ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

February 2005

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

	COST (In Thousands)	FY 2□□4 Actual	FY 2□□5 Estimate	FY 2□□6 Estimate	FY 2□□7 Estimate	FY 2□□8 Estimate	FY 2□□9 Estimate	FY 2□1□ Estimate	FY 2□11 Estimate
	Total Program Element (PE) Cost	58268	6□142	62687	82385	85436	85673	88469	7□31□
628	DEVELOPMENTAL TEST TECHNOLOGY & SUSTAINMENT	48639	47880	46398	52771	55119	55166	56739	44362
62B	OPERATIONAL TESTING INSTRUMENTATION DEVELOPMENT	7260	6833	9021	12557	12877	12974	13498	10873
62C	MODELING AND SIMULATION INSTRUMENTATION	2369	5429	7268	17057	17440	17533	18232	15075

A. Mission Description and Budget Item Justification: Increased funding beginning in FY 2□□7 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 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 2□2□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 Systems (FCS), Theater High Altitude Area Defense (THAAD), Patriot

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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. This Program Element also includes funding for modeling and simulation efforts as well as support for 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 2□□5	FY 2□□6	FY 2□□7
Previous President's Budget (FY 2□□5)	52433	55586	73787
Current Budget (FY 2□□6/2□□7 PB)	6□142	62687	82385
Total Adjustments	77□9	71□1	8598
Net of Program/Database Changes			
Congressional Program Reductions	-9□1		
Congressional Rescissions			
Congressional Increases	1□25□		
Reprogrammings			
SBIR/STTR Transfer	-164□		
Adjustments to Budget Years		71□1	8598

Change Summary Explanation:
FY2□□5: Changes due to Congressional increases - WSMR Test Modernization (+425□); WSMR Film Elimination (+35□□); ChemBio Def Material T&E Initiative (+1□□□); Adv Digital Radar System (+15□□).

Funding - FY 2□□6/FY 2□□7: Funding increased to improve Army testing capability (FY2□□6 +71□1/FY2□□7 +8598).

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6 - Management support	**0605602A - Army Technical Test Instrumentation and Targets**	**628**

COST (In Thousands)		FY 2□□4 Actual	FY 2□□5 Estimate	FY 2□□6 Estimate	FY 2□□7 Estimate	FY 2□□8 Estimate	FY 2□□9 Estimate	FY 2□1□ Estimate	FY 2□11 Estimate
628	DEVELOPMENTAL TEST TECHNOLOGY & SUSTAINMENT	48639	47880	46398	52771	55119	55166	56739	44362

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 2□2□initiatives.

Within this program, the 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 Brigade Combat Team (BCT) development critical path, and will be utilized to support the first BCT Integration Phase test 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 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.

Sustaining instrumentation maintains existing capabilities at 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.

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Accomplishments/Planned Program	FY 2004	FY 2005	FY 2006	FY 2007
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 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. Synthetic Environment Integration Testbed Distributed Test Events are used to develop and demonstrate the ability to tie all geographically dispersed Army Test ranges and synthetic battle-space representations together for system of systems level testing. The FCS Lead Systems Integrator and the PM, Unit of Action, have built this distributed test capability into their testing strategy and will utilize it beginning in FY05. This project also funds a collaborative knowledge management system to provide a common access for all data/documents within the Army test community. It continues development of a High Level Architecture (HLA) and DoD Test and Training Enabling Architecture (TENA) compliant architecture for integrating internal and external models, software algorithms, virtual test tools, databases, and synthetic environments; integrate synthetic range and image generation, and begin acquisition of test support tools. Continue development of tools for real-time monitoring of missile flight testing, greatly enhancing range safety operations.	20304	14854	16000	16552

Accomplishments/Planned Program (continued)	FY 2004	FY 2005	FY 2006	FY 2007
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. Acquire instrumentation for reliability, availability and maintainability data collection on vehicles, replace automotive transducers for measuring vibration and engine performance. Replacing ballistic transducers for measuring chamber pressures during ammunition tests. Support development of common instrumentation for developmental and operational testing within all test commodity areas. Acquiring improved instruments to support NBC tests and model development. Acquiring instrumentation for electromagnetic environment effects on ground systems and air vehicles. Continue to replace range control instrumentation and upgrade and replace radar, optics and telemetry equipment. Acquire aircraft data recorders, signal conditioning equipment, data processing equipment and other instrumentation for aircraft and UAV tests. Updating the Weibel ballistic radars for artillery testing. Continue development/acquisition of: an optical data measurement system, radar transponders, mobile video instrumentation and control equipment used for tracking and capturing event data on aircraft and missiles. Improving the air to ground weapon scoring for aircraft weapon system testing. Continuing to update survivability test capabilities in support of live fire and active protection systems. Improving vibration equipment for munitions tests. Improving mobile communications equipment and digital end devices for all test commodity area. Continue to develop Test Operation Procedures (TOPs) to ensure quality and consistent test results throughout the Army.	21362	17540	24539	30185
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).	5215	5639	5859	6034
Chemical Biological Defense Materiel Test and Evaluation Initiative (CBDMTEI) was a congressional addition to DPG for the creation of a Technology Development, Application and Commercialization Center to promote licensing of inventions and submission of research proposals. It will also showcase DPG technology to business and education institutions, and sponsor activities to showcase capabilities of small business and educational institutions of interest to DPG.	793	961	0	0

Accomplishments/Planned Program (continued)	FY 2004	FY 2005	FY 2006	FY 2007
Technology Development Corporation (TEDCO) Initiative: This congressional add to APG funds the Maryland TEDCO and the APG Business Development Office. These funds are being used to identify companies to have Technology Transfer Initiative with and fund those initiatives.	965	0	0	0
WSMR Congressional add for WSMR modernization (4083), Film Eliminator (3362), and Advanced Digital Radar (1441). The WSMR Test Modernization and Film Elimination projects will replace film based camera systems with digital devices for both tracking and non-tracking instruments. WSMR Test Modernization will: Acquire high-speed, medium-resolution digital imagers for tracking systems and required support equipment; acquire digital photographic support equipment; facility networking equipment; and digital camera data downloading systems for the Media Transfer Facility; acquire upgrades to digital image processing and optical data analysis computers; high-bandwidth network equipment; a 50TB disk library; and acquire medium-resolution test camera and support equipment for testing, calibration and maintenance. The WSMR Film Elimination will: Acquire high-speed, medium-resolution digital imagers for non-tracking systems; acquire mobile launch support network vans for non-tracking systems; acquire lenses, portable field computers, field storage devices, media duplicators for non-tracking systems; and acquire equipment for digital imaging, reproduction, archiving and photo lab support in the Media Transfer Facility. The Advanced Digital Range Radar is a network-centric radar suite that will provide for future missile tracking requirements, while simultaneously reducing the costs of operation. The radar suite will consist of single-object trackers, multiple-object trackers, Imaging Systems, Doppler radars, and multistatic radar receivers - all of which are highly reliable and transportable. The radar suite will be configured as a single system, operating from single control points and remotely controlling the individual radar sensors without the need of onsite personnel. The system will provide needed measurement capabilities and will be able to perform at very high and very low altitudes.	0	8886	0	0
Totals	48639	47880	46398	52771

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COST (In Thousands)		FY 2□□4 Actual	FY 2□□5 Estimate	FY 2□□6 Estimate	FY 2□□7 Estimate	FY 2□□8 Estimate	FY 2□□9 Estimate	FY 2□1□ Estimate	FY 2□11 Estimate
62B	OPERATIONAL TESTING INSTRUMENTATION DEVELOPMENT	7260	6833	9021	12557	12877	12974	13498	10873

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.

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Accomplishments/Planned Program	FY 2004	FY 2005	FY 2006	FY 2007
The accomplished and planned projects fall within the test technology areas as outlined in the Army Test Resource Master Plan. These projects fall within Optical Imaging, Network/Test Data Management, Mobile Range Operations Performance Instrumentation and Telemetry/TSPI test technology categories. Projects such as Airdrop High Speed Digital Cameras, Multi-Media Data Transfer System, High Speed Data Recording System, Global Positioning System Modernization, Digital Field Data Collection Systems, Digital Terrain Database, Aviation Bus Recording System, Airborne Position Location System etc.	7260	6833	9021	12557
Totals	7260	6833	9021	12557

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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 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
62C	MODELING AND SIMULATION INSTRUMENTATION	2369	5429	7268	17057	17440	17533	18232	15075

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 Research Model (STORM), Command, Operational Test Command (OTC) Analytic, Simulation and Instrumentation Suite (OASIS), Command, Control and Communication Driver (C3Driver), Extensible C4I Instrumentation System - Fire Support Application (ExCIS-FSA), Intelligence Modeling and Simulation for Evaluation (IMASE). Systems that will benefit from this effort include, but are not limited to Stryker, Brigade Combat Team, Army Tactical Command and Control System (ATCCS), Advanced Field Artillery Tactical Data System (AFATDS), and Maneuver Control System (MCS), All Source Analysis System (ASAS), and Combat Service Support Control System (CSSCS). The additional funding in FY 2007 will provide Information Technology infrastructure and M&S instrumentation to test and evaluate the increasingly complex systems of the Army Future Force.

Accomplishments/Planned Program	FY 2004	FY 2005	FY 2006	FY 2007
Funds development and sustainment of high priority modeling and simulation instrumentation systems, such as STORM and OASIS.	2369	1229	2628	12337
Funds development of the C3 Driver. The C3 Driver supports the C4ISR ABCS 6.3, 6.4, Brigade Combat Team, JTRS, and WIN-T development and integration at the Central Technical Support Facility and contractor locations as the Army's single simulator/stimulator.	0	4200	4640	4720
Totals	2369	5429	7268	17057