Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Air Force										DATE: February 2012	
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*				R-1 ITEM NOMENCLATURE PE 0602890F: *High Energy Laser Research*							
COST ($ in Millions)	**FY 2011**	**FY 2012**	**FY 2013 Base**	**FY 2013 OCO**	**FY 2013 Total**	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**Cost To Complete**	**Total Cost**
Total Program Element	51.514	53.791	38.557	-	38.557	40.177	41.296	42.045	42.514	Continuing	Continuing
625096: *High Energy Laser Research*	51.514	53.791	38.557	-	38.557	40.177	41.296	42.045	42.514	Continuing	Continuing

Note

Note: In FY 2013, reductions due to higher Department of Defense priorities.

A. Mission Description and Budget Item Justification

This program funds Department of Defense (DoD) high energy laser (HEL) applied research through the HEL Joint Technology Office (JTO). HEL weapon systems have many potential advantages including speed-of-light delivery, precision target engagement, significant magazine depth, low-cost per kill, and reduced logistics requirements. HELs have the potential to perform a wide variety of military missions including defeat of high-speed, maneuvering anti-ship and anti-aircraft missiles and the ultra-precision negation of targets in urban environments with minimal collateral damage. This program is part of an overall DoD HEL Science and Technology program. Efforts funded under this program are generally chosen for their potential to have an impact on multiple HEL systems and multiple Service missions while complimenting Service/Agency programs that are directed at specific Service needs. A broad range of technologies are addressed in key areas such as electrically powered lasers, laser beam control, and laser lethality mechanisms. 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.

B. Program Change Summary ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total
Previous President's Budget	53.384	54.059	52.297	-	52.297
Current President's Budget	51.514	53.791	38.557	-	38.557
Total Adjustments	-1.870	-0.268	-13.740	-	-13.740
• Congressional General Reductions	-	-0.268			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.433	-			
• Other Adjustments	-0.437	-	-13.740	-	-13.740

Change Summary Explanation

FY11: Other Adjustments include -0.437 Congressional General Reductions

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Decrease in FY13 is due to higher Department of Defense priorities.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total
Title: Major Thrust 1. ***Description:*** Advance solid-state laser development. ***FY 2011 Accomplishments:*** Conducted a joint-high power electric laser product improvement program under the Robust Electric Laser Initiative (RELI). Concurrent design verification experiments supported risk-reduction efforts. ***FY 2012 Plans:*** Continue a joint high power electric laser product improvement program as part of the RELI effort. Monitor and evaluate progress toward a 25 kilowatt (kW) laser design. ***FY 2013 Base Plans:*** Conduct a joint high power electric laser product improvement program as part of the RELI effort. Prepare for government-sponsored measurements to validate RELI performance. ***FY 2013 OCO Plans:*** N/A	12.206	12.696	11.850	-	11.850
Title: Major Thrust 2. ***Description:*** Mature technologies that will provide system level performance commensurate with fieldable solid-state laser devices. ***FY 2011 Accomplishments:*** Demonstrated building blocks for highly efficient, compact, modular laser system with weapons-class applications. Scaled eye-safer laser technologies to kW-class power levels. Conducted Service and Agency proposal call for FY 2011 and awarded seven new efforts. ***FY 2012 Plans:*** Develop high reliability/cost efficient diode pump sources. Scale eye-safer laser technologies to militarily relevant higher powers. Develop high power delivery fiber technologies. Conduct an industry proposal call for FY 2012. ***FY 2013 Base Plans:***	9.534	9.781	4.950	-	4.950

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total
Develop highly efficient, compact, modular electric laser systems. Conduct a Service and Agency proposal call for FY 2013. ***FY 2013 OCO Plans:*** N/A					
Title: Major Thrust 3. ***Description:*** Conduct system-level technology development to facilitate scaling of free electron lasers (FELs) to weapons-class power levels. ***FY 2011 Accomplishments:*** Demonstrated technologies that can support a megawatt (MW) class future FEL system. Conducted a Service and Agency proposal call for FY 2011, and awarded three new efforts. ***FY 2012 Plans:*** Demonstrate technologies that can support a MW class future FEL system. Conduct an industry proposal call for FY 2012. ***FY 2013 Base Plans:*** Reduction is due to higher Department of Defense priorities. ***FY 2013 OCO Plans:*** N/A	4.304	4.299	-	-	-
Title: Major Thrust 4. ***Description:*** Investigate new technologies that have revolutionary potential for HEL applications. ***FY 2011 Accomplishments:*** Explored novel laser technologies to improve efficiency and decrease mass/volume. Evaluated new materials for HEL application. Initiated a military study on short pulse laser technology applications. Scaled electrically pumped alkali lasers to moderate power levels. Conducted a Service and Agency proposal call for FY 2011 and awarded eight new efforts. ***FY 2012 Plans:***	8.637	9.652	8.970	-	8.970

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total
Explore novel laser technologies to improve efficiency and decrease mass/volume. Evaluate new materials for HEL applications. Prepare to demonstrate applications for short pulse laser technology. Continue to scale electrically pumped alkali lasers to kW-class power levels. Conduct an industry proposal call for FY 2012. ***FY 2013 Base Plans:*** Explore novel laser technologies to improve efficiency and decrease mass/volume. Evaluate new materials for HEL applications. Demonstrate applications for short pulse laser technology. Continue to scale electrically pumped alkali lasers to increased power levels. Conduct a Service and Agency proposal call for FY 2013. ***FY 2013 OCO Plans:*** N/A					
Title: Major Thrust 5. ***Description:*** Develop technology to support high performance beam control systems and integrated demonstrations. ***FY 2011 Accomplishments:*** Demonstrated advanced component and control techniques for difficult environments, such as high-speed flight, high turbulence, and extended ranges. Conducted a Service and Agency proposal call for FY 2011 and awarded eight contracts. ***FY 2012 Plans:*** Implement beam control technology options for laser weapon use on multiple platforms (aircraft, ground vehicles, and shipboard systems) in stressing environments. Conduct an industry proposal call for FY 2012. ***FY 2013 Base Plans:*** Implement beam control technology options for laser weapon use on multiple platforms (aircraft, ground vehicles, and shipboard systems) in stressing environments. Conduct a Service and Agency proposal call for FY 2013.	9.630	9.841	5.080	-	5.080
Title: Major Thrust 6. ***Description:*** Conduct laser vulnerability experiments on materials, components, and targets. Develop a lethality database, and integrate into a systems-level architecture plan and lethality models. ***FY 2011 Accomplishments:***	4.385	4.557	4.587	-	4.587

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total
Integrated lethality data into campaign-level HEL system models. Continued laser vulnerability experiments on materials, components, and targets. Updated laser systems inputs for the Joint Munitions Effect Manual. Developed a counter-Unmanned Aircraft System (UAS) vulnerability assessment. ***FY 2012 Plans:*** In close coordination with existing HEL models, integrate lethality data into campaign-level HEL system models. Conduct laser vulnerability experiments on materials, components, and targets. Update laser systems inputs for the Joint Munitions Effect Manual. ***FY 2013 Base Plans:*** In close coordination with existing HEL models, integrate lethality data into campaign-level HEL system models. Conduct laser vulnerability experiments on materials, components, and targets. Update laser systems inputs for the Joint Munitions Effect Manual. ***FY 2013 OCO Plans:*** N/A					
Title: Major Thrust 7. ***Description:*** Maintain and evaluate high-fidelity engineering models for HEL system scenario evaluation and incorporation into the HEL toolkit. Provide for HEL system modeling for mission-level war gaming activities. ***FY 2011 Accomplishments:*** Provided maintenance, verification, validation, and accreditation for updated system level HEL models. Conducted mission-level HEL engagement scenarios and wargame HEL concepts. Incorporated predictive avoidance modeling into existing HEL toolkit. ***FY 2012 Plans:*** Provide maintenance, verification, validation, and accreditation for updated system level HEL models. Conduct mission-level HEL engagement scenarios and wargame HEL concepts. Incorporate predictive avoidance modeling into existing HEL toolkit. ***FY 2013 Base Plans:*** Provide maintenance, verification, validation, and accreditation for updated system level HEL models. Conduct mission-level HEL engagement scenarios and wargame HEL concepts. Incorporate predictive avoidance modeling into existing HEL toolkit. ***FY 2013 OCO Plans:***	2.818	2.965	3.120	-	3.120

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total
N/A					
Accomplishments/Planned Programs Subtotals	51.514	53.791	38.557	-	38.557

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
• N/A: *N/A*	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

E. Acquisition Strategy

N/A

F. 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.