrumentation XXI is required by the operational test community to integrate digital battlefield data collection and analysis tools into the MAIS. These tools will collect, store and analyze data from this new dimension of digital battlefield warfare. Instrumentation XXI ensures Army Transformation communications can be captured and analyzed at various echelons from the tactical vehicle to the command center, in realistic operational scenarios. Additionally, Instrumentation XXI provides MAIS the opportunity to interface the Live component "weapons systems" into the synthetic environment and leverage live tests with simulations. The ability to fully stress the entire battlefield with numerous simulated entities present opportunities for significant cost savings and greater realism than would otherwise be achievable. This effort responds to the current OPTEMPO and PERSTEMPO demands to force the US Army to conduct more realistic, more accurate, and comprehensive evaluations at reduced costs by virtually

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replicating a greater number of troop resources in force-on-force testing and training exercises. Personnel and resources cuts have already been taken in the test community predicated upon data reduction/analysis streamlining provided by this MAIS capability.

During FY 2002, this effort continues the development of MAIS P3I in support of Army Transformation.

FY 2000 Accomplishments

- 4550 Completed the design and development of the MAIS Weapons Performance Module (WPM) and the Micro-programmable Electronics (MPE) initiative. Continued MAIS miniaturization, specifically the design, development, and testing of system algorithms. Initiated studies, implementation concepts, and conducted preliminary testing of a new programmable encryption device mandated by the National Security Agency. Initiated the development of core system algorithms and interfaces for existing and emerging weapon systems. Initiated development of a reconfigurable interface/controller that allows MAIS to use the training community's surrogate weapons. Initiated development of player unit bus architecture for player unit instrumentation kits to improve performance, safety, and eliminate bulky cabling. Initiated C3 Center upgrade and performance improvement studies. Evaluated and prototyped a multi-spectral laser receiver that receives both simulated engagement pairing and tactical laser messages.

Total 4550

FY 2001 Planned Program

- 6319 Complete development of the player unit bus architecture. Continue MAIS P3I core weapon system interface development for existing and emerging weapon systems. Continue development of the MAIS reconfigurable surrogate interface/controller. Continue MAIS miniaturization, specifically design, develop and test system algorithms. Initiate the development of core system algorithms and interfaces for existing and emerging weapon systems to include vest peripherals, GPS System and encryption components. Continue development of a reconfigurable interface/controller that allows MAIS to use the training community's surrogate weapons. Initiate development of the MAIS Weapons Performance Module upgrade. Initiate After Action Review, Test Officer's Training Station, Combat Identification for Dismounted Soldiers (CIDDS) and the Land Warrior Interface. Implement development of the Weapon System Software Compatibility Upgrade. Initiate design and development of the MAIS P3I Wearable Computer. Implement C3 Center upgrade and performance improvements. Implement new encryption device in conjunction with MPE.
- 169 Small Business Innovation Research (SBIR)/Small Business Technology Transfer (STTR) Programs.

Total 6488

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986**FY 2002 Planned Program**

- 8309 Complete C3 Center upgrade. Complete Combat Identification for Dismounted Soldiers (CIDDS), the Land Warrior Interface and new Micro-Programmable Electronic (MPE) encryption device. Initiate development of Multi-Frequency and See-Through Obscurants. Initiate development of Pairing Improvements, specifically the development and testing of system algorithms. Implement development of Artillery Fire Support Interface to incorporate Area Weapons Effects (AWE). Initiate the design and development of Threat Interfaces, to emulate threat weapons systems. Continue development of MAIS P3I core weapons system interface and the MAIS reconfigurable surrogate interface/controller. Continue MAIS miniaturization. Continue the development of core system algorithms and interfaces for existing and emerging weapons systems to include vest peripherals, GPS System, and encryption components. Continue development of a reconfigurable interface/controller, which allows use of the training community's surrogate weapons. Continue development of the After Action Review and Test Officer's Training Station. Continue development of the Weapon System Software Compatibility Upgrade and the design and development of MAIS P3I Wearable Computer.

Total 8309