ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

February 2004

BUDGET ACTIVITY	PE NUMBER AND TITLE
6 - Management support	**0605602A - Army Technical Test Instrumentation and Targets**

COST (In Thousands)		FY 2003 Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
Total Program Element (PE) Cost		41774	56899	52433	55586	73787	77190	81026
628	TEST TECH & SUST INSTR	32682	47223	39633	41288	47870	50117	52623
62B	OPERATIONAL TESTING INSTRUMENTATION DEVELOPMENT	6415	7295	7132	7853	11098	11615	12208
62C	MODELING AND SIMULATION INSTRUMENTATION	2677	2381	5668	6445	14819	15458	16195

A. Mission Description and Budget Item Justification: Increased funding provides sustainment and improvements to the Army's test infrastructure reflecting an Army leadership decision supporting Congressional and OSD interest in implementing the Defense Science Board (DSB) recommendations to increase developmental test funding. The DSB report indicated that testing is not being adequately conducted, resulting in latent defects that can be very costly and impact system's operational effectiveness and that the acquisition process is not delivering high quality, reliable and effective equipment to our military forces. Limited T&E instrumentation investments are a major contributor to the lack of testing and the problems described in the DSB report.

This Program Element 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 and the Tropical Regions Test Center, Hawaii); 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 all commodity areas throughout the Army including programs such as Stryker Armored Vehicle (SAV), 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), Javelin Missile System, Family of Medium Tactical Vehicles, 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). This Program Element also includes funds transferred from the Army Test and Evaluation Command's (ATEC) Operational Testing Instrumentation line, 0605712A/987, to provide greater visibility of modeling and simulation efforts as well as to support development and sustainment of operational test assets at Airborne Special Operations Test Directorate, Fort Bragg, North Carolina; Air Defense Artillery Test Directorate, Fort Bliss, Texas; Fire Support Test Directorate, Fort Sill, Oklahoma; Intelligence Electronic Warfare Test Directorate, Fort Huachuca, Arizona; and Test and Evaluation Support Agency, Fort Hood, Texas. The development and sustainment of ATEC's Simulation Testing Operations Rehearsal Model (STORM) is also included. Systems that will benefit from this effort are Army Tactical Command and Control System (ATCCS), Battlefield Functional Area (BFA), Advanced Field Artillery Tactical Data System Service Support Control System (AFATDS), Maneuver Control System (MCS), Forward Area Air Defense Command Control and Intelligence (FAADC2I), All Source Analysis System (ASAS), and Combat Service Support Control System (CSSCS).

B. Program Change Summary	FY 2003	FY 2004	FY 2005
Previous President's Budget (FY 2004)	41052	54986	60018
Current Budget (FY 2005 PB)	41774	56899	52433
Total Adjustments	722	1913	-7585
Congressional program reductions		-500	
Congressional rescissions			
Congressional increases		3800	
Reprogrammings	722	-1387	
SBIR/STTR Transfer			
Adjustments to Budget Years			-7585

Change Summary Explanation
FY05: Funds realigned ($7585) to higher priority requirements.

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February 2004

BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
6 - Management support	**0605602A - Army Technical Test Instrumentation and Targets**	**628**

COST (In Thousands)		FY 2003 Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
628	TEST TECH & SUST INSTR	32682	47223	39633	41288	47870	50117	52623

A. Mission Description and Budget Item Justification: 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), a subordinate command of the Army Test and Evaluation Command (ATEC), which includes: Aberdeen Test Center (ATC), Aberdeen Proving Ground, Maryland; White Sands Missile Range (WSMR), New Mexico; Electronic Proving Ground (EPG), Fort Huachuca, Arizona; Yuma Proving Ground (YPG), Arizona (including the Cold Regions Test Center (CRTC), Fort Greely, Alaska and the Tropic Regions Test Center, Hawaii); Aviation Technical Test Center (ATTC), Fort Rucker, Alabama; Redstone Technical Test Center (RTTC), Redstone Arsenal, Alabama; and Dugway Proving Ground (DPG), Utah. These capabilities are required to support the development and fielding cycle of the Army Transformation from the Current Force to the Future Force as well as Joint Vision 2020 initiatives.

Under funding of instrumentation sustainment and improvements at Army Developmental Test Ranges has contributed to a less efficient and capable technical test infrastructure. Increased funding, starting in FY 2004, provides substantial, long needed sustainment and improvements to the Army's test data collection capability and technical infrastructure.

Within this program, DTC's highest priority technology investment initiative called the Virtual Proving Ground (VPG) is building the Army's network-centric test capability to support testing of the Future Force. This capability, comprised of modern modeling, simulation and internetting technologies, uses the Department of Defense Architecture Framework to integrate live, virtual and constructive models in realistic live and synthetic environments. A network of Distributed Test Control Centers (DTCCs), each connected to the Defense Research and Engineering Network (DREN), is being installed at each Army test range to bring all of the Army's test capabilities to bear on the complex challenge of system-of-systems testing for the Future Force. This capability is on the Future Combat Systems (FCS) development critical path, and will be utilized to support the first FCS Integration Phase test in FY 04 and all future Integration Phase test events. Within the DTCC network, an Inter-Range Control Center (IRCC) is being installed at White Sands Missile Range (WSMR) to serve as the primary interface between ATEC test ranges and the FCS System-of-Systems Integration Laboratory (SOSIL). The IRCC will facilitate a complete virtual replication of the battlespace using distributed test assets to exercise, measure and analyze the synergies achieved through the system-of-systems architecture. It will serve as the central test control for distributed tests involving multiple ranges and the SOSIL, and will provide the central analytic data center for comparing tactical common operational pictures with ground truth. The Virtual Proving Ground has recently been recognized as a critical capability by the Program Executive Officer for Ground Combat Systems and the FCS Combined Test Organization, and has been named as one of the Army's "Top Ten" modeling and simulation efforts by the Army Modeling and Simulation Executive Steering Committee. Continued support for the Virtual Proving Ground program and the distributed testing infrastructure that it is producing is critical to the success of the Army's Future Force.

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 project develops and sustains developmental test instrumentation and capabilities that provide the data necessary to support acquisition milestone decisions for all commodity areas throughout the Army and in direct support of all Army Transformation Elements.

Accomplishments/Planned Program	FY 2003	FY 2004	FY 2005
Support of Virtual Proving Ground (VPG): provide the necessary synthetic test environments, hardware-in-the-loop capabilities and models and simulations to successfully develop and test the Army Transformation and the Future Force. This program will continue development of test control simulation tools and test beds which integrate actual field instrumentation data with existing simulations and models to conduct test range management, test setup, simulation model validation and test result validation. DTC proved with Synthetic Environment Integrated Testbed (SEIT) the ability to tie all geographically dispersed Army Test ranges and synthetic battle-space representations together for system level testing. DTC put into place a collaborative knowledge management system to provide a common access for all data/documents across ATEC. Continue development of a DTC-wide High Level Architecture (HLA) compliant architecture for integrating internal and external models, software algorithms, virtual test tools, databases, and synthetic environments; simulation model to accurately measure shock and vibration characteristics of ammunition stored on-board howitzers and acquire visualization tools (3-D graphics workstations) for real-time monitoring of missile flight testing, greatly enhancing range safety operations. Continue development and integration of fire control, ground system platforms and other simulations; ground truth databases, information system, and synthetic environments into system level models and simulation; standardization process to integrate software components for virtual testing; validated model to replicate a chemical/biological point detection system and characterization of simulant/agent properties; common synthetic environments that include digitized terrain, signature, propagation models and climatic environments, virtual battlefield, and human effects into system-level models and simulations.	11601	17650	16202

Accomplishments/Planned Program (continued)	FY 2003	FY 2004	FY 2005
Development, Acquisition and Sustainment of Critical Test Instrumentation: provide and maintain the necessary test instrumentation, computer and communications systems and other test facilities to successfully develop and test the Army Transformation and the Future Force. Continue development/acquisition of: an optical data measurement system to analyze missile flight position data and mobile video instrumentation and control equipment used for tracking and capturing event data on missiles and instrumentation for electromagnetic environment effects and vibration environments for missile testing and digital ground-to-air radios, mobile communications equipment and digital end devices. Acquire instrumentation for reliability, availability and maintainability data collection on vehicle systems, replace ballistic transducers for measuring chamber pressures during ammunition tests and acquire high bandwidth signal conditioners for on-vehicle data collection. Initiate integration of lab equipment used for testing infrared guidance systems. For missile system tests, acquire chemistry lab equipment for analyzing hazardous wastes, radar transponders for high accuracy missile tracking and upgrade to Global Positioning System equipment for position location. Support development of common instrumentation for developmental and operational testing within all test commodity areas. Continue to replace range control instrumentation and upgrade and replace radar, optics and telemetry equipment used in large missile testing. Acquire aircraft data recorders, signal conditioning equipment and data processing equipment. For artillery testing, updated the Weibel ballistic radars. Improved the air to ground weapon scoring for aircraft weapon system testing. Continuing to update survivability test capabilities in support of live fire. Continue to develop Test Operation Procedures (TOPs) and International TOPs (ITOPs) to ensure quality and consistent test results throughout Army.	16135	23089	17742
Provide management support 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 investments accounts for Small Business Innovation Research, Production Base Support, Army Test Technology and Sustaining Instrumentation, Major T&E Investment, and the Central T&E 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 of the Army principal of the Test Resource Advisory Group (TRAG).	4946	5166	5689
Small Business Innovative Research/Small Business Technology Transfer Programs	0	1318	0
Totals	32682	47223	39633

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
6 - Management support	**0605602A - Army Technical Test Instrumentation and Targets**	**62B**

COST (In Thousands)		FY 2003 Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
62B	OPERATIONAL TESTING INSTRUMENTATION DEVELOPMENT	6415	7295	7132	7853	11098	11615	12208

A. Mission Description and Budget Item Justification: Provides for the technical development, enhancement, upgrade and maintenance of essential instrumentation related technology programs. The various projects will achieve cost effective data collection, data reduction, data analysis, telemetry, and processing capability in support of robust and credible operational tests as required by the DOD and Congress. The increased sophistication of the Army's new weapons as well as communication and control systems demands new instrumentation's ability to capture test data non-intrusively. The data are required to collect at high rates and in massive volumes. After the essential data is collected, it must be reduced to the essential elements necessary for effective evaluation. As Army's digitization and transformation of the battlefield continues, this development effort allows ATEC's Operational Test Command (OTC) to modernize and develop its non-major instrumentation to be more robust, reliable and less intrusive in terms of integrating automated instrumentation during the operational tests. The goal is to expand data collection, reduction, and analysis of the collected data and test control capability, while reducing the future operational test costs. This project supports multiple instrumentation development efforts leading to improved command and control, increased mobility, expanded remote data collection from various tactical sites. In many instances instrumentation has transmission capability to central receiving, control, and evaluation stations at various test directorates, and new instrumentation capability in support of real-time Casualty Assessment which measures simulated attrition of forces during simulated battlefield engagements. OTC's test directorates are located at Fort Hood, TX, Fort Bragg, NC, Fort Bliss, TX, Fort Huachuca, AZ, and Fort Sill, OK. These programs support the Current to Future transition path of the Transformation Campaign Plan.

Accomplishments/Planned Program	FY 2003	FY 2004	FY 2005
Planned projects include Multi-Media Data Transfer System Enhancements, High Speed Data Recording System, Global Positioning System Modernization, Automated Intelligence/Electronic Warfare Test System (AI/EWTS) Multiple Emitter Capability, Improved Field Data Collection Systems, Digital Terrain Database and Toolkit, Aviation Bus Recording System, High Speed Data Recording System, Quick Look Instrumentation Work Stations, and Airborne Position Location System.	6415	7078	7132
Small Business Innovative Research/Small Business Technology Transfer Programs	0	217	0
Totals	6415	7295	7132

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
6 - Management support	**0605602A - Army Technical Test Instrumentation and Targets**	**62C**

COST (In Thousands)		FY 2003 Actual	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate
62C	MODELING AND SIMULATION INSTRUMENTATION	2677	2381	5668	6445	14819	15458	16195

A. Mission Description and Budget Item Justification: This project provides a critical foundation necessary to develop and sustain the Army Test and Evaluation Command's (ATEC) current and future modeling and simulation (M&S) instrumentation efforts. ATEC's M&S efforts include: Simulation Testing Operations Rehearsal Model (STORM), Fire Support Automated Test Suite (FSATS), Extensible C4I Instrumentation Suite-Fire Support Application (ExCIS), Command, Control and Communication Driver (C3Driver), Intelligence Modeling and Simulation for Evaluation (IMASE), C3I Engineering Evaluation System (CEES), and OTC Analytic Simulation-Instrumentation Suite (OASIS). Systems that will benefit from this effort include, but are not limited to Stryker, Army Tactical Command and Control System (ATCCS), Battlefield Functional Area (BFA), Advanced Field Artillery Tactical Data System (AFATDS), Maneuver Control System (MCS), Forward Area Air Defense Command Control and Intelligence (FAADC2I), All Source Analysis System (ASAS), and Combat Service Support Control System (CSSCS). These programs support the Current to Future transition path of the Transformation Campaign Plan.

Accomplishments/Planned Program	FY 2003	FY 2004	FY 2005
Funds development and sustainment of high priority modeling and simulation instrumentation systems, such as STORM and OASIS.	2677	2310	1468
Funds development of the C3 Driver. The C3 Driver supports the C4ISR ABCS 6.3, 6.4, FCS, JTRS, and WIN-T development and integration at the Central Technical Support Facility and contractor locations as the Army's single simulator/stimulator.	0	0	4200
Small Business Innovative Research/Small business Technology Transfer Programs	0	71	0
Totals	2677	2381	5668