RDT&E BUDGET ITEM JUSTIFICATION SHEET (R-2 Exhibit)	DATE June 2001

BUDGET ACTIVITY 03 - Advanced Technology Development	PE NUMBER AND TITLE 0603227F Personnel Training and Simulation Technology	PROJECT 2743

COST ($ in Thousands)	FY 2000 Actual	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	Cost to Complete	Total Cost
2743 Advanced Training/Force Management	5,878	6,432	0	0	0	0	0	0	Continuing	TBD
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0	0

Note: In FY 2002, efforts transfer to PE 0603231F, Crew Systems and Personnel Protection Technology, Project 634924, Distributed Mission Training Technology, to align resources with the Air Force Research Laboratory (AFRL) organization. FY 2003-FY 2007 budget numbers do not reflect the DoD strategy review results.

(U)   A. Mission Description

This program develops and demonstrates technologies that will result in improved warfighter readiness. Develops, demonstrates, and evaluates technologies for Distributed Mission Training (DMT) including realistic, effective, and affordable synthetic combat environments, technologies for long distance networking to enhance joint-Service training, visual displays for real-time and post-mission debrief, and instructional strategies to support warfighter training in a joint synthetic battlespace. Provides a technology testbed for examining warfighter skills, cognitive functions, and behaviors contributing to combat readiness. Develops models to support aircrew, space, and information operations, performance measurement systems for air, space, and information warfare, and tools for mission planning, rehearsal, execution, and force protection in a distributed mission environment. Develops and demonstrates technologies necessary to provide realistic training for night time warfighting. Develops and demonstrates computer-based intelligent tutoring technology for representative tasks in high technology jobs, and software to enable Air Force training developers to rapidly and affordably build intelligent computer-assisted training systems which continually interact with students for effective individualized training. Develops and demonstrates information management technology for the warfighter at the unit level. Work concentrates on aircrew, space, and information dominance domains. Note: In FY 2000, Congress added $1.5 million for Behavioral Science Research under AFRL.

(U)   FY 2000 ($ in Thousands)

(U) $2,747   Developed, demonstrated, and evaluated technologies to create DMT capabilities including physics-based modeling for constructive simulations and knowledge representation for courseware development. Technologies will more accurately represent real-world systems and representation technologies including a virtual threat cockpit to allow for human-in-the-loop training scenarios. Developed real-time intelligence fusion into the DMT battlespace environment to simulate real-time intelligence updates and developed technologies to include weapons controller interfaces and wing command and control systems to incorporate live ground segments. Began development of a multi-level security system so different simulators at different geographic locations with different levels of security authorization can participate in joint exercises without security violations.

(U) $901   Demonstrated advances in simulator visual system technologies through the development of high fidelity image generation, display, and database

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(U)   **A. Mission Description Continued**

(U)   <u>FY 2000 ($ in Thousands) Continued</u>

          systems. Advanced visual systems will provide operators greater visual definition to identify other aircraft, ground vehicles, roads, and bridges at realistic tactical ranges or to properly assess their aspect angle, increasing mission rehearsal capability for the warfighter. Began development of a PC-based high resolution real-time image generator. Continued development of an ultra-high resolution laser projector for Distributed Mission Training (DMT) simulators.

(U) $836   Developed DMT guidelines and technologies for combat support teams. Technologies will enhance readiness of support forces and increase survivability of warfighters. Developed specifications for training development and performance assessment focused on combat support, night vision ground operations, and force protection situational awareness. Conducted technology needs assessment for force protection DMT in Military Operations Other than War (MOOTW).

(U) $1,394   Developed and demonstrated technologies to enable and enhance Night Vision Goggle (NVG) training and rehearsal for aircrews by demonstrating wide area, networked multi-ship, high fidelity NVG combat mission simulations, including a lunar illumination model, as well as dynamic shadowing and illumination effects associated with combat related sources (fires, explosions, flares). This development will enhance night operations combat readiness and flight safety, decreasing the probability of NVG mishaps. Developed perceptual training guidelines for distance estimation, scanning techniques, task management techniques, and maintenance of situational awareness and spatial orientation when wearing NVGs. Designed interim NVG compatible cockpit lighting systems for selected fighter and bomber aircraft.

(U) $5,878   Total

(U)   <u>FY 2001 ($ in Thousands)</u>

(U) $743   Develop and demonstrate integrated techniques for DMT for aerospace operations, force protection, and command and control personnel to reduce the learning time for new operators, sustain critical mission competencies, and ensure that deployed personnel have the knowledge and skills to support the mission. Complete first training transfer studies of the impact of DMT on Air Force air-to-air combat flying performance, and demonstrate impact of DMT on washback rates and quality of performance during Flight Lead Upgrade training. Complete identification and representation of mission essential competencies for aerospace and information operators and force protectors. Develop and field test a common satellite architecture for control training in aerospace operations center, and integrate team performance measurement methods to assess the readiness and mission impact of DMT for combat support teams.

(U) $1,349   Develop advanced distributed learning information systems technologies that will increase mission rehearsal capability for the warfighter by creating the ability to import real-time intelligence data into the DMT environment. Technologies will provide the warfighter with enhanced training tools to make accurate and timely decisions in a real-time environment. Infuse real-time intelligence data under the mandated

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(U)   A. Mission Description Continued

(U)   FY 2001 ($ in Thousands) Continued

High Level Architecture (HLA) structure and continue evaluation of a multi-level security system for geographically disbursed man-in-the-loop simulators operating under different security classification levels. Demonstrate and evaluate pilot training results using real-time intelligence information.

(U) $1,835   Demonstrate advances in simulator visual system technologies through the development of high fidelity image generation, display, and database systems. Advanced visual systems will provide operators greater visual definition to identify other aircraft, ground vehicles, roads, and bridges at realistic tactical ranges or to properly assess their aspect angle, increasing mission rehearsal capability for the warfighter. Continue development of PC-based high resolution real-time image generator and development tools. Advance development of an ultra-high resolution laser projector for Distributed Mission Training (DMT) simulators. Continue development and integration of a less expensive, optical infinity display material for the simulator.

(U) $1,040   Advance DMT capabilities by increasing functional fidelity and realism of the training system through demonstrating and evaluating computer representation technologies. These advances in computer models of enemy threats, terrain, weather, and human behavior increase mission rehearsal capability for the warfighter as they acquire more accurate responses to battlefield stimuli. Develop threat models and environment representations that can be updated with real-time intelligence data. Develop physics-based radar threat, and other sensor models and their interaction with the environment. Develop an HLA compliant simulation architecture optimized for real-time, distributed, scalable training activities. Develop and test imagery manipulation tools for automatic database generation including automatic materials encoding of source imagery versus current hand coding.

(U) $1,465   Develop and demonstrate technologies for high fidelity Night Vision Goggle (NVG) simulation to support and increase mission training, preview, and rehearsal capabilities. This will reduce the cost of initial NVG qualification, allow for effective advanced night operation mission pretraining prior to aircraft, and increase combat training realism by adding simulated weather, seasonal, and environmental changes. Evaluate measures of training effectiveness, mission performance, and transfer of training from simulator to the aircraft. Conduct field evaluation of NVG training techniques to include distance estimation for aircraft, formation and aerial refueling, and combat maneuvering.

(U) $6,432   Total

(U)   FY 2002 ($ in Thousands)
(U) $0   Effort moved to PE 0603231F, Project 4924.
(U) $0   Total

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(U) **B. Budget Activity Justification**

This program is in Budget Activity 3, Advanced Technology Development, since it develops and demonstrates technologies for new system developments that have military utility and address warfighter needs.

(U) **C. Program Change Summary ($ in Thousands)**

	FY 2000	FY 2001	FY 2002	Total Cost
(U) Previous President's Budget (FY 2001 PBR)	6,250	6,491	7,633	TBD
(U) Appropriated Value	6,327	6,491		
(U) Adjustments to Appropriated Value				
a. Congressional/General Reductions	-2			
b. Small Business Innovative Research	-149			
c. Omnibus or Other Above Threshold Reprogram	-175			
d. Below Threshold Reprogram	-57			
e. Rescissions	-66	-59		
(U) Adjustments to Budget Years Since FY 2001 PBR			-7,633	
(U) Current Budget Submit/FY 2002 PBR	5,878	6,432	0	TBD

(U) Significant Program Changes:

In FY 2002, efforts transfer to PE 0603231F, Crew Systems and Personnel Protection Technology, Project 634924, Distributed Mission Training Technology, to align resources with the Air Force Research Laboratory (AFRL) organization.

(U) **D. Other Program Funding Summary ($ in Thousands)**

(U) Related Activities:

(U) PE 0602202F, Human Effectiveness Applied Research.

(U) PE 0604227F, Distributed Mission Training (DMT).

(U) This project has been coordinated through the Reliance process to harmonize efforts and eliminate duplication.

(U) **E. Acquisition Strategy**

Not Applicable.

(U) **F. Schedule Profile**

(U) Not Applicable.