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ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)	DATE February 1999
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BUDGET ACTIVITY 6 - Management and Support	PE NUMBER AND TITLE 0605602A Army Test Technology and Sustaining Instrumentation	PROJECT D628
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COST (<i>In Thousands</i>)	FY1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
D628 Test Technology & Sustaining Instrumentation	30518	43638	30470	33332	34925	39537	41734	41913	Continuing	Continuing

A. Mission Description and Budget Item Justification: Test technology 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 US Army Test and Evaluation Command (TECOM), which includes: 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. Within this element, 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 significant downsizing and budget reductions. Sustaining instrumentation maintains existing technical testing capabilities at TECOM 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 Patriot Advanced Capability Phase 3 (PAC 3), M1A2 Main Battle Tank, Joint Service Lightweight Integrated Suit Technology (JSLIST), Crusader, Theater High Altitude Area Defense (THAAD), Comanche and Javelin. VPG, an innovative Acquisition Streamlining Initiative in testing, 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 reduce acquisition costs. This initiative is critical to achieving long term efficiencies not only within the T&E mission to offset funding and manpower reductions, but also within the acquisition process at large by conforming to the Simulation Based Acquisition Process. Test instrumentation and equipment affected by the Year 2000 (Y2K) phenomena will be compliant to maintain data integrity and test site safety.

FY 1998 Accomplishments:

- 15021 Continued support of TECOM Virtual Proving Ground (VPG):
 - ATC: Continued development of databases, detailed models and system interfaces to support virtual testing of ground vehicle systems. Completed development of the Distributed Simulation Architecture and test procedures needed to link high fidelity system models with synthetic test stimuli and virtual instrumentation to conduct simulation testing of automotive and combat vehicles. Continued funding the cooperative Technology Program Annexes (TPA) with the Army Research Lab (ARL) to develop capabilities and implementation of VPG. Created a High Level Architecture (HLA) Engineering Federation to integrate the ARL reconfigurable fire control model with the ATC terrain model, virtual instrumentation, and automated test procedures.
 - ATTC: Continued development of a totally virtual test range to integrate various system models (such as the Comanche aircraft model), virtual terrain, and threat models to conduct virtual flight visualization testing. Continued development of a physics-based helicopter simulation to conduct test and evaluation of the potential flight hazards associated with integration of new components into the aircraft.

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<p>FY 1998 Accomplishments: (continued)</p> <p>DPG: Continued development of a software model to conduct virtual chemical, biological, and aerosol testing. Accomplished Verification, Validation and Accreditation (VV&A) of the Four-Dimensional Weather System (4DWX) software model. The 4DWX provides the world's leading developmental/operational test support MET capability. The 4DWX performs micro/meso-scale weather analyses and forecasts which provide increased range efficiencies, enhanced range safety, and significantly upgraded project support, i.e., test windows (acceptable weather conditions) and reduced setup/teardown times for instrumentation.</p> <p>RTTC: Continued to acquire the capability to support virtual component/subsystem tests for small missile systems with open loop and closed loop non-destructive testing of imaging IR/MMW Seekers, and all-up-round missiles. Continued development of ground truth databases. Completed development of a Dynamic 3-Dimensional IR Scene Generation System for the Electro-Optical Sensor Flight Evaluation Laboratory (EOSFEL) which will provide the capability to accept 3-D Virtual Range databases. Procured and installed fiber optic interface equipment. Provided support to Project Constellation, a distributed virtual test capability across multiple TECOM test centers (WSMR, EPG, EPG/Ft Lewis, ATTC and RTTC) using standard architectures, networks, and validation/accreditation procedures. Continued acquisition of hardware and software to support development of a small missile Modeling and Simulation (M&S) testbed.</p> <p>WSMR: Continued development of virtual reality mission planning for large missile systems. Continued development of an M&S testbed by acquiring the hardware and software required to conduct virtual large missile testing. Continued development of C4I and Electronic Warfare (EW) simulation testing capabilities that replace expensive airborne jammers with simulators which inject actual threat waveforms into the test items that will significantly reduce test costs, test time, and provide test repeatability. Developed test range and laboratory fiber-optic interconnectivity. Completed development of Distributed Interactive Simulation (DIS) interfaces to link together models used at various test centers. Initiated development of an Airblast Survivability Model for Comanche. Developed an Electromagnetic Model for Breacher (minefield-clearing system on M1 chassis). Completed development of software to merge video, Global Positioning System, radar, and Time/Space/Position/Information (TSPI) data acquisition during actual missile flight-tests to conduct post mission analyses. Continued development of software tools to simulate battlefield electromagnetic characteristics and C4I systems.</p> <p>YPG: Developed a comprehensive virtual tropic database that incorporates digital mapping data, soil characteristics, and terrain characteristics. Continued development of aviation fire control and line of sight models to characterize turreted weapon systems in an Air-to-Air firing environment. Completed development of requirements for integrated air delivery modeling and simulation.</p> <p>HQ TECOM: Continued VPG program coordination and integration.</p> <ul style="list-style-type: none"> • 9877 Continued development, acquisition and sustainment of critical test instrumentation and equipment. <ul style="list-style-type: none"> ATC: Continued development of test site integration which consists of electronically linking test site instrumentation with a control facility to conduct test control, monitoring and real-time data analysis and review. Continued to acquire high-speed analysis and processing equipment. Completed acquisition of range and system safety instrumentation. Continued development of autonomous vehicle control and test range traffic. 		
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<p>FY 1998 Accomplishments: (continued)</p> <p>monitoring systems. Continued development of a combined Developmental Test (DT)/Operational Test (OT) vehicle instrumentation package. Continued development of vehicle endurance/performance test data analyzers</p> <p>ATTC: Acquired Rotary-wing Flight Test Cockpit Indicators. Acquired wireless rotor measurement equipment, data management hardware and software and test analysis workstations to streamline data acquisition and reduction time. Developed software to integrate GPS equipment with a ground control station.</p> <p>DPG: Completed acquisition of agent hood ventilation system filters and chemical/biological laboratory analysis instrumentation for the Combined Chemical Test Facility to sustain the Nuclear, Biological, Chemical (NBC) Defense mission. Completed acquisition of fiber optic network equipment to interconnect the large-scale test grid for outdoor bio-testing.</p> <p>RTTC: Continued development of a flight test capability to produce dynamically accurate missile flights necessary to reduce the number of costly missile test flights. Continued upgrade to the laser tracker hardware and software to provide accurate and reliable TSPI data. Completed acquisition of solid state power amplifiers. Initiated acquisition of electromagnetic radiation equipment used in physical environments testing.</p> <p>WSMR: Continued modification of the Command Destruct system for remote control capability IAW personnel downsizing and safety assurance initiatives. Continued upgrade of a single station laser tracker. Initiated development of an instrumentation platform to remotely collect, analyze, transmit and log C4I message traffic. Upgraded a suite of optical tracking instrumentation with high-resolution video cameras. Continued upgrades to the Drone Formation Control System to control the QF-4 target drone. Modified/replaced test instrumentation and equipment affected by the Year 2000 (Y2K) phenomena to be compliant and maintain data integrity and test site safety.</p> <p>YPG: Acquired mobile, portable, and base station trunked land radio units. Initiated development of a scoring sensor suite for turreted gun systems on rotary wing aircraft (munitions from .50 caliber to 30mm) and a gun pointing vector instrumentation package.</p> <ul style="list-style-type: none"> • 906 Provided quick reaction capability to respond to failed instrumentation and replacement needs. Provided support for technical committees forging future instrumentation technology developments. Maintained/improved existing capability by replacing and upgrading worn out, obsolete or unserviceable equipment/instrumentation (such as the portable data acquisition system) at Army technical test ranges. Developed prototype instrumentation (e.g. a program designed to eliminate the need to use chlorofluorocarbon (CFC) refrigerants) and performed advanced concept studies for development of new technologies. Continued development of Test Operations Procedures (TOPs) and International Test Operations Procedures (ITOPs) to ensure quality and consistency of test results throughout Army and for international cooperative applications. • 4714 HQ TECOM: Provided technical support costs to include salaries and benefits, travel, training and developmental assignments for Directorate for Technical Mission personnel, who manage requirements development, project prioritization, and execution of investment accounts for Small 		
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<p>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. Management and support costs also provided for direct interface with the T&E Executive Agent, managing needs and solutions calls for T&E Reliance oversight, and supporting the Army TERIB co-chair as well as the Army principal on the T&E Board of Operating Directors. Provided administrative support for the Local Area Network and Test and Evaluation Community</p> <p>FY 1998 Accomplishments: (continued) Network (TECNET), contracts, patents, symposia and conferences, exhibits and printing. Continued funding support to the Joint Program Office (JPO) for Test and Evaluation under the tri-service Executive Agent for Test and Evaluation.</p> <p>Total 30518</p> <p>FY 1999 Planned Program:</p> <ul style="list-style-type: none"> • 16040 Continue support of TECOM Virtual Proving Ground (VPG): <ul style="list-style-type: none"> ATC: Initiate development of a Modeling & Simulation (M&S) Testbed to integrate High Level Architecture-compliant models and simulations with ground truth data. Continue development of databases, detailed models and system interfaces to support virtual testing of ground vehicle systems. Continue funding the cooperative Technology Program Annexes (TPA) with the Army Research Lab in developing capabilities and implementation of VPG. Initiate development of a bridge simulator to perform bridge durability testing by simulating heavy vehicle crossings using computer models of combat vehicles in a synthetic environment. ATTC: Initiate development of an M&S Testbed to develop and integrate high-fidelity Aviation models and simulations required to conduct virtual testing. Complete development of a virtual test range to integrate various system models (such as the Comanche aircraft model), virtual terrain, and threat models to conduct virtual flight visualization testing. Continue development of a physics-based helicopter simulation, in cooperation with the Comanche program, to conduct test and evaluation of the potential flight hazards associated with integration of new components into the aircraft. DPG: Initiate procurement of hardware and software to develop an M&S Testbed. Develop a smoke/obscurant model in the visible spectrum to predict dispersion characteristics under various live test conditions. Complete development of a software model to conduct virtual chemical, biological, and aerosol testing. 		
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<p>RTTC: Continue acquisition of virtual component/subsystem test capability for small missile systems with open loop and closed loop non-destructive testing of imaging IR/MMW Seekers, and all-up-round missiles. Complete development of small missile ground truth databases. Develop a 3-D smoke and obscurant model in the IR spectrum to generate and inject scenes for the EOSFEL. Continue to provide support to Project Constellation, a distributed virtual test capability across multiple TECOM test centers using standard architectures, networks, and validation/accreditation procedures. Develop an electromagnetic model to measure the susceptibility parameters of various anti-tank and Non-line-of-sight missiles. Continue acquisition of hardware and software to develop a small missile M&S tested.</p> <p>WSMR: Continue development of virtual reality mission planning for large missile systems. Develop an M&S testbed by acquiring the hardware and software required to conduct virtual large missile and C4I testing. Continue development of C4I and EW simulation testing capabilities that replace expensive airborne jammers with simulators that inject actual threat waveforms into the test items which will significantly reduce test costs, test time, and provides test repeatability. Develop test range and laboratory fiber-optic interconnectivity. Continue development of an Airblast Survivability Model for Comanche. Support Project Constellation, a distributed virtual test capability across multiple TECOM test centers using</p> <p>FY 1999 Planned Program: (continued)</p> <p>standard architectures, networks, and validation/accreditation procedures. Acquire software to reconfigure the High Performance Computing (HPC) mainframe computer to servers that will provide real-time control of test resources. Initiate development of terrain and ground truth databases. Complete development of software tools to simulate C4I systems. Complete development of software tools to simulate battlefield electromagnetic characteristics.</p> <p>YPG: Develop a comprehensive virtual desert terrain database that incorporates digital mapping data, soil characteristics, and terrain characteristics. Complete development of aviation fire control and line of sight models to characterize turreted weapon systems in an Air-to-Air firing environment. Develop an enhanced virtual range to support and incorporate multi-weapon test scenarios. Initiate development of an M&S Testbed to integrate the simulations, models and databases. Develop software models to conduct virtual shock and vibration testing of howitzers.</p> <p>HQ TECOM: Continue VPG design and integration.</p> <ul style="list-style-type: none"> • 21034 Continue development, acquisition and sustainment of critical test instrumentation and equipment. <ul style="list-style-type: none"> ATC: Continue development of test site integration which consists of electronically linking test site instrumentation with a control facility to conduct test control, monitoring and real-time data analysis and review. Continue development of autonomous vehicle control and test range traffic monitoring systems. Continue acquisition of high-speed analysis and processing equipment. Continue development of a combined Developmental Test (DT)/Operational Test (OT) vehicle instrumentation package. Continue development of vehicle endurance/performance test data analyzers. ATTC: Acquire inertial measurement units to measure aircraft altitude, angular rates and acceleration rates. Acquire airborne recorders to simultaneously record and reproduce multiple aircraft data channels. 		
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<p>DPG: Acquire gas chromatograph workstations, mini-cams and software to conduct real-time monitoring and detection of chemical agents.</p> <p>RTTC: Complete development of a test capability to produce dynamically accurate missile flights necessary to reduce the number of costly missile test flights. Complete upgrade of the laser tracker hardware and software to provide accurate and reliable Time Space Position Information (TSPI) data. Continue acquisition of electromagnetic radiation equipment used in physical environments testing.</p> <p>WSMR: Complete upgrade of a single station laser tracker. Continue development of an instrumentation platform to remotely collect, analyze, transmit and log C4I message traffic. Continue upgrade of the Drone Formation Control System to control the QF-4 target drone. Initiate acquisition of telemetry, range timing, operations control, data display, communications and video relay equipment and instrumentation to provide a smooth transition of range control from the Range Control Center to the new National Range Control Center. Upgrade a suite of optical tracking instrumentation with high-resolution video cameras. Upgrade the Command Destruct System for remote control capability IAW personnel downsizing and safety assurance initiatives. Procure two spare cables, a spare target trolley, and instrumentation to replace damaged equipment at the Aerial Cable Range. Upgrade core radar and telemetry instrumentation to improve missile tracking accuracy and reliability. Upgrade an existing Small Business Innovative Research project which predicts missile debris dispersion and analyzes the impact to commercial aircraft traversing the range.</p> <p>YPG: Continue acquisition of mobile, portable, and base station trunked land radio units. Develop of a scoring sensor suite for turreted gun systems on rotary wing aircraft (munitions from .50 caliber to 30mm) and a gun pointing vector instrumentation package.</p> <p>FY 1999 Planned Program: (continued)</p> <ul style="list-style-type: none"> • 815 Provide quick reaction capability to respond to failed instrumentation and replacement needs, provide support for technical committees forging future instrumentation technology developments, and maintain/improve existing capability by replacement and limited upgrade of worn out, obsolete or unserviceable equipment/instrumentation at Army technical test ranges. Develop prototype instrumentation and perform advanced concept studies for development of new technologies. Continue to develop Test Operations Procedures (TOPs) and International Test Operations Procedures (ITOPs) to ensure quality and consistency of test results throughout Army and for international cooperative applications. • 4658 HQ TECOM: Provide technical support costs to include salaries and benefits, travel, training and developmental assignments for Directorate for Technical Mission personnel, who manage 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. Continue to 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 TERIB co-chair and the Army principal on the T&E Board of Operating Directors. Provide administrative support for the Local Area Network and TECNET, contracts, patents, symposia and conferences, exhibits and printing. Continue funding support to the Joint Program Office (JPO) for Test and Evaluation under the tri-service Executive Agent for Test and Evaluation. • 1091 Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Programs <p>Total 43638</p>		
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<p>FY 2000 Planned Program:</p> <ul style="list-style-type: none"> • 11924 Continue support of TECOM Virtual Proving Ground (VPG): <ul style="list-style-type: none"> ATC: Continue development of a Modeling & Simulation (M&S) Test Bed to integrate High Level Architecture-compliant models and simulations with ground truth data. Continue development of databases, detailed models and system interfaces to support virtual testing of ground vehicle systems. Continue funding the cooperative Technology Program Annexes (TPA) with the Army Research Lab in developing capabilities and implementation of VPG. Complete development of a bridge simulator to perform bridge durability testing by simulating heavy vehicle crossings in a virtual environment. Continue development of an engineering model to support tri-service development and evaluation of the Joint Modeling and Simulation System (J-MASS). ATTC: Continue development of an M&S Testbed to develop and integrate high-fidelity aviation models and simulations required to conduct virtual testing. Continue development of a 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 database management system to store, access, aggregate, and manipulate aircraft performance data. <p>FY 2000 Planned Program: (continued)</p> <p>DPG: Continue acquisition and integration of hardware and software to develop a M&S Testbed. Initiate development of a database management system to store, access, aggregate, and manipulate chemical/biological performance data. Conduct verification, validation and accreditation of the 4D Weather System at ATC to perform micro/meso-scale weather analyses and forecasts which provide increased range efficiencies, enhanced range safety, and significantly upgraded project support, i.e., test windows (acceptable weather conditions) and reduced setup/teardown times for instrumentation. Initiate development of validated model to replicate a chemical/biological point detection system.</p> <p>RTTC: Continue to acquire the capability to support virtual component/subsystem tests for small missile systems with open loop and closed loop non-destructive testing of imaging IR/MMW Seekers, and all-up-round missiles. Continue to provide support to Project Constellation, a distributed virtual test capability across multiple TECOM test centers using standard architectures, networks, and validation/accreditation procedures. Continue acquisition of hardware and software to develop a small missile M&S testbed. Initiate 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 3-D smoke and obscurant model to generate IR scenes for the EOSFEL.</p>		
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WSMR: Continue development of virtual reality mission planning for large missile systems. Continue development of C4I and EW testing capabilities to replace expensive airborne jammers with simulators that inject actual threat waveforms into the test items which significantly reduce test costs, test time, and provide test repeatability. Continue development of terrain and ground truth databases. Continue development of software tools to simulate C4I systems. Continue development of an Airblast Survivability Model for Comanche. Initiate development of an architecture to rehost existing C4I legacy test tools to support DT, OT and training exercises.

YPG: Continue development of a M&S Testbed to integrate simulations, models and databases. Initiate development of a test instrumentation suite to merge real-time test data with simulation models and databases.

HQ TECOM: Continue VPG program coordination and integration.

- 12412 Initiate/continue development, acquisition and sustainment of critical test instrumentation and equipment.

ATC: Continue development of test site integration which consists of electronically linking test site instrumentation with a control facility to conduct test control, monitoring and real-time data analysis and review. Continue development of autonomous vehicle control and test range traffic monitoring systems. Continue acquisition of high-speed analysis and processing equipment. Continue development of a combined Developmental Test (DT)/Operational Test (OT) vehicle instrumentation package. Continue development of vehicle endurance/performance test data analyzers. Initiate development of a soldier-system instrumentation suite to measure and record field test data. Initiate development of a laser target scoring system to measure supersonic/subsonic projectiles. Acquire a high-speed digital camera to reduce costly environmental hazardous waste. Initiate development of a gun chamber pressure system. Initiate development of a ballistic measurement system to measure shock levels generated by munitions on combat vehicles. Upgrade the real-time x-ray system to maximize detection of defects in materials, ammunition, and ammunition components.

FY 2000 Planned Program: (continued)

ATTC: Complete acquisition of airborne recorders to simultaneously record and reproduce multiple aircraft data channels. Initiate upgrade of the helicopter icing spray system to ensure spray level characteristics are identical to natural clouds. Initiate acquisition of pre-flight instrumentation checkout equipment.

DPG: Complete acquisition of gas chromatograph workstations, mini-cams and software to conduct real-time monitoring and detection of chemical agents. Acquire aerodynamic particle sizers that are used to measure aerosol clouds that are produced during all field tests of biological agent detectors. Acquire biological aerosol detectors to support chamber and outdoor testing.

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<p>RTTC: Continue acquisition of electromagnetic radiation equipment used in physical environments testing. Initiate procurement of automated matrix switching devices and programmable conditioning equipment to allow insertion of flight test data into hardware-in-the-loop and six degree-of-freedom simulators. Continue procurement and installation of fiber optic interface equipment. Initiate development of signal conditioning units and transducers to upgrade data acquisition instrumentation. Initiate acquisition of digital data recorders and receivers to receive, record, and display missile flight performance data. Acquire inertia measurement system to measure missile system physical characteristics. Initiate development of a six degree of freedom motion simulator to perform non-destructive testing of small missiles.</p> <p>WSMR: Continue development of an instrumentation platform to remotely collect, analyze, transmit and log C4I message traffic. Continue upgrade of the Drone Formation Control System to control the QF-4 target drone. Continue acquisition of telemetry, range timing, operations control, data display, and video relay equipment and instrumentation to provide a smooth transition of range control from the Range Control Center to the new National Range Control Center. Initiate development of a high speed/high capacity wireless data communication network to support data collection, analysis and reduction of C4I test data. Initiate upgrade of optical tracking platforms to single station laser trackers. Upgrade a suite of optical tracking instrumentation with high-resolution video cameras.</p> <p>YPG: Continue acquisition of mobile, portable, and base station trunked land radio units. Upgrade tracking radar to provide increase data accuracy required for support of smart munitions testing. Initiate acquisition of data recorders, sensors and telemetry equipment to collect aerodynamic and flight dynamic data for airdrop systems. Initiate acquisition of a wireless link to transmit test data from remote sites at Cold Regions Test Center (CRTC). Initiate acquisition of data loggers, radios, modems and sensor test equipment at CRTC.</p> <ul style="list-style-type: none"> • 775 Provide quick reaction capability to respond to failed instrumentation and replacement needs, provide support for technical committees forging future instrumentation technology developments, and maintain/improve existing capability by replacement and limited upgrade of worn out, obsolete or unserviceable equipment/instrumentation at Army technical test ranges. Continue to develop Test Operations Procedures (TOPs) and International Test Operations Procedures (ITOPs) to ensure quality and consistency of test results throughout Army and for international cooperative applications. • 5359 HQ TECOM: Provide technical support costs to include salaries and benefits, travel, training and developmental assignments for Directorate for Technical Mission personnel, who manage 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 <p>FY 2000 Planned Program: (continued) Executive Agent, management of needs and solutions calls for T&E Reliance oversight, and support to the Army TERIB co-chair and the Army principal on the T&E Board of Operating Directors. Provide administrative support for Local Area Network and TECNET, contracts, patents, Symposia and Conferences, exhibits and printing. Continue funding support to the Joint Program Office (JPO) for Test and Evaluation under the tri-service Executive Agent for Test and Evaluation. Provide oversight to monitor issues and compliance for Y2K.</p>		
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Total	30470	
<p>FY 2001 Planned Program:</p> <ul style="list-style-type: none"> • 11080 Continue support of TECOM Virtual Proving Ground (VPG): <ul style="list-style-type: none"> ATC: Continue development of a Modeling & Simulation (M&S) Test Bed to integrate High Level Architecture-compliant models and simulations with ground truth data. Continue development of databases, detailed models and system interfaces to conduct virtual testing of ground vehicle systems. Continue funding the cooperative Technology Program Annexes (TPA) with the Army Research Lab in developing capabilities and implementation of VPG. Continue development of engineering models to support tri-service development and evaluation of the Joint Modeling and Simulation System (J-MASS). ATTC: Complete development of a M&S Testbed to develop and integrate high-fidelity Aviation models and simulations required to conduct virtual testing. Continue development of a physics-based helicopter simulation to conduct test and evaluation of the potential flight hazards associated with integration of new components into the aircraft. Continue development of a database management system to store, access, aggregate, and manipulate aircraft performance data. DPG: Continue acquisition and integration of hardware and software to develop a M&S Testbed. Continue development of a database management system to store, access, aggregate, and manipulate chemical/biological performance data. Conduct verification, validation and accreditation of the 4D Weather System at RTTC and YPG to perform micro/meso-scale weather analyses and forecasts which provide increased range efficiencies, enhanced range safety, and significantly upgraded project support, i.e., test windows (acceptable weather conditions) and reduced setup/teardown times for instrumentation. Continue development of validated model to replicate a chemical/biological point detection system. RTTC: Continue to acquire the capability to support virtual component/subsystem tests for small missile systems with open loop and closed loop non-destructive testing of imaging IR/MMW Seekers, and all-up-round missiles. Continue development of a 3-D smoke and obscurant model to generate IR scenes for the EOSFEL. Continue to procure and install fiber optic interface equipment. Continue to provide support to Project Constellation, a distributed virtual test capability using standard architectures, networks, and validation/ accreditation procedures. Initiate development of thermal state models of targets and backgrounds for arctic and desert environments. Continue acquisition of hardware and software to develop a small missile M&S testbed. Continue development of a standardization process to integrate various software components (synthetic environments, databases, data repositories, models, and interfaces) to support virtual testing. <p>FY 2001 Planned Program: (continued)</p>		
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<p>WSMR: Continue development of virtual reality mission planning for large missile systems. Continue development of C4I and EW testing capabilities to replace expensive airborne jammers with simulators that inject actual threat waveforms into the test items which significantly reduce test costs, test time, and provides test repeatability. Continue development of terrain and ground truth databases. Continue development of software tools to simulate C4I systems. Continue development of an Airblast Survivability Model for Comanche. Initiate development of an architecture to rehost existing C4I legacy test tools to support DT, OT and training exercises</p> <p>YPG: Continue development of an M&S Testbed to integrate simulations, models and databases. Continue development of a test instrumentation suite to merge real-time test data with simulation models and databases.</p> <p>HQ TECOM: Continue VPG program coordination and integration.</p> <ul style="list-style-type: none"> • 16151 Initiate/continue development, acquisition and sustainment of critical test instrumentation and equipment. <ul style="list-style-type: none"> ATC: Continue development of test site integration which consists of electronically linking test site instrumentation with a control facility to conduct test control, monitoring and real-time data analysis and review. Continue development of autonomous vehicle control and test range traffic monitoring systems. Continue acquisition of high-speed analysis and processing equipment. Continue development of a combined DT)/OT vehicle instrumentation package. Continue development of vehicle endurance/performance test data analyzers. Continue development of a soldier-system instrumentation suite to measure and record field test data. Continue development of a laser target scoring system to measure supersonic/subsonic projectiles. Initiate acquisition of amplifiers and digitizers to upgrade the collection of ballistic range data. Continue acquisition of a high-speed digital camera to reduce costly environmental hazardous waste. Continue development of a gun chamber pressure system. Continue development of a ballistic measurement system to measure shock levels generated by munitions on combat vehicles. ATTC: Continue upgrade of the helicopter icing spray system to ensure spray level characteristics are identical to natural clouds. Initiate acquisition of pre-flight instrumentation checkout equipment. Acquire airborne recorders to simultaneously record and reproduce multiple aircraft data channels. DPG: Acquire a large-scale data storage system for chemical and biological field-test data. Continue acquisition of atmospheric dispersion thermometers and process logic controllers to collect field test data from mini-cams. RTTC: Continue acquisition of electromagnetic radiation equipment used in physical environments testing. Continue acquisition of automated matrix switching devices and programmable conditioning equipment to allow insertion of flight test data into hardware-in-the-loop and six degree-of-freedom simulators. Continue acquisition of signal conditioning units and transducers to upgrade data acquisition instrumentation. Continue procurement and installation of fiber optic interface equipment. Continue development of signal conditioning units and transducers to upgrade data acquisition instrumentation. Continue acquisition of digital data recorders and receivers to receive, record, and display missile flight performance data. Acquire inertial measurement system to measure missile system physical characteristics. Complete development of a six degree of freedom motion simulator to perform non-destructive missile testing. <p>FY 2001 Planned Program: (continued)</p>		
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ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)		DATE February 1999
BUDGET ACTIVITY	PE NUMBER AND TITLE	PROJECT
6 - Management and Support	0605602A Army Test Technology and Sustaining Instrumentation	D628
<p>WSMR: Continue development of instrumentation platform to remotely collect, analyze, transmit and log C4I message traffic. Continue upgrade of the Drone Formation Control System to control the QF-4 target drone. Continue acquisition of telemetry, range timing, operations control, data display, and video relay equipment and instrumentation to provide a smooth transition of range control from the Range Control Center to the new National Range Control Center. Continue development of the high speed/high capacity wireless data communication network to support data collection, analysis and reduction of C4I test data. Initiate acquisition of communications equipment to link test ranges to the range control center. Upgrade a suite of optical tracking instrumentation with high-resolution video cameras.</p> <p>YPG: Continue acquisition of mobile, portable, and base station trunked land radio units. Initiate upgrade of a scoring sensor suite for turreted gun systems on rotary wing aircraft (munitions from .50 caliber to 30mm) and for a gun pointing vector instrumentation package. Continue acquisition of data recorders, sensors and telemetry equipment to collect aerodynamic and flight dynamic data for airdrop systems. Continue acquisition of data loggers, radios, modems, sensor test equipment and a wireless link to transmit test data from remote sites at CRTC. Acquire of real-time, high-speed data analysis, network and data processing equipment.</p> <ul style="list-style-type: none"> • 775 Provide quick reaction capability to respond to failed instrumentation and replacement needs, provide support for technical committees forging future instrumentation technology developments, and maintain/improve existing capability by replacement and limited upgrade of worn out, obsolete or unserviceable equipment/instrumentation at Army technical test ranges. Continue to develop Test Operations Procedures (TOPs) and International Test Operations Procedures (ITOPs) to ensure quality and consistency of test results throughout Army and for international cooperative applications. • 5326 HQ TECOM: Provide technical support costs to include salaries and benefits, travel, training and developmental assignments for Directorate for Technical Mission personnel, who manage 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 TERIB co-chair and the Army principal on the T&E Board of Operating Directors. Provide administrative support for the Local Area Network and TECNET, contracts, patents, symposia and conferences, exhibits and printing. Continue funding support to the Joint Program Office (JPO) for Test and Evaluation under the tri-service Executive Agent for Test and Evaluation. <p>Total 33332</p>		
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ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)		DATE February 1999
BUDGET ACTIVITY 6 - Management and Support	PE NUMBER AND TITLE 0605602A Army Test Technology and Sustaining Instrumentation	PROJECT D628

B. Program Change Summary	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>
Previous President's Budget (FY 1999 PB)	32160	33439	35758	37991
Appropriated Value	33184	43939		
Adjustments to Appropriated Value				
a. Congressional General Reductions	-1024	-301		
b. SBIR/STTR	-773			
c. Omnibus or Other Above Threshold Reduction	-255			
d. Below Threshold Reprogramming	-614			
e. Rescissions				
Adjustments to Budget Years Since <u>FY 1999 PB</u>			-5288	-4659
Current Budget Submit (FY 2000/2001 PB)	30518	43638	30470	33332

Change Summary Explanation: Funding: FY 1999 Congressional increase to fund critical instrumentation shortfalls at WSMR. FY 2000 and FY 2001 funds realigned to higher priority requirements.