Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Army											Date: March 2014	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603015A *I Next Generation Training & Simulation Systems*							
COST ($ in Millions)	**Prior Years**	**FY 2013**	**FY 2014**	**FY 2015 Base**	**FY 2015 OCO #**	**FY 2015 Total**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**Cost To Complete**	**Total Cost**
Total Program Element	-	15.404	13.620	16.749	-	16.749	17.553	17.852	17.937	21.081	-	-
S28: *Immersive Learning Environments*	-	2.498	2.570	2.737	-	2.737	3.144	3.278	3.124	4.183	-	-
S29: *Modeling & Simulation - Adv Tech Dev*	-	3.905	6.441	8.886	-	8.886	9.280	6.974	7.076	8.112	-	-
S31: *Modeling And Simulation Infrastructure Technology*	-	9.001	4.609	5.126	-	5.126	5.129	7.600	7.737	8.786	-	-

The FY 2015 OCO Request will be submitted at a later date.

Note

FY13 decreases attributed to Congressional General reductions (-22 thousand); SBIR/STTR transfers (-471 thousand) and Sequestration reductions (-1.360 million)
FY15 increase for immersive training demonstrations.

A. Mission Description and Budget Item Justification

This program element (PE) matures and demonstrates tools to enable effective training capability for the Warfighter. Project S28 matures and demonstrates simulation technologies developed by the Institute for Creative Technologies (ICT)at the University of Southern California. Project S29 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 S31 develops, integrates and demonstrates an overarching M&S architecture that incorporates multi-resolution, entity-based models, simulations, and tools to enable Network-Centric Warfare M&S capability.

Work in this PE complements and is fully coordinated with efforts in PE 0602308A (Advanced Concepts and Simulation), PE 0602785A (Manpower/Personnel/Training Technology), PE 0602787A (Medical Technology) and PE 0603007A (Manpower, Personnel and Training Advanced Technology).

The cited work is consistent with the Assistant Secretary of Defense for Research and Engineering science and technology priority focus areas and the Army Modernization Strategy

Work in this PE is performed by the U.S. Army Research Laboratory, Human Research and Engineering Directorate, Simulation and Training Technology Center (STTC), Orlando, FL.

Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Army					Date: March 2014
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 3: *Advanced Technology Development (ATD)*			R-1 Program Element (Number/Name) PE 0603015A / *Next Generation Training & Simulation Systems*		
B. Program Change Summary ($ in Millions)	**FY 2013**	**FY 2014**	**FY 2015 Base**	**FY 2015 OCO**	**FY 2015 Total**
Previous President's Budget	17.257	13.627	13.316	-	13.316
Current President's Budget	15.404	13.620	16.749	-	16.749
Total Adjustments	-1.853	-0.007	3.433	-	3.433
• Congressional General Reductions	-0.022	-0.007			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.471	-			
• Adjustments to Budget Years	-	-	3.433	-	3.433
• Sequestration	-1.360	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army			Date: March 2014
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603015A / *Next Generation Training & Simulation Systems*	Project (Number/Name) S28 / *Immersive Learning Environments*	

COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
S28: *Immersive Learning Environments*	-	2.498	2.570	2.737	-	2.737	3.144	3.278	3.124	4.183	-	-

The FY 2015 OCO Request will be submitted at a later date.

A. Mission Description and Budget Item Justification

This project matures and demonstrates immersive technologies that include the application of photorealistic synthetic environments, multi-sensory interfaces, virtual humans, and training applications on low-cost game platforms for Soldier training applications using simulation technologies. This project uses advanced modeling, simulation, and leadership development techniques to leverage the emerging immersive technologies that are created at the Institute for Creative Technologies (ICT) University Affiliated Research Center (UARC) at the University of Southern California to develop training demonstrators. These demonstrators focus on urban operations, asymmetric warfare, resilience and rehabilitation to support Warfighting units and Army Institutions (U. S. Army Training and Doctrine Command (TRADOC) and U.S. Army Medical Command (MEDCOM)). Resilience and rehabilitation research will focus on Post Traumatic Stress Disorder (PTSD). The ICT's collaboration with its entertainment partners 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 capabilities.

Efforts in this program element (PE) support the Army science and technology Soldier portfolio.

The cited work is consistent with the Assistant Secretary of Defense for Research and Engineering science and technology priority focus areas and the Army Modernization Strategy.

Work in this project is performed by the U.S. Army Research Laboratory (ARL), Human Research and Engineering Directorate, Simulation and Training Technology Center (STTC), Orlando, Florida.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: Immersive Techniques for Training Applications	2.498	2.570	2.737
Description: 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 applications.			
FY 2013 Accomplishments: Developed technologies to fully immerse Soldiers in various environments; assessed the use of distributed mobile platforms for the delivery of training software and applications to training subjects; and validated the effectiveness relative to fixed platforms.			
FY 2014 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army		Date: March 2014
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603015A / *Next Generation Training & Simulation Systems*	**Project (Number/Name)** S28 / *Immersive Learning Environments*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Mature the tools and technologies required to create prototype simulations, games, and virtual environments focused on training commanders on the decision making, planning, and leadership for institutional and Warfighting units; and explore advanced display technologies to prototype new low cost immersive displays for virtual training environments. ***FY 2015 Plans:*** Will investigate visual perception technologies and effects and use findings to incorporate more natural human perception/ performance in virtual training environments; and demonstrate how technologies that capture the essence of high performing instructors can be used to improve virtual classroom instruction.			
Accomplishments/Planned Programs Subtotals	2.498	2.570	2.737

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army			Date: March 2014
Appropriation/Budget Activity 2040 / 3	R-1 Program Element (Number/Name) PE 0603015A / *Next Generation Training & Simulation Systems*	Project (Number/Name) S29 / *Modeling & Simulation - Adv Tech Dev*	

COST ($ in Millions)	Prior Years	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO #	FY 2015 Total	FY 2016	FY 2017	FY 2018	FY 2019	Cost To Complete	Total Cost
S29: *Modeling & Simulation - Adv Tech Dev*	-	3.905	6.441	8.886	-	8.886	9.280	6.974	7.076	8.112	-	-

The FY 2015 OCO Request will be submitted at a later date.

A. Mission Description and Budget Item Justification

This project matures and demonstrates next generation training and simulation systems that integrate virtual threats, asymmetric warfare concepts, network-centric operations, and embedding training capabilities as well as 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 as well as 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; 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 Corps forces.

Efforts in this program element (PE) support the Army science and technology Soldier portfolio.

The cited work is consistent with the Assistant Secretary of Defense for Research and Engineering science and technology priority focus areas and the Army Modernization Strategy.

Work in this project is performed by the U.S. Army Research Laboratory (ARL), Human Research and Engineering Directorate, Simulation and Training Technology Center (STTC), Orlando, Florida.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: Embedded Techniques	3.905	6.441	7.886
Description: This effort matures and demonstrates capabilities (most provided from PE 0602308A/project C90) built into or added onto operational systems, subsystems, or equipment, to enhance as well as maintain the skill proficiency of Soldiers, and maximizes component commonality among combat vehicles and Soldier computer systems.			
FY 2013 Accomplishments: Integrated component level sensors for tracking Soldier movement, and augmented reality for dismounted Soldier immersive training environments; and commenced planning for technology experiments, demonstrations and evaluations in FY14 of enhanced embedded training environments. Completed analysis and began development of individual components for			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army		Date: March 2014
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603015A / *Next Generation Training & Simulation Systems*	**Project (Number/Name)** S29 / *Modeling & Simulation - Adv Tech Dev*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
dismounted Soldier and embedded training technology. The technology included predictive technologies, artificial intelligence behaviors for interactive characters in a mixed kinetic/non-kinetic environment and sensors for locomotion and gesturing. ***FY 2014 Plans:*** Design embedded training components (e.g. predictive simulation) for current and future Command and Control systems for both mounted and dismounted; design components for advance sensor technology for locomotion and gesturing; advance and mature technology for developing artificial intelligence behaviors for interactive characters in a mixed kinetic/non-kinetic training scenario within a dismounted squad virtual game environment; and advance and conduct experimentation with tactile feedback technology. ***FY 2015 Plans:*** Will mature component design of algorithms for course of action embedded training on current and future command and control systems; mature component design of advance sensor technology for locomotion and gesturing, tactile feedback technology, and artificial intelligence behaviors for computer generated forces to simulate dismounted squads; and validate component technology maturity in relevant simulation environments. This effort develops virtual, mixed and augmented technologies for dismounted Soldier training.			
Title: Training Effectiveness ***Description:*** This research addresses the effectiveness of training Soldiers and teams in an immersive environments. This effort will research and develop simulations to determine the interaction of realism, immersion, acceptance, and training effectiveness. A baseline of the key dimensions of realism and immersion for current training systems will be developed and will be extended to generate guidelines for the development of future training technologies. Cost effectiveness of these training components will also be considered. ***FY 2015 Plans:*** Will identify impacts and tradeoffs associated with training effectiveness using current (training) simulation architectures and the expected training effectiveness associated with using future virtual, mixed, and augmented reality training technologies.	-	-	1.000
Accomplishments/Planned Programs Subtotals	3.905	6.441	8.886

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army		Date: March 2014
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603015A / *Next Generation Training & Simulation Systems*	**Project (Number/Name)** S29 / *Modeling & Simulation - Adv Tech Dev*

E. Performance Metrics

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army												Date: March 2014
Appropriation/Budget Activity 2040 / 3					R-1 Program Element (Number/Name) PE 0603015A / *Next Generation Training & Simulation Systems*				Project (Number/Name) S31 / *Modeling And Simulation Infrastructure Technology*			
COST ($ in Millions)	**Prior Years**	**FY 2013**	**FY 2014**	**FY 2015 Base**	**FY 2015 OCO #**	**FY 2015 Total**	**FY 2016**	**FY 2017**	**FY 2018**	**FY 2019**	**Cost To Complete**	**Total Cost**
S31: *Modeling And Simulation Infrastructure Technology*	-	9.001	4.609	5.126	-	5.126	5.129	7.600	7.737	8.786	-	-

The FY 2015 OCO Request will be submitted at a later date.

Note

Not applicable for this item.

A. Mission Description and Budget Item Justification

This project matures and demonstrates a distributed modeling and simulation (M&S) environment that integrates a collection of multi-fidelity models and simulations and tools that map to an evolving architecture and M&S activities to support decisions throughout the acquisition life-cycle. This provides a unifying M&S architecture that synchronizes and integrates multi-resolution modeling applications such as Live, Virtual, and Constructive experimentation. This effort focuses on researching cutting-edge M&S methods to enable the Army and DoD to perform critical System of Systems (SoS) analysis, experimentation, technology tradeoffs, capability assessments, concept development, and training that saves time and resources while increasing the effectiveness of acquisition and training activities.

Efforts in this program element (PE) support the Army science and technology Soldier portfolio.

The cited work is consistent with the Assistant Secretary of Defense for Research and Engineering science and technology priority focus areas and the Army Modernization Strategy.

Work in this project is performed by the U.S. Army Research Laboratory (ARL), Human Research and Engineering Directorate, Simulation and Training Technology Center (STTC), Orlando, Florida.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: Advanced Distributed Simulation Environments	9.001	4.609	5.126
Description: In FY14, this effort is renamed from Modeling Architecture for Technology, Research, and Experimentation (MATRIX) to Advanced Distributed Simulation Environments to reflect this effort's evolution of simulation technologies. This effort matures and demonstrates modeling and simulation technologies and techniques that support training and experimentation to assess and support system acquisition and military planning decision-making and System of Systems (SoS) architecture, technology tradeoffs, etc.			
FY 2013 Accomplishments:			

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army		Date: March 2014
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603015A / *Next Generation Training & Simulation Systems*	**Project (Number/Name)** S31 / *Modeling And Simulation Infrastructure Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Matured the SoS architecture concept for analysis, event management, and simulation initialization for use throughout the Army and DoD to save time and money across a wider scope of SoS; exploited and refined next generation architectures demonstrating advances in computer science to support future training, experimentation, and acquisition decisions tools; demonstrated computer cloud technologies to increase the ability to better use and distribute M&S application services to users; investigated capabilities to demonstrate the use of data from a central authoritative source maintained by other DoD agencies to expand distributed capabilities beyond Army data sources; and refined Soldier protection and performance M&S representations to identify tradeoff analysis tools and future virtual training applications for commanders to optimize protection with Soldier load and performance. ***FY 2014 Plans:*** Refine and mature SoS architecture for integration and use in Army and DoD simulation and training programs; mature a generalized interface for the systems engineering architecture and M&S tools for transition to DoD programs with existing M&S systems engineering capabilities; mature and refine Distributed Soldier Representation to demonstrate a Soldiers-as-a-Service simulation (illustrating relevance of human factors data to training); identify hardware and software solutions that decrease dependence on third party solutions; formalize M&S in a cloud environment (M&S as a service tool for training and mission rehearsal simulations across geographically distributed areas); provide a tool to rapidly configure and run training simulations by maturing and translating simulations from complex scenario definitions and databases; mature and refine M&S tools targeted towards Program Executive Office for Simulation, Training and Instrumentation (PEO STRI) simulation needs. ***FY 2015 Plans:*** Will mature and demonstrate SoS simulation architecture technologies for integrating Army and DoD simulation and training programs; demonstrate an initial distributed Soldier simulation providing a more complete representation of the Soldier by including effects such as culture, individual stress, resilience, social and family relationships, individual and unit decision making, and effects on performance; mature and demonstrate M&S as a cloud-based service that supports training and mission rehearsal simulations across geographically distributed areas; advance and refine simulation and training technologies in support of the Army next generation training initiatives; and mature and transition M&S hardware and software solutions targeted towards PEO STRI simulation needs.			
Accomplishments/Planned Programs Subtotals	9.001	4.609	5.126

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2015 Army		Date: March 2014
Appropriation/Budget Activity 2040 / 3	**R-1 Program Element (Number/Name)** PE 0603015A / *Next Generation Training & Simulation Systems*	**Project (Number/Name)** S31 / *Modeling And Simulation Infrastructure Technology*

E. Performance Metrics

N/A