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

June 2001

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
6 - MANAGEMENT SUPPORT	**0605602A - Army Technical Test Instrumentation & Targets**	**628**

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
628 TEST TECH & SUST INSTR	32943	36915	34259	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 provides critical front-end investments for development of new test methodologies, test standards, advanced test technology concepts for long range requirements, future test capabilities, and advanced instrumentation prototypes for the United States Army Developmental Test Command (DTC), which includes: Aberdeen Test Center (ATC), Aberdeen Proving Ground, Maryland; White Sands Missile Range (WSMR), New Mexico (including the Electronic Proving Ground (EPG), Fort Huachuca, Arizona); Yuma Proving Ground (YPG), Arizona (including the Cold Regions Test Center (CRTC), Fort Greely, Alaska); Aviation Technical Test Center (ATTC), Fort Rucker, Alabama; Redstone Technical Test Center (RTTC), Redstone Arsenal, Alabama; and Dugway Proving Ground (DPG), Utah. These capabilities support the development and fielding cycle of the Army Transformation as well as Joint Vision 2020 initiatives. Within this program, a major initiative called Virtual Proving Ground (VPG) is directed towards integrating Modeling, Simulation, and Internetting technologies into the test and evaluation process to support acquisition streamlining and to offset prior manpower and budget reductions. The Virtual Proving Ground will significantly improve the ability of the Army to provide early influence on system design, reduce test costs and time, and extend the envelope of information to reduce risk and acquisition costs. This initiative is critical to achieving long-term efficiencies within the acquisition process by conforming to the Simulation and Modeling for Acquisition, Requirements, and Training (SMART) and Simulation Based Acquisition (SBA) processes. Sustaining instrumentation maintains existing testing capabilities at DTC test facilities by replacing unreliable, uneconomical and irreparable instrumentation, as well as incremental upgrades of instrumentation and software, to assure adequate test data collection capabilities. This data supports acquisition milestone decisions for projects such as Interim Armored Vehicle (IAV), Future Combat System (FCS), Theater High Altitude Area Defense (THAAD), Comanche, Patriot Advanced Capability Phase 3 (PAC 3), High Mobility Artillery Rocket System (HIMARS), M1A2 Main Battle Tank, Joint Service Lightweight Integrated Suit Technology (JSLIST), Army Battle Command System (ABCS), Force XXI Battle Command Brigade and Below (FBCB2) and Land Warrior. This Program Element develops and sustains developmental test capabilities that provide key support to the Army's Transformation Campaign Plan (TCP).

FY 2000 Accomplishments

FY 2000 Accomplishments (Continued)

- 11330 CONTINUED SUPPORT OF VIRTUAL PROVING GROUND (VPG):Developed and integrated a DTC-wide High Level Architecture (HLA) compliant architecture to integrate internal and external models, software algorithms, databases and synthetic environments. Continued funding of the cooperative Technology Program Annexes (TPA) with the Army Research Lab to support development and integration of fire control and ground vehicle simulations. Completed development of a bridge-crossing simulator to perform bridge performance and endurance testing by simulating heavy vehicle crossings. Continued development of a physics-based helicopter simulation for Comanche to conduct test and evaluation of the potential flight hazards associated with integration of new components into the aircraft. Initiated development of a standardization process to integrate various software components (synthetic environments, databases, data repositories, models, and interfaces) to support virtual testing. Developed a system to merge telemetry, optics, radar, Global Positioning Systems (GPS), and Time-Space-Position Information (TSPI) data to support mission analysis of large missile and air defense system test data. Initiated development of an architecture to rehost existing C4I legacy test tools to support Army testing and training requirements. Initiated development of a test control simulation tool which integrates actual field instrumentation data with existing simulations and models to conduct test range management, test setup, simulation model validation and test result validation. Initiated development of validated model to replicate a chemical/biological point detection system. Developed databases and models and simulations supporting virtual testing of weapons systems, drive hardware-in-the-loop simulators, and provide range efficiencies and enhanced range safety. Developed 2-D visible and IR scenes to drive the scene projectors and signal injection interfaces in the Electro-Optics Target Acquisition,
  Electro-Optics Sensor Flight Evaluation and IR Simulation Test Acceptance test facilities. Procured computer hardware and software to conduct virtual testing.
- 15805 INITIATED/CONTINUED DEVELOPMENT, ACQUISITION AND SUSTAINMENT OF CRITICAL TEST INSTRUMENTATION AND EQUIPMENT. Completed upgrade of the real-time x-ray system, acquisition of airborne recorder interface units, upgrade of a suite of optical tracking instrumentation with high-resolution video cameras and development of software that predicts missile debris dispersion and analyzes the impact to commercial aircraft traversing the range. Corrected tornado damage to Redstone Technical Test Center electromagnetic radiation effects and lightning suite, laser target scoring system, gun chamber/gun pointing measurement system, aircraft icing spray system, and six degree of freedom missile motion simulator. Initiated acquisition of robotic chemical agent application system, airdrop test instrumentation, data collection and analysis instrumentation and data transmission equipment for extreme cold environments. Continued integration of instrumentation across autonomous vehicle control and test range traffic monitoring systems, acquisition of computer workstations for data processing and analysis, development of enhanced DT/OT on-board vehicle instrumentation, development of vehicle endurance/performance test data analyzers and development of a remote arming and detonating capability to support live fire vulnerability testing. Continued acquisition of electromagnetic radiation effects power amplifiers, fiber optic network links, digital data recorders, laser tracker, C4I instrumentation platform, target control software, range control instrumentation, range radios and radar upgrades. Initiated development of a high speed/high capacity wireless data communication network for C4I testing, development of an acoustic soldier-system instrumentation suite, laser target scoring system, gun chamber/gun pointing measurement system, aircraft icing spray system, and six degree of freedom missile motion simulator.
  Continued integration of instrumentation across test sites for centralized monitoring and control.

FY 2000 Accomplishments (Continued)

- 700 PROTOTYPE INSTRUMENTATION AND ADVANCED CONCEPTS. Provided quick reaction capability to respond to emergency requirements. Provided support for technical committees forging future instrumentation technology developments. Continued to develop Test Operations Procedures (TOPs) and International Test Operations Procedures (ITOPs) to ensure quality and consistency of test results throughout the Army and for international cooperative applications.
- 5108 HQ DTC/ATEC: Provided management support for VPG across the command. Conducted strategic planning and developed roadmaps to guide current and future programs. Provided command-level oversight and management support for the DTC and ATEC instrumentation programs. Technical support included requirements development, project prioritization, and execution of investment accounts for Small Business Innovative Research, Production Base Support, Army Test Technology and Sustaining Instrumentation, Major Test and Evaluation Investment, and the Central Test and Evaluation Investment Program. Provided management and support costs for direct interface with the T&E Executive Agent, management of needs and solutions calls for T&E Reliance oversight, and support to the Army principal of the Test Resources Advisory Group (TRAG). Provided administrative support for Local Area Network and TECNET, contracts, patents, symposia and conferences, exhibits and printing. Continued funding support to the Joint Program Office (JPO) as the Tri-Service Executive Agent for Test and Evaluation.

Total 32943

FY 2001 Planned Program

- 10987 CONTINUE SUPPORT OF VIRTUAL PROVING GROUND (VPG): Complete development of the physics-based helicopter simulation for Comanche to conduct T&E of the potential flight hazards associated with integration of new components into the aircraft. Complete development of 2-D visible and IR scenes to drive the scene projectors and signal injection interfaces in the Electro-Optics Target Acquisition, Electro-Optics Sensor Flight Evaluation and IR Simulation Test Acceptance test facilities. Complete acquisition and integration of computer workstations and software to conduct virtual testing. Initiate DTC-wide integration of terrain features, characteristics and functionality into system level models and simulations. Initiate DTC-wide integration of databases and common synthetic environment signatures into system level models and simulation. Initiate development of a simulation model to accurately measure shock and vibration characteristics of ammunition stored on-board howitzers. Continue development and integration of a DTC-wide HLA compliant architecture to integrate internal and external models, software algorithms, databases and synthetic environments. Continue funding of the cooperative Technology Program Annexes (TPA) with the Army Research Lab to support development and integration of fire control and ground vehicle simulations. Continue development of a standardization process to integrate various software components (synthetic environments, databases, data repositories, models, and interfaces) to support virtual testing. Continue development of system to merge telemetry, optics, radar, GPS, and TSPI data to support mission analysis of large missile and air defense system test data. Continue development of an architecture to rehost existing C4I legacy test tools to support Army testing and training requirements. Continue development of a test control simulation tool which integrates actual field instrumentation data with existing simulations and models to
conduct test range management, test setup, simulation model validation and test result validation. Continue development of validated model to replicate a chemical/biological point detection system.

FY 2001 Planned Program (Continued)

- 19619 INITIATE/CONTINUE DEVELOPMENT, ACQUISITION AND SUSTAINMENT OF CRITICAL TEST INSTRUMENTATION AND EQUIPMENT. Complete integration of a robotic agent application system into two existing test fixtures that support chemical testing on protective clothing fabrics. Complete acquisition of data loggers, radios, modems and sensor test equipment for extreme cold environment testing. Complete conversion of an optical tracker system to single station laser tracker. Complete development of instrumentation platform to remotely collect, analyze, transmit and log C4I message traffic. Continue development of the high speed/high capacity wireless data communication network to support data collection, analysis and reduction of C4I test data. Complete software upgrade of the Drone Formation Control System autopilot, control, navigation and guidance systems. Complete upgrade of the MPS-36 radars to control other down range instrumentation (such as Kineto Tracking Mounts and other short-range radars) near the impact point for artillery and smart munitions testing. Congressional Plus-up received to fund the Advanced Comprehensive Engineering Simulator (ACES) which upgrades the missile debris dispersion and analysis software. Initiate acquisition of aircraft high-speed digital camera, airborne video recorders, video cameras, telemetry link, signal

  conditioning equipment, ground control data processing equipment; replacement of obsolete chemical equipment used to conduct safety air monitoring, hazardous waste characterization, and sample analysis; and acquisition of test control and upgrade of portable Weibel tracking radars. Replace obsolete micro-organism fermentor/containment chamber. Acquire smoke density detectors for the fire extinguisher testing, aircraft icing instrumentation, analysis workstations at missile launch complexes and rocket motor digital real-time imaging system. Develop a prototype air-to-air munitions scoring system that supports helicopter turreted gun accuracy testing. Continue development of a high speed/high capacity wireless data communication network for C4I testing, development of an acoustic soldier-system instrumentation suite, laser target scoring system, gun chamber/gun pointing measurement system, aircraft icing spray system, and six degree of freedom missile motion simulator and airdrop test instrumentation. Continue integration of instrumentation across test sites for centralized monitoring and control, development of autonomous vehicle control and test range traffic monitoring systems,acquisition of computer workstations for data processing and analysis,

  development of enhanced DT/OT on-board vehicle instrumentation, development of vehicle endurance/performance test data analyzers and development of a remote arming and detonating capability to support live fire vulnerability testing. Continue acquisition of electromagnetic radiation effects power amplifiers, fiber optic network links, digital data recorders, laser tracker, C4I instrumentation platform, target control software, range control instrumentation and range radios.
- 1353 PROTOTYPE INSTRUMENTATION AND ADVANCED CONCEPTS. Provide quick reaction capability to respond to emergency requirements. Provide support for technical committees forging future instrumentation technology developments. Conduct methodology studies to improve test processes and determine future test capability requirements. Continue to develop TOPs and ITOPs to ensure quality and consistency of test results throughout Army and for international cooperative applications.

FY 2001 Planned Program (Continued)

- 3938 HQ DTC/ATEC: Provide management support for VPG across the command. Conduct strategic planning and develop roadmaps to guide current and future programs. Provide command-level oversight and management support for the DTC instrumentation program. Technical support includes requirements development, project prioritization, and execution of investment accounts for Small Business Innovative Research, Production Base Support, Army Test Technology and Sustaining Instrumentation, Major Test and Evaluation Investment, and the Central Test and Evaluation Investment Program. Provide management and support costs for direct interface with the T&E Executive Agent, management of needs and solutions calls for T&E Reliance oversight, and support to the Army principal of the TRAG. Provide administrative support for the Local Area Network, contracts, patents, symposia and conferences, exhibits and printing. Continue funding support to the JPO for Test and Evaluation as the tri-service Executive Agent for Test and Evaluation.

- 1018 Small Business Innovative Research/Small Business Technology Transfer Programs

Total 36915

FY 2002 Planned Program

- 10967 CONTINUE SUPPORT OF VIRTUAL PROVING GROUND (VPG): Complete development of a test control simulation tool which integrates actual field instrumentation data with existing simulations and models to conduct test range management, test setup, simulation model validation and test result validation. Develop DTC-wide requirements for visualization tools to collect and portray real-time simulations as well as support after action reviews. Initiate development of a general physics-based helicopter simulation to conduct test and evaluation of the potential flight hazards associated with integration of new components into the aircraft. Initiate development of a validated model to replicate remote detection systems. Initiate development of a range operations and control capability for integrated testing. Continue development and integration of a DTC-wide HLA compliant architecture to integrate internal and external models, software algorithms, databases and synthetic environments. Continue funding of the cooperative Technology Program Annexes (TPA) with the Army Research Lab to support development and integration of fire control and ground vehicle simulations. Continue development of a standardization process to integrate various software components (synthetic environments, databases, data repositories, models, and interfaces) to support virtual testing. Continue development of a system to merge telemetry, optics, radar, GPS, and TSPI data to support mission analysis of large missile and air defense system test data. Continue development of an architecture to rehost existing C4I legacy test tools to support Army testing and training requirements. Continue development of a validated model to replicate a chemical/biological point detection system. Continue DTC-wide integration of terrain features, characteristics and functionality into system level models and simulations. Continue DTC-wide integration of databases and synthetic environment signatures into
system level models and simulation. Continue development of a simulation model to accurately measure shock and vibration characteristics of ammunition stored on-board howitzers.
- 17471 INITIATE/CONTINUE DEVELOPMENT, ACQUISITION AND SUSTAINMENT OF CRITICAL TEST INSTRUMENTATION AND EQUIPMENT.

FY 2002 Planned Program (Continued)

Complete upgrade of the helicopter icing spray system to ensure that the spray level characteristics are identical to natural clouds. Complete development of a remote arming and detonating capability to support live fire vulnerability testing. Complete development of a six degree of freedom motion simulator to perform non-destructive missile testing. Complete acquisition of range control instrumentation. Initiate acquisition of chemical/biological data collection workstations; environmental simulation equipment for missile testing; a digital microwave communications system and network routers, switches, direct current power systems, and rectifiers to support range telecommunications and interface hardware and software between instrumentation systems and data transport systems. Initiate development of an optical data measurement system to analyze missile flight position data. Procure a six-degree of freedom control system that is capable of performing close loop vibration control testing for missiles. Upgrade existing video instrumentation control systems with improved data display, data logging, high-speed interface equipment and software to support multi-target missile testing. Acquire electro-mechanical components and antennas to replace obsolete equipment at the electromagnetic radiation effects test range. Acquire semiconductor test laboratory test equipment to support semiconductor testing. Continue acquisition of aircraft high-speed digital camera, airborne video recorders, video cameras, telemetry link, signal conditioning equipment, ground control data processing equipment; replacement of obsolete chemical equipment used to conduct safety air monitoring, hazardous waste characterization, and sample analysis; and upgrade of portable Weibel tracking radars. Continue development of a high speed/high capacity wireless data communication network for C4I testing, development of an acoustic soldier-system instrumentation suite, laser target scoring
system and gun chamber/gun pointing measurement system. Continue integration of instrumentation across test sites for centralized monitoring and control, development of autonomous vehicle control and test range traffic monitoring systems, acquisition of computer workstations for data processing and analysis, development of enhanced DT/OT on-board vehicle instrumentation and development of vehicle endurance/performance test data. Continue acquisition of electromagnetic radiation effects power amplifiers.

- 685 PROTOTYPE INSTRUMENTATION AND ADVANCED CONCEPTS. Provide quick reaction capability to respond to emergency requirements. Provide support for technical committees forging future instrumentation technology developments. Continue to develop TOPs and ITOPs to ensure quality and consistency of test results throughout Army and for international cooperative applications.
- 5136 HQ DTC/ATEC: Provide management support for VPG across the command. Conduct strategic planning and develop roadmaps to guide current and future programs. Provide command-level oversight and management support for the DTC instrumentation program. Technical support includes requirements development, project prioritization, and execution of investment accounts for Small Business Innovative Research, Production Base Support, Army Test Technology and Sustaining Instrumentation, Major Test and Evaluation Investment, and the Central Test and Evaluation Investment Program. Provide management and support costs for direct interface with the T&E Executive Agent, management of needs and solutions calls for T&E Reliance oversight, and support to the Army principal of the TRAG. Provide support for the Local Area Network, contracts, patents, symposia and conferences, exhibits and printing. Continue funding support to the JPO for Test and Evaluation under the tri-service Executive Agent for Test and Evaluation.

Total 34259

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June 2001

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6 - MANAGEMENT SUPPORT	**0605602A - Army Technical Test Instrumentation & Targets**	**628**

B. Program Change Summary	FY 2000	FY 2001	FY 2002	FY 2003
Previous President's Budget (FY2001 PB)	31439	33156	34678	0
Appropriated Value	31670	37256	0	0
Adjustments to Appropriated Value	0	0	0	0
a. Congressional General Reductions	0	0	0	0
b. SBIR/STTR	-769	0	0	0
c. Omnibus or Other Above Threshold Reduction	-118	0	0	0
d. Below Threshold Reprogramming	2273	0	0	0
e. Rescissions	-113	-341	0	0
Adjustments to Budget Years Since FY2001 PB	0	0	-419	0
Current Budget Submit (FY 2002/2003 PB)	32943	36915	34259	0