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

February 2002

BUDGET ACTIVITY	PE NUMBER AND TITLE
6 - Management support	**0604759A - Major T&E Investment**

COST (In Thousands)		FY 2001 Actual	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		42380	49482	53797	63845	68720	71895	67467	Continuing	Continuing
983	MAJOR T&E INVEST-USAKA	7879	7706	8459	14372	9960	7467	8196	Continuing	Continuing
984	MAJOR TECH TEST INSTR	28182	33535	37372	37563	41550	41674	37828	Continuing	Continuing
986	MAJ USER TEST INST	6319	8241	7966	11910	17210	22754	21443	Continuing	Continuing

A. Mission Description and Budget Item Justification: 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. This program line supports the Legacy to Objective transition path of the Transformation Campaign Plan (TCP).

B. Program Change Summary	FY 2001	FY 2002	FY 2003
Previous President's Budget (FY2001 PB)	43616	49897	56277
Appropriated Value	44019	49897	0
Adjustments to Appropriated Value	0	0	0
a. Congressional General Reductions	0	-415	0
b. SBIR/STTR	-1236	0	0
c. Omnibus or Other Above Threshold Reductions	0	0	0
d. Below Threshold Reprogramming	0	0	0
e. Rescissions	-403	0	0
Adjustments to Budget Years Since FY2001 PB	0	0	-2480
Current Budget Submit (FY 2003 PB)	42380	49482	53797

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6 - Management support	**0604759A - Major T&E Investment**	**983**

COST (In Thousands)		FY 2001 Actual	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	7879	7706	8459	14372	9960	7467	8196	Continuing	Continuing

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/Ronald Reagan Ballistic Missile Defense Test Site (USAKA/RTS) located in the Marshall Islands. USAKA/RTS is a national test range supporting Army, Missile Defense Agency (MDA, formerly 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 RTS as a national test range. These upgrades are critical to the success of Theater Missile Defense (TMD) and Ground-based Mid-course Missile Defense (GMD) test missions.

The Kwajalein 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 significantly reduce USAKA/RTS annual operating costs beginning in FY 2003.

FY 2001 Accomplishments:

- 7879 Continued Kwajalein Modernization and Remoting (KMAR) - Completed installation of IF receiver, computer, digital pulse compression and recording equipment for Millimeter Wave (MMW) Radar. Began installation of ARPA Long Range Tracking and Instrumentation Radar (ALTAIR) modernization transmit control, antenna control, radiation monitor interface subsystems. Constructed the Kwajalein Mission Control Center and installed, verified and validated operation of computer and consoles. Procured and installed three telemetry (TM) antennas for the Roi TM Site and procured an additional antenna for Kwajalein. Installed one Super RADOT servo system and procured four additional servo systems. Completed pre-siting development of ALTAIR KMAR systems and initiated on-site installation. Initiated pre-siting development of Target Resolution and Discrimination Experiment (TRADEX) KMAR systems.

Total 7879

FY 2002 Planned Program

•	7706	Continue Kwajalein 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, and radiation monitor interface subsystems. Complete installation of four TM antenna systems at Kwajalein TM site. Complete installation of remaining four Super RADOT servo systems.
Total	7706	

FY 2003 Planned Program

•	2675	Continue Kwajalein Modernization and Remoting (KMAR) - Complete installation of IF receiver, computer, digital pulse compression and recording equipment for TRADEX Radar. After validation and verification, TRADEX radar modernization will be complete on 1 January 2003.
•	1670	Outside Cable Plant Restoration - All pressurized, lead-sheathed backbone and distribution cable will be replaced with copper cable. This upgrade will provide adequate mission and administrative communications support for RTS technical instrumentation and its supporting/supported organizations and customers.
•	1570	Purchase and install TM recording, processing and distribution equipment.
•	2000	Initiate upgrade to Kwajalein Mission Control Center (KMCC) for compatibility with upgraded KMAR sensors.
•	544	Continue Range Safety Center upgrade to support Multiple Simultaneous Engagements (MSE). Effort previously funded under USAKA PE 0605301A.
Total	8459	

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
6 - Management support	**0604759A - Major T&E Investment**	**984**

COST (In Thousands)		FY 2001 Actual	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	28182	33535	37372	37563	41550	41674	37828	Continuing	Continuing

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 Automotive Test Command's (ATC) 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 2001 Accomplishments:

- 18870 Combined WSMR TSN Phase II/III into single TSN build-out phase for extension of fiber optic service to additional WSMR test sites.
- 829 Continued LCI installation of ACN instrumentation at Perryman and Churchville test areas of ATC.
- 2242 Continued development and acceptance testing of HSTSS components. Continued work in TERM-KE and MLRS integration.
- 4626 Continued installation of digital fiber optic cable to support YPG RDTS Phase I.

FY 2001 Accomplishments: (Continued)

- 1312 Continued development and acquisition of Phase II objective MIRSP.
- 172 Conducted final system acceptance test of FSS equipment at WSMR.
- 131 Conducted DIRSP system integration and factory acceptance testing at contractor's facility. Finalized site acceptance testing at Redstone Technical Test Center (RTTC).

Total 28182

FY 2002 Planned Program

- 12931 Complete Test Support Network (TSN) build-out for fiber optic cable installation. Continue transmission electronics and system integration and testing efforts.
- 11547 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.
- 4342 Hardened Subminiature Telemetry and Sensor System (HSTSS) component deliveries complete, continue prototype system testing.
- 1076 Complete LCI installation of ACN Instrumentation at the Perryman and Churchville test areas of ATC.
- 1230 Continue the development and acquisition of Phase II objective MIRSP.
- 1020 Initiate development of the high fidelity and low fidelity simulation/test acceptance chambers for the Advanced Multi-Spectral Sensor Subsystem Test Capability (AMSSTC).
- 1389 Initiate test items to data center and database systems development of Versatile Information Systems Integrated Online (VISION) project at ATC.

Total 33535

FY 2003 Planned Program

•	14552	Continue RDTS installation of digital fiber optic cable in support of the South Cibola and East Kofa test ranges.
•	1513	Complete TSN transmission electronics, system integration and testing efforts.
•	5766	Initiate development of Hardened Subminiature Telemetry and Sensor System (HSTSS) embedded instrumentation for a single round for use in both testing and training arenas.
•	5157	Advanced Multi-Spectral Sensor Subsystem Capabilities (AMMSTC) - Complete acquisition of test chamber flight motion simulators. Procure long-lead instrumentation for the Multi-Spectral Simulation Test Acceptance Facility (MS-STAF).
•	6323	Continue development of test items and database for Versatile Information Systems Integrated Online (VISION).
•	102	21st Century Target Control System: Acquisition and integration of DoD-standard multi-service target control system at White Sands Missile Range
•	1605	C41/Test Instrumentation Control Center (TCC) II: Enhancement and expansion of the functions of the Test Instrumentation Control Center (TCC) to test the Digitized Army and its suite of Army Technical Architecture (ATA)-compliant C4I systems
•	642	Quantitative Visualization for Test and Evaluation: Development of new a capability for real-time and quantitatively precise visualization of all test data, simulated and real, for use by testers and program managers
•	1712	MIRSP Objective: Completion of verification, validation, accreditation and fielding of the prototype mobile system to project accurate, dynamic, realistic infrared scenes for evaluation of imaging infrared seekers, night sights, and trackers on aviation and ground vehicles

Total 37372

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986 MAJ USER TEST INST	6319	8241	7966	11910	17210	22754	21443	Continuing	Continuing

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 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

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.

FY 2001 Accomplishments:

- 6319 Completed development of the player unit bus architecture. Continued MAIS P3I core weapon system interface development for existing and emerging weapon systems. Continued development of the MAIS reconfigurable surrogate interface/controller. Continued MAIS miniaturization, specifically designed, developed and tested system algorithms. Initiated the development, under Instrumentation XXI, of core system algorithms and interfaces for existing and emerging weapon systems to include Air Defense Artillery and aviation fly-out models, player unit peripherals, GPS system, and communication/encryption components. Continued development of a reconfigurable interface/controller that allows MAIS to use the training community's surrogate weapons. Initiated study of interface MAIS into the MOUT environment.

Total 6319

FY 2002 Planned Program

- 8241 Complete development of Micro-Programmable Electronics (MPE) miniaturization and communications/encryption devices. Continue development of MAIS interface into the MOUT environment. Continue development of MAIS P3I core weapons system interface and the MAIS reconfigurable surrogate interface/controller. Continue the development, under Instrumentation XXI, of core system algorithms and interfaces for existing and emerging weapons systems to include Air Defense Artillery and aviation fly-out models, player unit peripherals, GPS system, and communication/encryption components. Continue development of a reconfigurable interface/controller, which allows use of the training community's surrogate weapons. Initiate development of Pairing Improvements, specifically the development and testing of system algorithms. Initiate development of MAIS/Land Warrior interface.

Total 8241

FY 2003 Planned Program

•	7966	Continue development of MAIS interface into the MOUT environment. Continue development of MAIS P3I core weapons systems interface and the MAIS reconfigurable surrogate interface/controller. Under Instrumentation XXI, complete the development of core system algorithms and interfaces for existing and emerging weapons systems to include Air Defense Artillery and aviation fly-out models, player unit peripherals, GPS system, and communication/encryption components. Continue development of a reconfigurable interface/controller, which allows use of the training community's surrogate weapons. Continue development of Pairing Improvements. Continue development of MAIS/Land Warrior interface.

Total 7966