Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Air Force										DATE: February 2011	
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*				R-1 ITEM NOMENCLATURE PE 0602202F: *Human Effectiveness Applied Research*							
COST ($ in Millions)	**FY 2010**	**FY 2011**	**FY 2012 Base**	**FY 2012 OCO**	**FY 2012 Total**	**FY 2013**	**FY 2014**	**FY 2015**	**FY 2016**	**Cost To Complete**	**Total Cost**
Total Program Element	93.461	87.452	86.663	-	86.663	86.109	88.892	90.557	92.363	Continuing	Continuing
621123: *Learning and Organizational Collaboration*	22.635	13.214	13.745	-	13.745	13.852	13.729	13.596	13.878	Continuing	Continuing
625328: *Human Dynamics Evaluation*	14.144	16.587	15.229	-	15.229	14.819	18.342	18.694	19.046	Continuing	Continuing
625329: *Sensory Evaluation and Decision Science*	22.734	22.492	23.471	-	23.471	23.544	23.738	24.477	24.964	Continuing	Continuing
627184: *Performance Evaluation in Extreme Environments*	19.634	18.436	17.016	-	17.016	16.837	15.424	15.703	16.038	Continuing	Continuing
627757: *Directed Energy Bioeffects*	14.314	16.723	17.202	-	17.202	17.057	17.659	18.087	18.437	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program conducts applied research in the area of airmen training, airmen system interfaces, directed energy bioeffects, deployment and sustainment of airmen in extreme environments, and understanding and shaping adversarial behavior. The Learning and Organizational Collaboration project conducts research to measure, accelerate, and expand the cognitive skills necessary to improve airmen training and mission performance. The Human Dynamics Evaluation project conducts research to advance information operations and intelligence operator-aiding technologies by developing and applying human-focused research to create and influence behavior signatures of existing and emerging adversaries. The Sensory Evaluation and Decision Science project conducts research to revolutionize the manner in which the human optimizes the capabilities of Air Force systems, including remotely piloted aircraft (RPA) and adaptive teams of humans and machines. The Performance Evaluation in Extreme Environments project conducts research to enhance human sensory, cognitive, and physical capabilities to increase airmen survivability and performance. The Directed Energy Bioeffects project conducts research on the effects of human exposure to electromagnetic energy (radio frequency to optical), scalable directed energy weapons, and non-lethal weapons. Efforts in this program have been coordinated through the Reliance 21 process to harmonize efforts and eliminate duplication. This program is in Budget Activity 2, Applied Research, since it develops and determines the technical feasibility and military utility of evolutionary and revolutionary technologies.

Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Air Force	DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	**R-1 ITEM NOMENCLATURE** PE 0602202F: *Human Effectiveness Applied Research*

B. Program Change Summary ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	93.527	87.452	89.331	-	89.331
Current President's Budget	93.461	87.452	86.663	-	86.663
Total Adjustments	-0.066	-	-2.668	-	-2.668
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	1.000	-			
• SBIR/STTR Transfer	-1.047	-			
• Other Adjustments	-0.019	-	-2.668	-	-2.668

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2010	FY 2011
Project: 621123: *Learning and Organizational Collaboration*		
Congressional Add: *Center for UAS Research, Education and Training*	6.373	-
Congressional Add Subtotals for Project: 621123	6.373	-
Project: 625329: *Sensory Evaluation and Decision Science*		
Congressional Add: *Advanced Night Vision System - Cockpit Integration*	0.797	-
Congressional Add Subtotals for Project: 625329	0.797	-
Project: 627184: *Performance Evaluation in Extreme Environments*		
Congressional Add: *Imaging Tools for Human Performance Enhancement and Diagnostics*	1.593	-
Congressional Add Subtotals for Project: 627184	1.593	-
Congressional Add Totals for all Projects	8.763	-

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602202F: *Human Effectiveness Applied Research*	PROJECT 621123: *Learning and Organizational Collaboration*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
621123: *Learning and Organizational Collaboration*	22.635	13.214	13.745	-	13.745	13.852	13.729	13.596	13.878	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project conducts applied research to measure, accelerate, and expand the cognitive skills necessary to improve airmen training and mission performance. Research is conducted in three focus areas: immersive environments; continuous learning and aiding; and cognitive and behavioral modeling. The immersive environments effort creates live, virtual, and constructive (LVC) decision-making environments for use in developing revolutionary simulation technologies to increase training capabilities. Continuous learning and aiding enhances training effectiveness and efficiency by using learning theory to improve military training and mission performance. Cognitive and behavioral modeling creates realistic models and simulations of human behavior to advance the understanding of how people perform complex tasks.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Title: Major Thrust 1	5.144	4.094	4.094	-	4.094
Description: Research enhances Distributed Mission Operations (DMO) and decision dominance environments; identifies requirements for aircrew training in live, immersive environments.					
FY 2010 Accomplishments: Researched training and rehearsal issues for helmet cueing and targeting pod simulation systems that will allow for greater realistic composite force training. Expanded sensory-driven modeling efforts to predict targeting pod performance and investigate how neural-sensory measurements correlate with model predictions. Defined sensory requirements for a fully immersive collaborative training environment for DMO. Assessed modeling and simulation requirements for intelligent threat models to support immersive training. Conducted research for the capabilities needed for a full-threat reaction trainer system. Enhanced training capabilities by populating DMO databases with robust 3-D cultural content and correlated sensor attribution.					
FY 2011 Plans: Complete analysis of simulation requirements for air-to-ground and air-to-air force training. Utilize results to address specific training requirements for current and future Air Force fighter platforms. Apply sensory-driven decision-making models to broader range of Air Force mission areas. Evaluate analysis of modeling and simulation efforts for enhanced training. Complete evaluation of real-time data insertion capabilities into DMO.					
FY 2012 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602202F: *Human Effectiveness Applied Research*	PROJECT 621123: *Learning and Organizational Collaboration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Develop technology that represents accurate training scenario across multiple security levels in live, virtual, constructive environments. ***FY 2012 OCO Plans:***					
Title: Major Thrust 2 ***Description:*** Continuous learning/aiding strategies to improve personnel selection, mission training, command/ control, intelligence, surveillance, and reconnaissance (ISR) and unmanned and cyber missions. ***FY 2010 Accomplishments:*** Developed methods for identifying common knowledge, skill, and experience requirements for individuals, teams, and teams-of-teams in manned and unmanned aerospace environments. Developed methods for adapting learning and performance environments to support individual and team training within and across Air Force and coalition mission areas. Developed tools for routinely tracking and storing experience and performance based on operational activities and training events. Explored methods that permit persistent learning within and across aerospace operational training, rehearsal, exercise, test, and evaluation contexts. Evaluated alternative approaches for training in LVC environments and across tactical, operational, and strategic levels of decision making. ***FY 2011 Plans:*** Validate methods for identifying common learning requirements for teams. Validate adaptation methods that function in both learning and operational environments and at the coalition level of interaction. Develop and evaluate alternative approaches to model human performance. Develop alternative data aggregation and reporting methods for analyzing mission performance and use these methods to enhance personnel selection, learning, and training. Evaluate these alternative methods for their effectiveness in supporting adaptive readiness training for individuals, teams, and teams-of teams. Begin validating approaches for LVC training and performance across tactical, operational, and strategic contexts. ***FY 2012 Base Plans:*** Develop common tools to define scenario and content compatible with different training and operational environments. Demonstrate alternative models for human performance assessment and predictions into an LVC event. Complete validation of fidelity analysis methods and models for use in identifying alternative training and operational environment characteristics. Develop learning management tools for use in LVC contexts. Demonstrate mission performance-based after action review tools. Complete documentation of joint and multi-	6.870	5.785	6.255	-	6.255

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602202F: *Human Effectiveness Applied Research*	PROJECT 621123: *Learning and Organizational Collaboration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
national best practices for RPA personnel selection, placement, and training. Demonstrate persistent training and operations event tracking for individual and small team proficiency and squadron readiness assessment. ***FY 2012 OCO Plans:***					
Title: Major Thrust 3 ***Description:*** Cognitive/behavioral modeling explores application of cognitive science for performance improvement by enhancing training in mission-relevant environments (e.g., flight simulators). ***FY 2010 Accomplishments:*** Created adaptive language comprehension and generation capability for computer-generated communication models. Continued to integrate knowledge and skill tracking prediction system with mission essential competencies to predict individualized, optimized training requirements for airmen. Broadened ability to model and predict individual differences in trainee susceptibility to cognitive fatigue across multiple tasks. ***FY 2011 Plans:*** Integrate mission-relevant task model with language comprehension and generation capability to improve situational awareness of computer-generated teammates. Conduct empirical studies with skill acquisition/ retention models and demonstrate ability to produce optimized training and rehearsal programs. Develop graphical user interface for performance prediction systems. ***FY 2012 Base Plans:*** Improve human behavior representation in synthetic teammates by incorporating prediction intervals, enhanced knowledge base, and decision heuristics. ***FY 2012 OCO Plans:***	4.248	3.335	3.396	-	3.396
Accomplishments/Planned Programs Subtotals	16.262	13.214	13.745	-	13.745

	FY 2010	FY 2011
Congressional Add: Center for UAS Research, Education and Training ***FY 2010 Accomplishments:*** Conducted Congressionally-directed effort. ***FY 2011 Plans:***	6.373	-
Congressional Adds Subtotals	6.373	-

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	**R-1 ITEM NOMENCLATURE** PE 0602202F: *Human Effectiveness Applied Research*	**PROJECT** 621123: *Learning and Organizational Collaboration*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
• Activity Not Provided: *Title Not Provided*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

D. Acquisition Strategy

N/A

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602202F: *Human Effectiveness Applied Research*	PROJECT 625328: *Human Dynamics Evaluation*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
625328: *Human Dynamics Evaluation*	14.144	16.587	15.229	-	15.229	14.819	18.342	18.694	19.046	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project conducts applied research to advance information operations and intelligence operator-aiding technologies by developing and applying human-focused research to create and influence behavior signatures of existing and emerging adversaries. Research will be in six focus areas: mission-essential human capabilities for air, space, and cyber operations; enhancing human components of intelligence, surveillance, and reconnaissance (ISR); anticipatory command, control, and intelligence (C2I); adversarial modeling and cross-cultural communication; predicting and evaluating organizational effectiveness alignment and collaboration readiness; and electromagnetic theory. These focus areas will enhance capabilities in layered sensing, decision aids for computer network attack/defense/survive, and human-centric exploitation of measurement and signatures intelligence.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Title: Major Thrust 1	4.743	3.971	1.436	-	1.436
Description: Identify methods to enhance mission-essential human capabilities for cyber operations. Develop measures of effectiveness for cyber capabilities. ***FY 2010 Accomplishments:*** Conducted research to enhance performance and increase situational awareness within cyber operations, including operations support center environments. Developed the operator's ability to anticipate and influence the behavior of adversaries. Conducted foundational studies toward enhancing cognitive cyber performance. ***FY 2011 Plans:*** Continue conducting research to enhance performance and increase situational awareness within cyber operations, including operations support center environments. Develop quantifiable measures of effectiveness to demonstrate ability to effectively anticipate and influence the behavior of adversaries. Continue foundational studies toward enhancing cognitive cyber performance. ***FY 2012 Base Plans:*** Continue conducting research into enhancing cognitive cyber performance. Develop technologies that increase situational awareness within cyber operations and research metrics to accurately assess attacks from adversaries. ***FY 2012 OCO Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602202F: *Human Effectiveness Applied Research*	PROJECT 625328: *Human Dynamics Evaluation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Title: Major Thrust 2 ***Description:*** Conduct research to enhance human components of ISR. Develop ability to anticipate, influence, and dominate adversary's air, space, and cyber ISR systems, processes, and organizations. ***FY 2010 Accomplishments:*** Conducted cognitive task analysis and cognitive systems engineering to develop new intelligence analyst tools, training, and methods to establish and demonstrate dynamic command and control of air, space, and cyber ISR collection capabilities. Specific ISR capability objectives include universal situational awareness, dynamic control of ISR planning, workload reduction, and multi-source/multi-intelligence collaboration. ***FY 2011 Plans:*** Conduct research to enable human operators to maximize utility of multi-sensor ISR systems in planning for dynamic situations. Conduct research to develop distributed, collaborative ISR dynamic planning capabilities for intelligence analysts. ***FY 2012 Base Plans:*** Develop framework and knowledge-based foundation for intelligence analysis. Conduct studies and incorporate feedback from the intelligence community to enhance methodologies for exploiting unstructured and cognitively complex data and information. ***FY 2012 OCO Plans:***	1.238	2.518	4.061	-	4.061
Title: Major Thrust 3 ***Description:*** Conduct research to develop technology base for anticipatory C2I decision support environment using past and present battlefield mission states to predict adversarial intent and actions. ***FY 2010 Accomplishments:*** Refined knowledge of representation techniques to model potential adversarial behavior and complex systems of systems and begin integrating information within visual displays. Researched integrated set of work aids to achieve persistent operational planning, persistent prediction, and focused execution. Developed aids to enhance understanding of underlying C2I models and algorithms. ***FY 2011 Plans:***	1.741	1.368	1.977	-	1.977

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602202F: *Human Effectiveness Applied Research*	PROJECT 625328: *Human Dynamics Evaluation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Research ability of models to simulate enemy potential courses of action, including complex adversarial behavior. Explore the feasibility to integrate models within visual displays. ***FY 2012 Base Plans:*** Develop methods to enhance an analyst's ability to assess possible threats as a logical consequence of observed human and organizational behavior. Begin integration of cognitive modeling architectures and cultural modeling techniques to initiate framework for estimating adversary intent and possible courses of action. ***FY 2012 OCO Plans:***					
Title: Major Thrust 4 ***Description:*** Conduct research in adversarial modeling, cross-cultural communication, and automated speech translation tools for Air Force missions. ***FY 2010 Accomplishments:*** Conducted research to develop behavioral modeling techniques to gauge adversarial threats. Developed measures of effectiveness for selected influence operations capabilities. Developed speech-to-speech translation tools that support automated, cross-cultural communications. ***FY 2011 Plans:*** Develop adversarial cultural modeling techniques to gauge adversarial threats. Develop advanced models/simulation to demonstrate measures of effectiveness for selected influence operations capabilities. Research foreign language speech-to-speech translation applications that support automated, cross-cultural communications. ***FY 2012 Base Plans:*** Continue conducting foreign language speech-to-speech translation applications that support automated, cross-cultural communications. Continue to refine and expand advanced, automated algorithms for measures of effectiveness analyses supporting improved influence operations capabilities. Develop methods applicable to theaters of operation that enhance warfighter situational awareness of adversarial location, intent, and predictability of hostile action. ***FY 2012 OCO Plans:***	4.748	6.683	3.158	-	3.158
Title: Major Thrust 5	0.861	1.079	4.597	-	4.597

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602202F: *Human Effectiveness Applied Research*	PROJECT 625328: *Human Dynamics Evaluation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Description: Develop models/metrics to predict/evaluate organizational effectiveness alignment and collaboration readiness. ***FY 2010 Accomplishments:*** Identified organizational vulnerabilities at the structure, organizational culture, process, or human operator levels. Focused on exploitation of theories involving human trust in automation and interpersonal relationships to provide an understanding of how to influence systems with little to no degree of detection/ suspicion among operators. Developed relevant organizational metrics, work design solutions, and simulation models to facilitate organizational effectiveness. ***FY 2011 Plans:*** Develop foundational decision aid concepts to exploit operator human-human trust and trust in automation for influence operators. Mature research on organizational effectiveness to support organizational change in government domains. Develop advanced models/simulations to show the impact of improved work design, engaged organizational culture, and enhanced collaboration readiness. ***FY 2012 Base Plans:*** Continue research and development on decision aid concepts to exploit operator human-human trust and trust in automation. Conduct trust-based experimentation, discourse analysis and building vulnerability modeling tools. Complete organizational vulnerabilities research; illustrate and document modes/simulations that show the impact of improved work design, engaged organizational culture and enhanced collaboration readiness. ***FY 2012 OCO Plans:***					
Title: Major Thrust 6 ***Description:*** Conduct applied research in the areas of mathematics and electromagnetic theory to exploit/ counter adversarial capabilities. ***FY 2010 Accomplishments:*** Conducted research on datasets from past/current influence operations. Continued anticipatory research designed to enhance blue force situational awareness of adversarial location and intent. ***FY 2011 Plans:***	0.813	0.968	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602202F: *Human Effectiveness Applied Research*	PROJECT 625328: *Human Dynamics Evaluation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Refine advanced, automated algorithms for measures of effectiveness analyses supporting improved influence operations capabilities. Develop methods to enhance warfighter situational awareness of adversarial location and intent. ***FY 2012 Base Plans:*** Research will be consolidated and combined in FY12 with Influence Operations major thrust above due to Defense Base Closure and Realignment Commission realignment. ***FY 2012 OCO Plans:***					
Accomplishments/Planned Programs Subtotals	14.144	16.587	15.229	-	15.229

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
• Activity Not Provided: *Title Not Provided*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

D. Acquisition Strategy

N/A

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602202F: *Human Effectiveness Applied Research*	PROJECT 625329: *Sensory Evaluation and Decision Science*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
625329: *Sensory Evaluation and Decision Science*	22.734	22.492	23.471	-	23.471	23.544	23.738	24.477	24.964	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project conducts applied research to revolutionize the manner in which the human optimizes the capabilities of Air Force systems, including remotely piloted aircraft (RPA) and adaptive teams of humans and machines. Research optimizes situational awareness, improves the human-machine interface, and seamlessly integrates warfighters with their weapon systems across air, space, and cyber domains. Research is conducted in four focus areas: network-centric collaboration; supervisory control; battlespace visualization; and battlespace acoustics. The network-centric collaboration area develops warfighter interface technologies to enhance human-human and human-machine collaborations and system interactions in distributed decision-making environments. The supervisory control area develops new control/display concepts and technologies to optimize Air Force platform capabilities. The battlespace visualization area advances the science and technology associated with collecting, optimizing, displaying, and assimilating sensory information to enhance warfighter decision-making. The battlespace acoustics area researches human-human and human-machine communications to exploit the use of voice and acoustic data in collaborative, net-centric environments while accounting for the effects of acoustic propagation.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Title: Major Thrust 1	5.191	4.881	5.582	-	5.582
Description: Develops warfighter interface technologies to enhance human-human and human-machine collaboration and system interaction in distributed decision-making environments. ***FY 2010 Accomplishments:*** Investigated individual and teams-of-teams performance metrics for team collaboration in a cross-domain distributed environment to include air, space, and cyber. Explored alternate human sensory technologies for operator functional state model development. Began initial understanding of adaptive interface algorithms for individual operator decision aiding. ***FY 2011 Plans:*** Investigate teams-of-teams performance metrics and begin to explore the nature of teams-of-teams cognitive workload so that future development of adaptive aiding algorithms shape team situational awareness in a network-centric environment. Investigate algorithms that assess team cognitive workload independent of the workload of individual operators. Begin to develop adaptive interface algorithms for operator decision aiding. ***FY 2012 Base Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602202F: *Human Effectiveness Applied Research*	PROJECT 625329: *Sensory Evaluation and Decision Science*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Develop team functional state assessment criteria and characterize context dependent methodologies for assessing the cognitive functional state of teams. Explore algorithm utility for assessing real-time team functional state in distributed operations. Evaluate ability to capture team functional state assessments to enhance collaboration and team decision-making. Develop adaptive interface algorithms for operator decision aiding. ***FY 2012 OCO Plans:***					
Title: Major Thrust 2 ***Description:*** Researches new control/display concepts and technologies (e.g., information portrayal, control devices, and decision aiding algorithms). Identify best design to direct operator attention. ***FY 2010 Accomplishments:*** Designed and evaluated advanced visualization concepts to support rapid situation assessment associated with switching tasks, interruptions, and unexpected state changes within multi-RPA control scenarios. Evaluated novel video exploitation aids to enable a single operator to monitor multiple video feeds. Compressed critical net-centric and system information onto man-portable RPA interfaces in a manner that permits flexible, high-level tasking without undue workload. Identified techniques that improve operator awareness of RPA automation mode and rationale for autonomous decisions. ***FY 2011 Plans:*** Evaluate the utility of 3-D information displays, multi-sensory interfaces, and other virtual reality technologies for multi-RPA supervisory control. Generate intuitive ways to monitor, interact, and coordinate with complex, intelligent RPA automation algorithms. Identify predictive information displays, including temporal displays that furnish proactive decision support to the human operator in multi-RPA scenarios. Investigate unique facets of automation, such as social attributes, that may improve the overall RPA human-system bandwidth. ***FY 2012 Base Plans:*** Explore flexible automation techniques and transitions to enable a human operator to intervene at various levels with autonomous systems. Develop methods to quickly and easily ascertain the status/intent of complex automation. Design and evaluate methods and interfaces to support distributed, ubiquitous unmanned system control of many heterogeneous systems. Investigate combined spatial and temporal displays for proactive management of multiple semi-autonomous assets. ***FY 2012 OCO Plans:***	5.943	6.075	5.524	-	5.524

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602202F: *Human Effectiveness Applied Research*	PROJECT 625329: *Sensory Evaluation and Decision Science*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Title: Major Thrust 3 ***Description:*** Battlespace visualization advances science and technology associated with collecting, optimizing, displaying, and assimilating sensory information to enhance warfighter decision-making. ***FY 2010 Accomplishments:*** Explored vision enhancement techniques to increase rapid classification and identification for objects of interest in air, space, and cyber. Developed visualization technologies and interaction techniques for presenting complex information to enhance air, space, and cyber operations. Investigated presentation and interface technologies for enhancing space situational awareness. ***FY 2011 Plans:*** Explore vision enhancement techniques that can support the air, space, and cyber analyst's ability to quickly categorize objects of interest. Perform laboratory evaluations of visualizations that support human knowledge when presented with complex information in the air, space, and cyber domains. Develop visualizations and interaction techniques to exploit dynamic information. Develop situational awareness presentation and interface technologies that increase warfighter knowledge. ***FY 2012 Base Plans:*** Explore vision enhancement techniques for fusing multi-source data to facilitate decision making. Develop interactive visualizations for displaying and analyzing multi-source information to improve situational awareness. Investigate visual analytics to optimally represent relevant information from large and disparate data sets. Develop initial visualizations to represent and analyze large amounts of data to increase human performance. ***FY 2012 OCO Plans:***	6.106	6.162	6.755	-	6.755
Title: Major Thrust 4 ***Description:*** Conducts battlespace acoustics research on advanced auditory and communication technologies that mitigate effects of noise and enhance performance in operational environments. ***FY 2010 Accomplishments:*** Examined applications of how advanced multi-modal interfaces can optimize distributed team performance in large-scale communication networks. Conducted research on network-based audio technologies for achieving shared situational awareness and exploiting information from multi-layered arrays of sensors in complex operational environments. Explored the use of persistent audio displays and other advanced auditory cueing	4.697	5.374	5.610	-	5.610

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602202F: *Human Effectiveness Applied Research*	PROJECT 625329: *Sensory Evaluation and Decision Science*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
techniques for continuously monitoring the status of complex RPA technologies. Conducted research on sensor systems and immersive display technologies for facilitating remote telepresence and optimizing the presentation of complex information in human-machine interfaces. ***FY 2011 Plans:*** Evaluate the use of multi-modal speech displays to optimize distributed team performance in large-scale communication networks. Conduct research on immersive audio and multi-modal interfaces for exploiting large-scale networks of distributed information and enhancing real-time situational awareness and time-critical decision effectiveness. Explore integrated multi-sensory display concepts to optimize the flow of information across distributed teams, emphasizing how intuitive displays can promote shared situational awareness between command, control, intelligence, surveillance, and reconnaissance assets and operators. ***FY 2012 Base Plans:*** Explore the application of multi-modal digital communication technologies to enhance speech intelligibility, communication effectiveness, and situational awareness in communication-intense military environments. Explore the use of accelerated speech to enhance situational awareness and communication effectiveness. Assess integration of graphical images with speech and text communication to enhance operator situational awareness and understanding. Evaluate and monitor operator stress and workload using verbal communication signals. ***FY 2012 OCO Plans:***					
Accomplishments/Planned Programs Subtotals	21.937	22.492	23.471	-	23.471

	FY 2010	FY 2011
Congressional Add: Advanced Night Vision System - Cockpit Integration	0.797	-
FY 2010 Accomplishments: Conducted Congressionally-directed effort.		
FY 2011 Plans:		
Congressional Adds Subtotals	0.797	-

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602202F: *Human Effectiveness Applied Research*	PROJECT 625329: *Sensory Evaluation and Decision Science*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
• Activity Not Provided: *Title Not Provided*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

D. Acquisition Strategy

N/A

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602202F: *Human Effectiveness Applied Research*	PROJECT 627184: *Performance Evaluation in Extreme Environments*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
627184: *Performance Evaluation in Extreme Environments*	19.634	18.436	17.016	-	17.016	16.837	15.424	15.703	16.038	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project conducts applied research to enhance human sensory, cognitive, and physical capabilities to increase airmen survivability and performance. The research is focused in four areas: biobehavioral performance; biomechanics; applied biotechnology; and counterproliferation. Both biobehavioral and biomechanics focus areas enhance airmen performance and survivability through dynamic human modeling techniques that define the capabilities and limits of system operators under military-unique stressors, as well as assessing and identifying adversarial threats. Applied biotechnology advances bioscience, nanotoxicology, and neuroscience research to protect airmen from the effects of toxic chemicals and materials, and to monitor and enhance cognitive and physiological performance. Counterproliferation research focuses on biotechnology for the detection, identification, monitoring, and neutralization of biological threat agents.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Title: Major Thrust 1	4.789	4.873	2.274	-	2.274
Description: Develop databases of human motion and features collected from air/space platforms. Identify human threat signatures across diverse populations for ISR and force protection applications. ***FY 2010 Accomplishments:*** Used principles of biomechanics to analyze behavioral data. Collected motion data and develop initial analysis techniques to identify behaviors that seem out-of-context. Included cultural information to develop physical behavior signatures. Integrated information from multiple sensors to help identify a human threat. ***FY 2011 Plans:*** Develop anthropometry and motion database ontology to exploit human threat signatures. Complete development and validate techniques to identify human motion that seem out-of-context as viewed from Air Force sensors. Develop models that include cultural information to detect anomalies in both behavior and expressions. ***FY 2012 Base Plans:*** Initiate 3-D human activity replication using 3-D human models. Develop a human motion repository to identify human threat and performance signatures. Develop tools for image analyst training that identify and visualize critical threat indicating signatures. ***FY 2012 OCO Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602202F: *Human Effectiveness Applied Research*	PROJECT 627184: *Performance Evaluation in Extreme Environments*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Title: Major Thrust 2 ***Description:*** Define and model operator cognitive performance in stressful environments and develop technologies to mitigate effects of stressors on cognitive function, safety, and mission effectiveness. ***FY 2010 Accomplishments:*** Used performance databases to refine warfighter physical training programs with the goal of improving retention and operational performance. Conducted research integrating behavioral psychology and metabolomic research to enhance human performance in multiple stressor environments. ***FY 2011 Plans:*** Develop biological, behavioral, and physical metrics and markers of cognitive performance. Delineate mechanisms that affect warfighter (e.g., battlefield airmen and RPA operators) cognitive and physical performance. ***FY 2012 Base Plans:*** Define stressor-influenced mechanisms for developing strategies to optimize cognitive readiness and to influence performance in theater. Target specific biological, behavioral, and physical metrics and markers for defining mechanisms that improve cognitive performance. ***FY 2012 OCO Plans:***	2.907	3.055	6.193	-	6.193
Title: Major Thrust 3 ***Description:*** Conduct bio/nanotechnology research to advance warfighter performance. Leverage toxicological/ biological data to improve human performance and decision-making abilities. ***FY 2010 Accomplishments:*** Conducted research to identify and validate biomarkers relevant to cognitive and physiological changes that enhance human performance. Conducted analysis of novel Air Force nanomaterial toxicity. Defined cell-based pathway engineering for biosensors of human performance. ***FY 2011 Plans:***	5.119	5.201	3.592	-	3.592

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602202F: *Human Effectiveness Applied Research*	PROJECT 627184: *Performance Evaluation in Extreme Environments*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Advance toxicity research associated with Air Force relevant nanomaterials and conduct toxicity assessments of biofuels of Air Force interest. Continue to identify molecular markers that enhance human performance. Continue to investigate cell-based pathways. ***FY 2012 Base Plans:*** Pursue advanced analysis of new and emerging nanomaterials and biofuels of Air Force interest. Validate molecular markers in specific cognitive and physiological pathways that impact human performance. ***FY 2012 OCO Plans:***					
Title: Major Thrust 4 ***Description:*** Conduct surveillance and counterproliferation research to support detection, identification, and assessment of threat agents in support of Air Force operational missions. ***FY 2010 Accomplishments:*** Conducted research to develop nanoparticle taggants for line-of-sight, stand-off assessment of preemptive airstrike destruction of biological warfare agents. Defined preliminary techniques to effectively neutralize genetically-modified biological threat agents. Performed initial research to anticipate impacts of high threat environments on air operations and to provide post-attack situational awareness. ***FY 2011 Plans:*** Complete techniques to effectively neutralize threat agents. Use bioinspired approaches to expand and refine nanoparticle taggants research. ***FY 2012 Base Plans:*** Develop and incorporate bioinspired nanoparticle taggants for enhanced warfighter counterproliferation capability during operational missions. Identify biological markers that indicate that individuals have handled, transported, or manipulated weapons of mass destruction. ***FY 2012 OCO Plans:***	5.226	5.307	4.957	-	4.957
Accomplishments/Planned Programs Subtotals	18.041	18.436	17.016	-	17.016

	FY 2010	FY 2011
Congressional Add: Imaging Tools for Human Performance Enhancement and Diagnostics	1.593	-

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	**R-1 ITEM NOMENCLATURE** PE 0602202F: *Human Effectiveness Applied Research*	**PROJECT** 627184: *Performance Evaluation in Extreme Environments*

	FY 2010	FY 2011
FY 2010 Accomplishments: Conducted Congressionally-directed effort.		
FY 2011 Plans:		
Congressional Adds Subtotals	1.593	-

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
• Activity Not Provided: *Title Not Provided*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

D. Acquisition Strategy

N/A

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602202F: *Human Effectiveness Applied Research*	PROJECT 627757: *Directed Energy Bioeffects*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
627757: *Directed Energy Bioeffects*	14.314	16.723	17.202	-	17.202	17.057	17.659	18.087	18.437	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project conducts applied research on the effects of human exposure to electromagnetic (EM) energy (radio frequency to optical), scalable directed energy weapons, and non-lethal weapons. This research addresses fundamental physical principles as well as the psychophysical interaction between directed energy and the individual or groups of individuals. Research is divided into three core focus areas: optical radiation bioeffects; radio frequency radiation (RFR) bioeffects; and biobehavioral systems. Optical radiation bioeffects research enhances combat survivability and systems effectiveness through technologies that enable deployed forces to counter optical threats and exploit optical systems for offensive applications. The RFR bioeffects research focuses on theoretical and empirical dosimetry, bioeffects of short- and long-term exposure, methods to counter RFR threats, and exploitation of directed energy systems for offensive capabilities. Biobehavioral systems research concentrates on the design and characterization of scalable directed energy and novel-effects weapons, and their ability to modify human behavior.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Title: Major Thrust 1	7.119	8.186	8.406	-	8.406
Description: Conducts laboratory experiments and field research on laser bioeffects, enabling military exploitation of laser technology, while providing countermeasures for optical hazards/threats.					
FY 2010 Accomplishments: Evaluated collateral hazard assessment software model on high energy laser platforms and develop next generation of hazard assessment tools. Expanded laser damage threshold database for multiple wavelengths to validate Department of Defense, national, and international safety standards. Evaluated superthreshold tissue impacts and further define weapon effectiveness parameters. Conducted experiments for future high energy laser weapon systems to predict, evaluate, and explore target bioeffects.					
FY 2011 Plans: Conduct research to refine Department of Defense, national, and international safe exposure standards to include multiple wavelength laser exposures. Initiate research to provide personal protection while operating in a high energy directed energy weapon hazard zones. Validate collateral hazard assessment software for high energy laser systems and weapon platforms.					
FY 2012 Base Plans: Begin developing tools to assess collateral high energy laser hazards using probabilistic techniques. Develop new models and techniques for assessing vision effects from laser eye protection. Assess human factors					

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602202F: *Human Effectiveness Applied Research*	PROJECT 627757: *Directed Energy Bioeffects*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
integration of laser eye protection with visor, helmet, and advanced cockpit designs. Continue research on advanced designs of personal protection in high energy directed energy weapons hazard zones. ***FY 2012 OCO Plans:***					
Title: Major Thrust 2 ***Description:*** Conducts laboratory experiments and field research to enable safe exploitation of directed energy technologies for communication, target identification, and weapons development. ***FY 2010 Accomplishments:*** Evaluated biological responses to high power and high peak power electromagnetic systems from cellular to whole organism perspectives. Validated models of RFR bioeffects through laboratory and field experimentation, as well as applied mathematics. Conducted research to support fielding and effectiveness of scalable directed energy weapon systems. Conducted research into the bioeffects and safety of terahertz sources. ***FY 2011 Plans:*** Conduct terahertz research in order to refine national and international safe exposure levels and evaluate potential military utility. Conduct bioeffects research to support scalable directed energy weapon capabilities. Initiate development of a model of scalable RFR effects based on experimentation and theoretical physics. Assess combinations of directed energy parameters on behavior and physiology. ***FY 2012 Base Plans:*** Conduct electromagnetic radiation (0 Hz – 10 THz) bioeffects research in support of national and international safety standards. Conduct biological studies of advanced directed energy weapon concepts. Conduct physiological and behavioral research to support scalable directed energy weapon capabilities. Continue scalable RFR effects modeling development based on theoretical and experimental physics. Assess bioeffects of combined directed energy sources. ***FY 2012 OCO Plans:***	6.822	8.136	8.388	-	8.388
Title: Major Thrust 3 ***Description:*** Concentrates on human responses to non-lethal weapons and conducts research to assess the effects and risk of these weapons. ***FY 2010 Accomplishments:***	0.373	0.401	0.408	-	0.408

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602202F: *Human Effectiveness Applied Research*	PROJECT 627757: *Directed Energy Bioeffects*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Developed initial quantitative models of behavioral responses to RFR non-lethal weapons. Developed Human Effect-Modeling Applications Program (HE-MAP) by incorporating a software interface that links graphical user interfaces with predictive models of RFR non-lethal weapon-induced effectiveness and risk. Incorporated within HE-MAP the development of a design optimization and effects-based module that will allow analysis of design parameters and their influence on effectiveness. ***FY 2011 Plans:*** Develop initial quantitative models of behavioral responses using effects data from directed energy non-lethal weapons. Enhance HE-MAP through addition of a software interface linking HE-MAP graphical user interfaces with predictive models of acoustic non-lethal weapon-induced effectiveness and risk. Incorporate within HE-MAP the development of an effects-based design module that will allow analysis of design parameters of directed energy non-lethal weapons and their influence on effectiveness. ***FY 2012 Base Plans:*** Develop a quantitative framework for relating directed energy and scalable novel-effects technologies (including non-lethal and escalation of force weapons) to operationally relevant outcomes via research on physiological and psychological human effects (HE). Establish a database containing behavioral effectiveness and risk of injury information under operational conditions to facilitate coordination among operators, researchers, and weapon acquisition professionals. Develop methodology to quantify behavioral effectiveness (e.g., sensory, cognitive, motor) across the range of directed energy and scalable novel-effects technologies. Develop methodology to quantify the risk of injury (e.g., reversible, irreversible) across the range of non-lethal and escalation of force weapons. ***FY 2012 OCO Plans:***					
Accomplishments/Planned Programs Subtotals	14.314	16.723	17.202	-	17.202

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
• Activity Not Provided: *Title Not Provided*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602202F: *Human Effectiveness Applied Research*	PROJECT 627757: *Directed Energy Bioeffects*

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.