Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Air Force											DATE: April 2013	
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)	**All Prior Years**	**FY 2012**	**FY 2013#**	**FY 2014 Base**	**FY 2014 OCO ##**	**FY 2014 Total**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**Cost To Complete**	**Total Cost**
Total Program Element	-	52.186	38.557	40.217	-	40.217	41.575	42.316	42.636	43.405	Continuing	Continuing
625096: *High Energy Laser Research*	-	52.186	38.557	40.217	-	40.217	41.575	42.316	42.636	43.405	Continuing	Continuing

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

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). This program is part of an overall DoD HEL Science and Technology (S&T) program. 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. 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 DoD S&T Executive Committee 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 2014 Air Force		DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602890F: *High Energy Laser Research*	

B. Program Change Summary ($ in Millions)	FY 2012	FY 2013	FY 2014 Base	FY 2014 OCO	FY 2014 Total
Previous President's Budget	53.791	38.557	40.177	-	40.177
Current President's Budget	52.186	38.557	40.217	-	40.217
Total Adjustments	-1.605	0.000	0.040	-	0.040
• Congressional General Reductions	-	0.000			
• 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	-1.605	0.000			
• Other Adjustments	0.000	0.000	0.040	-	0.040

C. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
Title: Robust Electric Lasar Initiative	12.751	11.847	11.750
Description: Advance solid-state laser development. ***FY 2012 Accomplishments:*** Continued a joint high power electric laser product improvement program, as part of the Robust Electric Laser Initiative (RELI) effort, with Army and Air Force. Monitored and evaluated progress toward a 25 kilowatt (kW) laser design. ***FY 2013 Plans:*** Continue a joint high power electric laser product improvement program, as part of the RELI effort. Select efforts to build a 25kW laser source. Prepare for government-sponsored measurements to validate performance. ***FY 2014 Plans:*** Continue a joint high power electric laser product improvement program, as part of the RELI effort. Monitor technical progress toward multiple 25kW laser sources. Finalize preparations and equipment for government-sponsored measurements to validate performance.			
Title: Solid State Lasar Technologies	9.386	6.290	6.377
Description: Mature technologies that will provide system level performance commensurate with fieldable solid-state laser devices. ***FY 2012 Accomplishments:***			

Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Air Force	DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	**R-1 ITEM NOMENCLATURE** PE 0602890F: *High Energy Laser Research*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
Developed high reliability/cost efficient diode pump sources. Scaled alternate laser wavelengths to militarily relevant power levels. Developed high power capable fiber technologies. Conducted an industry proposal call for FY 2012 and awarded nine new contracts. ***FY 2013 Plans:*** Develop highly efficient, compact, modular electric laser systems. Advance technology for laser gain material, improved heat extraction, and novel fiber architectures. Conduct a Service and Agency proposal call for FY 2013. ***FY 2014 Plans:*** Develop highly efficient, compact, modular electric laser systems. Develop high reliability/cost efficient diode pump sources. Scale alternate laser wavelengths to militarily relevant power levels. Develop high power delivery fiber technologies. Conduct an industry proposal call for FY 2014.			
Title: Free Electron Laser Technologies ***Description:*** Conduct system-level technology development to facilitate scaling of free electron lasers (FELs) to weapons-class power levels. ***FY 2012 Accomplishments:*** Demonstrated technologies for a 100kW lab demonstration, with emphasis on technologies that can support 1 megawatt (MW) future FEL performance. Conducted an industry proposal call for FY 2012 and awarded three new contracts. ***FY 2013 Plans:*** Complete technologies for 100kW lab demonstration. Effort transitions to the Navy, PE 0602114N. ***FY 2014 Plans:*** N/A	3.850	0.580	0.000
Title: Advanced HEL Technologies ***Description:*** Investigate new technologies that have revolutionary potential for HEL applications. ***FY 2012 Accomplishments:*** Explored novel laser technologies to improve efficiency and decrease mass/volume. Evaluated new materials for high energy laser applications. Completed military assessment of applications for short pulse laser technology. Continued to scale electrically pumped alkali lasers to kW-class power levels. Conducted an industry proposal call for FY 2012 and awarded 12 new contracts. ***FY 2013 Plans:***	9.242	5.920	7.520

Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Air Force	DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	R-1 ITEM NOMENCLATURE PE 0602890F: *High Energy Laser Research*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
Explore novel laser technologies to improve efficiency and decrease mass/volume. Evaluate new materials for high energy laser applications, to include optics in a high-gain vacuum. 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 2014 Plans:*** Explore novel laser technologies to improve efficiency and decrease mass/volume. Evaluate new materials for high energy laser applications, to include optics in a high-gain vacuum. Demonstrate applications for short pulse laser technology. Continue to scale electrically pumped alkali lasers to increased power levels. Conduct an industry proposal call for FY 2014.			
Title: Laser Beam Control Technologies ***Description:*** Develop technology to support high performance beam control systems and integrated demonstrations. ***FY 2012 Accomplishments:*** Explored beam control technology options for laser weapon use on multiple platforms (aircraft, ground vehicles and shipboard systems) in stressing environments. Conducted an industry proposal call for FY 2012 and awarded 11 new contracts. ***FY 2013 Plans:*** Explore 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. ***FY 2014 Plans:*** Explore 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 2014.	9.517	7.240	7.660
Title: Lethality Research ***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 2012 Accomplishments:*** Integrated lethality data into campaign-level HEL system models. Continued laser vulnerability experiments on materials, components, and targets. Completed the Counter-Unmanned Aerial System vulnerability module and incorporated into modeling tools. ***FY 2013 Plans:***	4.460	3.560	3.590

Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Air Force	DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 3600: *Research, Development, Test & Evaluation, Air Force* BA 2: *Applied Research*	**R-1 ITEM NOMENCLATURE** PE 0602890F: *High Energy Laser Research*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2012	FY 2013	FY 2014
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. ***FY 2014 Plans:*** In close coordination with existing HEL models, integrate additional lethality data into campaign-level HEL system models. Conduct laser vulnerability experiments on materials, components, and targets.			
Title: HEL Modeling ***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 2012 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 2013 Plans:*** Provide maintenance, verification, validation, and accreditation for updated system level HEL models. Conduct mission-level HEL engagement scenarios and wargame HEL concepts. Incorporate enhanced predictive avoidance modeling into existing HEL toolkit. ***FY 2014 Plans:*** Provide maintenance, verification, validation, and accreditation for updated system level HEL models. Conduct mission-level HEL engagement scenarios and wargame HEL concepts. Incorporate additional predictive avoidance modeling into existing HEL toolkit .	2.980	3.120	3.320
Accomplishments/Planned Programs Subtotals	52.186	38.557	40.217

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

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.