Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Air Force										DATE: February 2010	
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 1: *Basic Research*				R-1 ITEM NOMENCLATURE PE 0601108F: *High Energy Laser Research Initiatives*							
COST ($ in Millions)	**FY 2009 Actual**	**FY 2010 Estimate**	**FY 2011 Base Estimate**	**FY 2011 OCO Estimate**	**FY 2011 Total Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	13.032	12.781	13.198	0.000	13.198	14.258	14.094	14.326	14.554	Continuing	Continuing
615097: *High Energy Laser Research Initiatves*	13.032	12.781	13.198	0.000	13.198	14.258	14.094	14.326	14.554	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program funds basic research aimed at developing fundamental scientific knowledge to support future Department of Defense (DoD) high energy laser (HEL) systems. The HEL Joint Technology Office (JTO) sends these funds to multi-disciplinary research institutes (MRIs) for projects on laser and beam control technologies. In addition, funding supports educational grants to stimulate interest in HELs. These educational grants are used for educational tools, scholarships, and summer intern employees in military laboratories. Through this program, the DoD invests in research directed toward increasing knowledge and understanding in those fields of science and engineering related to long-term national security needs. This program is in Budget Activity 1, Basic Research, because it funds scientific study and experimentation.

B. Program Change Summary ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Previous President's Budget	13.389	12.834	0.000	0.000	0.000
Current President's Budget	13.032	12.781	13.198	0.000	13.198
Total Adjustments	-0.357	-0.053	13.198	0.000	13.198
• Congressional General Reductions		-0.053			
• Congressional Directed Reductions		0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds		0.000			
• Congressional Directed Transfers		0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-0.357	0.000	13.198	0.000	13.198

Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Air Force	DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 1: *Basic Research*	**R-1 ITEM NOMENCLATURE** PE 0601108F: *High Energy Laser Research Initiatives*

Change Summary Explanation

The FY 2010 President's Budget submittal did not reflect FY 2011 through FY 2015 funding. A detailed explanation of changes between the two budget positions is not provided because it cannot be made in a relevant manner.

C. Performance Metrics

Under Development.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Air Force			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601108F: *High Energy Laser Research Initiatives*	PROJECT 615097: *High Energy Laser Research Initiatves*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
615097: *High Energy Laser Research Initiatves*	13.032	12.781	13.198	0.000	13.198	14.258	14.094	14.326	14.554	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program funds basic research aimed at developing fundamental scientific knowledge to support future Department of Defense (DoD) high energy laser (HEL) systems. The HEL Joint Technology Office (JTO) sends these funds to multi-disciplinary research institutes (MRIs) for projects on laser and beam control technologies. In addition, funding supports educational grants to stimulate interest in HELs. These educational grants are used for educational tools, scholarships, and summer intern employees in military laboratories. Through this program, the DoD invests in research directed toward increasing knowledge and understanding in those fields of science and engineering related to long-term national security needs. This program is in Budget Activity 1, Basic Research, because it funds scientific study and experimentation.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
MAJOR THRUST: Improve the fundamental understanding of high-power laser sources, to include solid-state, free electron, and gas laser technologies.	7.887	8.641	8.838	0.000	8.838
FY 2009 Accomplishments: In FY 2009: Completed efforts to conduct fiber laser research focused on single aperture scaling single-mode fibers, and organization of multiple fibers. Completed fundamental research of optically-pumped atomic and molecular gas lasers. Continued research on awarded topics in diode-pumped alkali, free electron, and solid state laser technologies. Initiated interaction to look at promising technology development overseas.					
FY 2010 Plans: In FY 2010: Continue research on awarded topics in diode-pumped alkali, free electron, and solid state laser technologies. Initiate a new call for fiber-based solid state laser technologies. Establish					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Air Force		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601108F: *High Energy Laser Research Initiatives*	PROJECT 615097: *High Energy Laser Research Initiatves*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
overseas efforts to leverage international technology advancements. Conduct an MRI proposal call for FY 2010. *FY 2011 Base Plans:* In FY 2011: Complete research efforts on awarded topics in diode-pumped alkali, free electron, fiber laser and solid state laser technologies, and evaluate for continuation. Continue overseas efforts to leverage international technology advancements. *FY 2011 OCO Plans:* In FY 2011 OCO: N/A					
MAJOR THRUST: Improve the fundamental understanding of beam control technologies as they relate to high power laser applications. *FY 2009 Accomplishments:* In FY 2009: Conducted research on awarded topics for improved beam control technologies and techniques. Continued mitigation of aero-optic effects to enhance tactical HEL architectures and to reduce weight, size and complexity of the beam control system. Initiated interaction to look at promising technology development overseas. *FY 2010 Plans:* In FY 2010: Continue mitigation of aero-optic effects to enhance tactical HEL architectures and to reduce weight, size, and complexity of the beam control system. Establish overseas efforts to leverage international technology advancements. *FY 2011 Base Plans:* In FY 2011: Evaluate for continuation the mitigation of aero-optic effects to enhance tactical HEL architectures and the reduction of weight, size, and complexity of the beam control system. Continue overseas efforts to leverage international technology advancements.	2.545	3.404	3.610	0.000	3.610

Exhibit R-2A, RDT&E Project Justification: PB 2011 Air Force		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601108F: *High Energy Laser Research Initiatives*	PROJECT 615097: *High Energy Laser Research Initiatves*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2011 OCO Plans: In FY 2011 OCO: N/A					
MAJOR THRUST: Maintain and evaluate high-fidelity models for HEL scenario evaluations and the HEL toolkit. Provide for HEL systems level modeling into mission-level wargaming activities. *FY 2009 Accomplishments:* In FY 2009: Developed a solid state laser model to allow parameterization of components with the laser system. Developed a high-fidelity model for HEL system scenario evaluation. *FY 2010 Plans:* In FY 2010: Not Applicable. *FY 2011 Base Plans:* In FY 2011: Not Applicable. *FY 2011 OCO Plans:* In FY 2011 OCO: N/A	1.850	0.000	0.000	0.000	0.000
MAJOR THRUST: Fund educational grants, through the Directed Energy Professional Society, intended to simulate interest in HEL technologies among students. *FY 2009 Accomplishments:* In FY 2009: Provided scholarships and internships to support college students studying HEL degrees. Provided grants to Service Academies to stimulate HEL studies among military cadets. Provided support to K-12 school programs to stimulate science and math studies, with an emphasis on lasers and optics. Funded publication of journals and continuing education for professionals in the HEL field. Conducted a proposal call for FY 2010 for execution and coordination of the Educational Grant program.	0.750	0.736	0.750	0.000	0.750

Exhibit R-2A, RDT&E Project Justification: PB 2011 Air Force		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601108F: *High Energy Laser Research Initiatives*	PROJECT 615097: *High Energy Laser Research Initiatves*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
FY 2010 Plans: In FY 2010: Provide scholarships and internships to support college students studying HEL degrees. Provide grants to Service Academies to stimulate HEL studies among military cadets. Provide support to K-12 school programs to stimulate science and math studies, with an emphasis on lasers and optics. Fund publication of journals and continuing education for professionals in the HEL field. *FY 2011 Base Plans:* In FY 2011: Provide scholarships and internships to support to college students studying HEL degrees. Provide grants to Service Academies to stimulate HEL studies among military cadets. Provide support to K-12 school programs to stimulate science and math studies, with an emphasis on lasers and optics. Fund publication of journals and continuing education for professionals in the HEL field. *FY 2011 OCO Plans:* In FY 2011 OCO: N/A					
Accomplishments/Planned Programs Subtotals	13.032	12.781	13.198	0.000	13.198

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
• PE 0602890F: *High Energy Laser Research.*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
• PE 0603444F: *Maui Space Surveillance System.*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
• PE 0603605F: *Advanced Weapons Technology.*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2011 Air Force			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601108F: *High Energy Laser Research Initiatives*	PROJECT 615097: *High Energy Laser Research Initiatves*	

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total	FY 2012	FY 2013	FY 2014	FY 2015	Cost To Complete	Total Cost
• PE 0603924F: *High Energy Laser Advanced Technology Program.*											
• PE 0602605F: *Directed Energy Technology.*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
• PE 0602120A: *Sensors and Electronic Survivability.*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
• PE 0602307A: *Advanced Weapons Technology.*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
• PE 0602624A: *Weapons and Munitions Technology.*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
• PE 0603004A: *Weapons and Munitions Advanced Technology.*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
• PE 0602114N: *Power Projection Applied Research.*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
• PE 0602702E: *Tactical Technology.*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
• PE 0603175C: *Ballistic Missile Defense Technology.*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
• PE 0603883C: *Ballistic Missile Defense Boost Phase Segment.*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
• PE 0602651M: *Joint Non-Lethal Weapons Applied Research.*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
• PE 0603651M: *Joint Non-Lethal Weapons Technology Development.*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

D. Acquisition Strategy

Not Applicable.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Air Force		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 1: *Basic Research*	**R-1 ITEM NOMENCLATURE** PE 0601108F: *High Energy Laser Research Initiatives*	**PROJECT** 615097: *High Energy Laser Research Initiatves*

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.