Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)					R-1 ITEM NOMENCLATURE PE 0603015A Next Generation Training & Simulation Systems					
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	23.292	25.298	19.415						Continuing	Continuing
HB5: IMMERSIVE ENVIRONMENTS DEMONSTRATIONS (CA)	1.932	1.994	.000						Continuing	Continuing
S28: Immersive Learning Environments	4.670	4.864	3.017						Continuing	Continuing
S29: MODELING & SIMULATION - Adv Tech Dev	3.646	3.878	5.883						Continuing	Continuing
S31: Modeling and Simulation Infrastructure Technology	9.759	10.077	10.515						Continuing	Continuing
S33: TRAINING AND SIMULATION SYSTEMS INITIATIVES (CA)	3.285	4.485	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates tools to enable effective training capability for the Warfighter. The PE supports the maturation and demonstration of simulation technologies developed by the Institute for Creative Technology (project S28); incorporates advanced modeling and simulation (M&S), training, and leader development technology into immersive training demonstrations as well as demonstrates a framework for future embedded training and simulation systems for future force combat and tactical vehicles and dismounted Soldier systems (project S29); develops, integrates and demonstrates an overarching M&S architecture that incorporates multi-resolution entity-based models, simulations, and tools to enable Network-Centric Warfare (NCW) M&S capability (project S31). Immersive Environments Demonstrations (project HB5) and Training and Simulation Initiatives (project S33) fund congressional special interest items.

Work in this PE is related, to and fully coordinated with efforts in PE 0601104A (University and Industry Research Centers), PE 0602308A (Advanced Concepts and Simulation), and PE 0603007A (Manpower, Personnel and Training Advance Technology).

Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification	DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	**R-1 ITEM NOMENCLATURE** PE 0603015A Next Generation Training & Simulation Systems

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this PE is performed by the Research, Development, and Engineering Command (RDECOM), Simulation and Training Technology Center (STTC), Orlando, FL.

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	22.365	18.881	20.231	
Current BES/President's Budget	23.292	25.298	19.415	
Total Adjustments	.927	6.417	-.816	
Congressional Program Reductions	.000	-.083		
Congressional Rescissions	.000	.000		
Total Congressional Increases	.000	6.500		
Total Reprogrammings	1.553	.000		
SBIR/STTR Transfer	-.626	.000		

Change Summary Explanation

FY09 funding increase is due to congressional adds.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603015A Next Generation Training & Simulation Systems					PROJECT NUMBER HB5	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
HB5: IMMERSIVE ENVIRONMENTS DEMONSTRATIONS (CA)	1.932	1.994	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Immersive Environments advanced technology development.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Joint Fires and Effects Training System (JFETS)	1.932	1.938	.000	
SBIR/STTR	.000	.056	.000	
Total	1.932	1.994	.000	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603015A Next Generation Training & Simulation Systems					PROJECT NUMBER S28	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
S28: Immersive Learning Environments	4.670	4.864	3.017						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates immersive technologies that include the application of photo-realistic synthetic environments, multi-sensory interfaces, virtual humans, and training applications on low-cost game platforms. This project uses advanced modeling, simulation, and leadership development techniques to leverage the emerging immersive technologies that are created at the Institute of Creative Technologies (ICT) University Affiliated Research Center (UARC) at the University of Southern California to formulate training demonstrations with an emphasis on urban operations and asymmetric warfare. The ICT's collaboration with its entertainment partners, the Research, Development, and Engineering Command, and the Army Training and Doctrine Command creates a true synthesis of creativity and technology that harnesses the capabilities of industry and the research and development community to advance the Army's ability to train and practice military skills across the full spectrum of conflict.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy and the Army Science and Technology Master Plan.

Work in this project is performed by the Research, Development, and Engineering Command (RDECOM), Simulation and Training Technology Center (STTC), Orlando, FL.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Small Business Innovative Research/Small Business Technology Transfer Programs	.000	.136	.000	
Immersive Techniques: This effort demonstrates and matures technological advancements from PE 0602308A/project D02 into complex state-of-the-art simulation environments in support of multi-student and team training. In FY08, developed, assessed, and refined immersive training methods to be more representative of complex political, religious, and cultural environments; demonstrated methods to integrate cultural traits into virtual humans operating in interactive training environments; created visualizations of the complex urban environment to support both immersive training and command and control concepts. In FY09, integrate photorealistic representations of complex terrain and rendering of specific individual facial features onto interactive virtual human models operating in a complex urban environment to support more realistic training; demonstrate intelligent tutoring/computer coaching with virtual instructors that tailor/enhance trainee educational/military experience.	4.670	4.728	3.017	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603015A Next Generation Training & Simulation Systems	PROJECT NUMBER S28

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
In FY10, will demonstrate methods and technologies that expand immersive environments to support multi-student and team training; and will demonstrate methods to support computer generated after action reviews, virtual human based mentoring, and computer directed scenario adaptation based on multi-player distributed training techniques.				
Total	4.670	4.864	3.017	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603015A Next Generation Training & Simulation Systems					PROJECT NUMBER S29	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
S29: MODELING & SIMULATION - Adv Tech Dev	3.646	3.878	5.883						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates next generation training and simulation systems that focus on integrating virtual threats, asymmetric warfare, network-centric operations, and embedding training capabilities and technologies into operational go-to-war future force systems to include dismounted warrior systems. The synergy between these embedded training capabilities and the immersive training advanced technology development in project S28 provides Army units with a set of complementary embedded and deploy-on-demand systems that provide just-in-time, dynamic, realistic training, and mission rehearsal capabilities. Demonstrations include technologies that form a framework for future training applications for the range of future force operations such as robotic control and other sensor operations; mission planning and rehearsal; command, control, and maneuver; Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) network analysis to support distributed simulations; and vehicle system interface requirements. This project creates a joint environment by synchronizing virtual and constructive simulated forces with the next generation and current training systems from the Army, Navy, Air Force, and Marine forces.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is performed by the Research, Development, and Engineering Command (RDECOM), Simulation and Training Technology Center (STTC), Orlando, FL.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Embedded Techniques (cont'd): In FY10, will team with CERDEC to exploit employing modeling and simulation technologies (i.e. Force Battle Command, Real time Adversarial Intelligence Decision aid) in embedded training for current and future Command and Control (C2) systems used to train for asymmetric urban warfare environments; will exploit technology development of computer generated behaviors to simulate terrorist/insurgency urban warfare for future embedding into C2 systems. Will continue technology maturity for dismounted soldier embedded training prototypes to support next generation Soldier systems in collaboration with U.S. Army Natick Soldier Research, Development and Engineering Center (NSRDEC) and U.S. Army Communications-Electronic Research, Development and Engineering Center (CERDEC).	.000	.000	5.883	
Small Business Innovative Research/Small Business Technology Transfer Programs	.000	.109	.000	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603015A Next Generation Training & Simulation Systems	PROJECT NUMBER S29

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Embedded Techniques: This effort demonstrates and matures capabilities (most provided from PE 0602308A/project C90) built into or added onto operational systems, subsystems, or equipment, to enhance and maintain the skill proficiency of Soldiers, and maximizes component commonality among combat vehicles and Soldier computer systems. In FY08, completed development of embedded training hardware component technologies for vehicles by conducting laboratory experiments with embedded training common components and developed user interfaces to support deployable mission planning and rehearsal; matured and demonstrated the use of instructional development tools for deployable learning environments. Results and hardware prototypes were provided to PEO Ground Combat Systems for a common vehicle embedded training system. In FY09, mature combat vehicle and dismounted soldier embedded training systems by conducting experiments in operational environments. Conduct demonstrations, provide results and prototypes for dismounted soldier embedded training to support next generation soldier systems in collaboration with U.S. Army Natick Soldier Research, Development and Engineering Center (NSRDEC) and U.S. Army Communications-Electronic Research, Development and Engineering Center (CERDEC).	3.646	3.769	.000	
Total	3.646	3.878	5.883	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603015A Next Generation Training & Simulation Systems					PROJECT NUMBER S31	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
S31: Modeling and Simulation Infrastructure Technology	9.759	10.077	10.515						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project matures and demonstrates a distributed modeling and simulation (M&S) environment, Modeling Architecture for Technology, Research, and Experimentation (MATREX). MATREX provides a unifying M&S architecture, supporting tools and infrastructure that synchronize and integrate multi-resolution (time and space) modeling applications such as Live, Virtual, and Constructive training applications, operational studies of Network-Centric Warfare (NCW) concepts and technologies, or the modeling of Battle Command operations with elements of advanced communications, information flow, data fusion, decision-making, and information warfare. MATREX also works to address M&S issues of modeling scalability, network design, enterprise services, and third party software compatibility issues.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work in this project is led by the Research, Development, and Engineering Command (RDECOM), Simulation and Training Technology Center (STTC), Orlando, FL, and executed across the Command.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Small Business Innovative Research/Small Business Technology Transfer Programs	.000	.282	.000	
MATREX: This effort develops a robust Modeling and Simulation (M&S) environment and Distributed Virtual Laboratory (DVL) wherein a collection of multi-fidelity models, simulations and tools can be integrated and mapped to an evolving architecture for conducting multi-scale (time and spatial resolution) M&S activities to provide M&S data and information to multiple users. In FY08, integrated high-fidelity modeling of networked sensor fusion, initial static weather, chemical-biological-radiological-nuclear effects, and Battle Command human behaviors into MATREX capabilities, developed a complete M&S environment for Army analysis, experimentation and technology trade-off studies by expanding the implementation of the TRADOC Integrated Process 3 (Networked Fires; Intelligence, Surveillance, and Reconnaissance; Battle Command, etc.). Expanded simulation interoperability and infrastructure tools to provide initial support for Test and Training Enabling Architecture (TENA) compatibility resulting in expanded M&S interoperability across the Army. Developed	9.759	.000	.000	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603015A Next Generation Training & Simulation Systems	PROJECT NUMBER S31

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
a new look-up table simulation as a test surrogate to stand in for high resolution simulations while researching issues of scalability (providing ability to simulate very large/complex battlefield environments). Established and implemented the MATREX DVL with international US coalition partners and over 50 Army based sites across the country currently to establish a Cross-Command Collaboration (3CE) network (via Defense Research and Engineering Network) that allows each user to run their M&S tool independently but integrates the independent results into a overall common shared scenario.				
MATREX (cont'd): In FY09, investigate and develop methodologies (e.g., Distributed Data Management (DDM) and Run-Time Infrastructure (RTI) distribution strategies) to increase MATREX scalability for modeling a future force Brigade Combat Team and enable accurate assessments of command and control concepts. Mature and demonstrate technologies and techniques to shorten M&S event setup time in support of Army experimentation and test events. Integrate and implement data collection and analysis tools to assess consistency of analysis results throughout an acquisition life cycle. Connect additional Army sites into the MATREX DVL to expand the Army's ability to conduct geographically distributed M&S efforts. Conduct initial study of Internet Protocol version 6 (IPv6) and evaluate for anticipated upgrade to DVL network. In FY10, will mature a multi-organization Army laboratory data collection process to support Army technology readiness level demonstrations and to enable consistent data structure/interoperability for multi-organization use throughout the development/design cycle. Will assess and improve current analysis tools to provide an integrated acquisition support capability for Army decision making. Will improve simulation for modeling of weather, terrain, chemical-biological-radiological-nuclear effects, human behavior, human decision-making and networked sensor fusion. Will improve M&S support architectures for cross-domain M&S environment interoperability to include live fire testing, Soldier and hardware-in-the-loop experiments, and software-based testing environments.	.000	9.795	10.515	
Total	9.759	10.077	10.515	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603015A Next Generation Training & Simulation Systems	PROJECT NUMBER S31

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 3 - Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603015A Next Generation Training & Simulation Systems					PROJECT NUMBER S33	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
S33: TRAINING AND SIMULATION SYSTEMS INITIATIVES (CA)	3.285	4.485	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding for Training and Simulation Systems advanced technology development.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Vigilant Auto-ID and Access Control System	.966	1.550	.000	
Enhanced Holographic Imaging Program	1.546	.000	.000	
Joint Medical Simulation Technology Research & Development Center (JMSTRDC)	.000	1.550	.000	
Mobile Medic Training Program	.000	.775	.000	
SBIR/STTR	.000	.126	.000	
Experiential Technologies for Urban Warfare and Disaster Response	.773	.484	.000	
Total	3.285	4.485	.000	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.