

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R2 Exhibit)

February 2008

BUDGET ACTIVITY		PE NUMBER AND TITLE					
6 - Management support		0605602A - Army Technical Test Instrumentation and Targets					
COST (In Thousands)	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
Total Program Element (PE) Cost	82525	85862	74624	73908	57934	59382	60717
628 Developmental Test Technology & Sustainment	54107	45642	46162	44296	35238	36024	36833
62B OPERATIONAL TESTING INSTRUMENTATION DEVELOPMENT	14729	11952					
62C MODELING AND SIMULATION INSTRUMENTATION	13689	28268	28462	29612	22696	23358	23884

A. Mission Description and Budget Item Justification: Effective FY09, 62B and 62C were combined into one line - 62C - to accurately reflect the interwoven use of both Modeling and Simulation (M&S) and instrumentation in support of operational and developmental testing.

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; advanced development of M&S and instrumentation prototypes; and the full development of systems for the United States Army Test and Evaluation Command (ATEC), which includes the Developmental Test Command (DTC) at Aberdeen Proving Ground, Maryland and the Operational Test Command (OTC) at Ft Hood, Texas. DTC consists of seven Test Centers: Aberdeen Test Center (ATC), Aberdeen Proving Ground, Maryland; White Sands Test Center (WSTC), New Mexico; Electronic Proving Ground (EPG), Fort Huachuca, Arizona; Yuma Test Center (YTC), Arizona (including the Cold Regions Test Center (CRTC), Fort Greely, Alaska and the Tropics 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. OTC consists of four forward Test Directorates (Airborne Special Operations Test Directorate, Fort Bragg, North Carolina; Air Defense Artillery Test Directorate, Fort Bliss, Texas; Fire Support Test Directorate, Fort Sill, Oklahoma; and Intelligence Electronic Warfare Test Directorate, Fort Huachuca, Arizona) together with five other Test Directorates (Aviation; Close Combat; Command, Control, Communications, and Computers; Engineer and Combat Support; and Future Force) at Ft Hood, Texas. These capabilities support the development and fielding cycle of the Army Transformation as well as Joint Vision 2020 initiatives. Sustainment funding maintains existing testing capabilities at both DTC and OTC by replacing unreliable, uneconomical, and irreparable instrumentation, as well as incremental upgrades of hardware and software for M&S and instrumentation systems to assure adequate test data collection capabilities. This data supports acquisition milestone decisions for all commodity areas throughout the Army including programs such as the Mine Resistant Ambush Protected (MRAP) vehicles, Future Combat Systems (FCS), Terminal High Altitude Area Defense (THAAD), Patriot Advanced Capability Phase 3 (PAC 3), Mobile Gun System (MGS), Armed Reconnaissance Helicopter (ARH), Joint Network Node - Network (JNN-N), Warfighter Information Network - Tactical (WIN-T), Joint Tactical Radio System (JTRS), Net Enabled Command and Control (NECC), and the Army Battle Command System (ABCS) with includes Force XXI Battle Command Brigade and Below (FBCB2)/Blue Force Tracking (BFT). This Program Element develops and sustains developmental and operational test capabilities that provide key support to the Army's Transformation. In addition this Program Element supports the Global War on Terror by providing instrumentation to support ATEC's 24/7 mission at Yuma Proving Ground, Arizona - supporting the Joint Improvised Explosive Device Defeat Organization (JIEDDO) - as well as efforts throughout ATEC in support of the Army's Rapid Equipping the Force (REF) initiative.

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<u>B. Program Change Summary</u>	FY 2007	FY 2008	FY 2009
Previous President's Budget (FY 2008/2009)	80467	74391	75067
Current BES/President's Budget (FY 2009)	82525	85862	74624
Total Adjustments	2058	11471	-443
Congressional Program Reductions		-569	
Congressional Rescissions			
Congressional Increases		12040	
Reprogrammings	4234		
SBIR/STTR Transfer	-2176		
Adjustments to Budget Years			-443

FY07 reprogramming to higher priority program. FY08 Congressional increases (\$12.04 million minus Congressional Program Reductions \$88 thousand); Robotic Manipulators for EOD (\$480 thousand); Mobile Optical Tracking System (\$1.96 million); Joint Directed Energy Test Site - IED (\$4.8 million); Joint Tactical Network Test Environment (\$2.0 million); and Dugway Testing and Infrastructure Upgrade (\$2.8 million) are identified in Project 62B.

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BUDGET ACTIVITY 6 - Management support	PE NUMBER AND TITLE 0605602A - Army Technical Test Instrumentation and Targets					PROJECT 628	
COST (In Thousands)	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
628 Developmental Test Technology & Sustainment	54107	45642	46162	44296	35238	36024	36833

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, at various locations); 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 developmental testing requirements of high priority Army systems being rapidly fielded to Iraq and Afghanistan, and those systems supporting Army Transformation.

A key element within this program is building the Army's network-centric test capability. This capability recognizes advances in network-centric warfare and enabling technologies for Mobile Ad Hoc Networking (MANET). In addition, DoD guidance (CJCSI 6212) mandates the certification of joint C4ISR-equipped systems as net-ready in accordance with the four pillars of Net-Ready Key Performance Parameters (NR-KPP) to enhance Interoperability and Information Assurance from a networked, system of system perspective. This capability will ensure that platforms are tested as nodes on the network while executing critical mission threads from end-to-end according to the Army's network model (platforms and sensors, applications, services, transport, and standards). A critical enabler is DTC's distributed testing capability, comprised of modern simulation and interneting technologies, and integrated architecture (uses the Department of Defense Architecture Framework or DoDAF) to integrate live, virtual and constructive simulations in realistic live and synthetic environments. A network of Distributed Test Control Centers (DTCCs), each connected to the Defense Research and Engineering Network (DREN), has been 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. Within the DTCC network, an Inter-Range Control Center (IRCC), installed at WSMR, serves as the primary interface between ATEC test ranges and the Future Combat Systems Lead Systems Integrator 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. This technology investment follows Office of Secretary of Defense guidance for Test and Evaluation test architectures and test and training range interoperability.

Another key element is sustaining aging instrumentation which maintains existing capabilities at test facilities by replacing unreliable, uneconomical and irreparable instrumentation, as well as incremental upgrades of instrumentation and software, reducing their average age 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.

<u>Accomplishments/Planned Program:</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
Provides command-level oversight, management and technical support for the DTC test technology and instrumentation investment programs. Technical support includes requirements development, project prioritization and execution of investment accounts for Small	5301	5117	5074

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BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT	
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Business Innovation Research, Major Construction, Army (MCA), Unspecified Minor MCA, Revitalization and Upgrade of facilities, Production Base Support, Army Test Technology and Sustaining Instrumentation, Major Test and Evaluation (T&E) Investment, and the Central T&E Investment Program. Provides support to ATEC Domain Teams in coordinating development of common instrumentation and technology needs for developmental and operational testing. Provides 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).			
Development, acquisition and sustainment of critical test technology and instrumentation: Provides and maintains the necessary test instrumentation, computer and communications systems, data collection, analysis and reporting equipment and other test capabilities to successfully develop and test the Army Future Force. Acquires instrumentation for reliability, availability and maintainability data collection on tracked and wheeled vehicles; replaces automotive transducers for measuring vibration and engine performance and ballistic transducers for measuring chamber pressures during ammunition tests; supports development of common data collection instrumentation used in developmental and operational testing across all test commodity areas; acquires instrumentation for electromagnetic environment effects on ground and air systems; continues replacement and upgrade of range control instrumentation, radar, optics and telemetry equipment used in missile testing; acquires data recorders, signal conditioning equipment, data processing equipment and other instrumentation for aircraft and Unmanned Aerial Systems (UAS) tests; upgrades natural environments test instrumentation used for testing weapon systems, vehicles, munitions and support equipment in extreme hot desert environments as well as extreme cold conditions; continues upgrade of survivability/vulnerability test capabilities in support of live fire and active protection systems; upgrades and replaces mobile range communications equipment and digital end devices and develops advanced test technologies and instrumentation for testing next generation materiel such as hybrid electric propulsion systems, advanced armor protection, multi-spectral sensors, and advanced soldier systems.	30307	25800	26644
Support of simulation and distributed testing for building the Army's network-centric test capability: Provides the necessary live, virtual and constructive environment, hardware-in-the-loop capabilities and models and simulations to successfully develop and test the Army Future Force. Continues 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 projects 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 LSI and the Program Manager (PM), FCS Brigade Combat Team (BCT), have built this distributed test capability into their testing strategy. These projects also fund a collaborative knowledge management system to provide a common access for all data/documents within the Army test community. 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 acquisition of test support tools. Continues development of tools for control and conduct of live, virtual and constructive integrated tests in net-centric warfare environments.	13149	13567	14444
Dugway Testing and Infrastructure Upgrades Congressional Add: The Dugway Proving Ground is charged with testing a broad range of sensor technologies across a variety of operational scenarios and environmental conditions including those encountered in urban operations. This presents very challenging requirements for T&E tools that can provide both high-fidelity simulated results and accurate ground truth data for sensor performance verification. By tying the modeling and simulation (M&S) software tools more closely to the actual sensor ground truth instrumentation, a more comprehensive T&E capability can be achieved. This will enable DPG to substantially improve its capabilities for improving our defense against chemical, biological and radiological threats. The Defense Advanced Research Projects Agency is funding an effort to design and build a highly engineered, autonomous 24/7, Raman-shifted, version of an Eye-safe,	1100		

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Aerosol light detection and ranging (LIDAR) system for detecting and mapping aerosols out to ranges greater than 10 kilometers. A breadboard version of this system was developed and deployed as part of the Pentagon Shield 2004 program. It provided unprecedented profiles of aerosol distributions and flow patterns in the vicinity of the Pentagon and will be deployed for full time unattended operation in support of the Pentagon Force Protection Agency. M&S software has also been developed for providing an understanding of how threat clouds will evolve on the battlefield and in urban environments as they are affected by meteorology and terrain. The purpose of this project is to build one or more LIDAR referee systems to develop elastic backscatter LIDAR calibration procedures and models, and to merge multiple LIDAR and other referee system data with atmospheric dispersion and LIDAR models, in order to generate the best possible aerosol cloud characterization and tracking.			
Chemical Biological Defense Materiel Test and Evaluation Initiative (CBDMTEI) Congressional Add: Supports the creation of a Technology Development, Application and Commercialization Center to promote licensing of inventions and submission of research proposals. Also showcases DPG technology to business and education institutions, and sponsors activities to showcase capabilities of small business and educational institutions of interest to DPG. As a Partnership Intermediary under 15 U.S. Code, 3715 between DPG, commissioned as the Department of Defense Center of Excellence for chemical and biological test and evaluation, the DTC, (its parent command) and teamed with the University of Utah and Battelle. This center will serve as a vehicle to quickly identify and transfer innovative test instrumentation and methodology technology to DPG and DTC and to commercialize dual use technologies developed by academia, the private sector, or the Department of Defense.	1650		
White Sands Missile Range Study Congressional Add: Provides an updated range wide Environmental Impact Statement (EIS) that covers a broad range of joint RDT&E activities. WSMR is the largest major range and test facility base in the Department of Defense. A variety of test and training activities occur at WSMR, each of which require environmental consideration per the National Environmental Protection Act (NEPA) and state environmental regulations. As the range mission evolves to meet the DoD transformational needs, the environmental documentation, process and uses of the range must also evolve. On January 6, 2006, the Army announced the location of the Evaluation Brigade Combat Team at Ft. Bliss/White Sands Missile Range and the establishment of a center for conducting the system design and development of the Future Combat System. This new type of RDT&E activity will not only transform the Army, but it will transform the use of WSMR and the region support infrastructure.	2600		
Funding for the Small Business Innovative Research/Small Business Technology Transfer Programs		1158	
Total	54107	45642	46162

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BUDGET ACTIVITY 6 - Management support		PE NUMBER AND TITLE 0605602A - Army Technical Test Instrumentation and Targets					PROJECT 62C	
COST (In Thousands)	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate	
62C MODELING AND SIMULATION INSTRUMENTATION	13689	28268	28462	29612	22696	23358	23884	

A. Mission Description and Budget Item Justification: Increased funding in FY07 develops synthetic environments and instrumentation systems necessary to test FCS and Future Force systems under realistic operational conditions. This project provides the critical foundation necessary to develop and sustain the Army Test and Evaluation Commands (ATEC) current and future modeling and simulation (M&S) instrumentation efforts. ATEC's M&S efforts include: Operational Test Tactical Engagements System (OT-TES); Command, Control and Communication Driver (C3 Driver); Test Technology Execution Centers (TTEC); Test and Evaluation Enterprise Architecture (TEEA); Intelligence Modeling and Simulation for Evaluation (IMASE); Extensible C4I Instrumentation System Fire Support Application (ExCIS-FSA); Simulation Testing Operations Research Model (STORM); and Operational Test Command (OTC) Analytic, Simulation and Instrumentation Suite (OASIS) Integration and Management. All these systems will benefit Army's Acquisition Category (ACAT) I, II and III systems under operational test and series of Future Combat Systems. Beginning FY 2008 funding from PE Number 0605602A Project 62B for modeling, simulation, and instrumentation development and the subsequent sustainment of all systems are identified under the PE line 0605602A Project 62C.

<u>Accomplishments/Planned Program:</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
FY07 Planned Programs: Funds will be utilized for the development and sustainment of high priority modeling and simulation instrumentation systems, such as Next Generation Command, Control, Communications, and Intelligent Engineering and Evaluation Systems (NG CEES), M&S Preparation and Integration for FCS OT, M&S Architecture and Requirement for FCS, ExCIS FSA, IMASE, OASIS Integration, Neural Network Based Software, and TTEC Base.	11092		
FY08 and FY09 Planned Programs: Funds will be utilized for the development and sustainment of high priority modeling and simulation instrumentation systems. The following systems are planned: OT-TES sustainment and minor upgrades, TTEC, TEEA, IMASE, Performance Instrumentation Systems, Time Space Positioning Information (TSPI) and Telemetry System, Network Control Systems and Data Management, Imaging Systems, Sustainment of OTC MS&I Inventory, ExCIS FSA, STORM, OASIS Integration and Management, Air Defense Artillery Simulation.		25401	26419
Funds development of the C3 Driver. The C3 Driver support the Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) Army Battle Command System (ABCS) 6.3, 6.4, Brigade Combat Team, Joint Tactical Radio System and Warfighter Information Network-Tactical development and integration at the Central Technical Support Facility and contractor location as the Army's single simulator/stimulator.	2597	2076	2043
Small Business Innovative Research/Small Business Technology Transfer Programs		791	
Total	13689	28268	28462