Exhibit R-2, RDT&E Budget Item Justification: PB 2015 Air Force											Date: March 2014	
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 2: *Applied Research*					R-1 Program Element (Number/Name) PE 0602890F / *High Energy Laser Research*							
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	-	34.233	40.155	37.496	-	37.496	42.316	42.636	43.405	44.054	Continuing	Continuing
625096: *High Energy Laser Research*	-	34.233	40.155	37.496	-	37.496	42.316	42.636	43.405	44.054	Continuing	Continuing

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

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.

B. Program Change Summary ($ in Millions)	FY 2013	FY 2014	FY 2015 Base	FY 2015 OCO	FY 2015 Total
Previous President's Budget	38.557	40.217	41.575	-	41.575
Current President's Budget	34.233	40.155	37.496	-	37.496
Total Adjustments	-4.324	-0.062	-4.079	-	-4.079
• Congressional General Reductions	-0.051	-0.062			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.050	-			
• Other Adjustments	-3.223	-	-4.079	-	-4.079

Change Summary Explanation

Decrease in FY13 Other Adjustments was due to Sequestration.
Decrease in FY15 is due to higher DoD priorities.

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Title: Robust Electric Laser Initiative	10.986	9.290	5.870
Description: Advance solid-state laser development. ***FY 2013 Accomplishments:*** Continued a joint high power electric laser product improvement program, as part of the Robust Electric Laser Initiative (RELI) effort. Selected two efforts to build a 60 kilowatt (kW) and a 30kW laser source for integration on relevant military platforms. Prepared 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 60kW and 30kW laser source development for integration onto relevant military platforms. Analyze trade space to understand performance and integration issues for other platforms. Continue investigation into other laser architectures for further development and scaling and initiate additional effort(s). Finalize preparations and equipment for government-sponsored measurements to validate performance. ***FY 2015 Plans:*** Continue the joint high power electric laser product improvement program, as part of the RELI effort. Monitor technical progress of the 60kW and the 30kW lasers and other sources. Monitor preparation for integration onto specific relevant military platforms. Continue analysis of trade space to understand performance and integration issues for other platforms. Perform government-sponsored measurements to validate performance.			
Title: Solid State Laser Technologies	5.797	6.365	5.336
Description: Mature technologies that will provide system level performance commensurate with fieldable solid-state laser devices. ***FY 2013 Accomplishments:*** Developed highly efficient, compact, modular electric laser system component technologies. Advanced technology for laser gain material, improved heat extraction, and novel fiber architectures. Conducted a Service and Agency call for FY13 and awarded nine new projects. ***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. ***FY 2015 Plans:***			

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Develop high reliability, lower cost, efficient and high temperature diode pump sources. Scale alternate laser wavelengths to militarily relevant power levels. Develop high power delivery fiber technologies. Conduct a reduced Service and Agency call for FY15.			
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 2013 Accomplishments:*** Demonstrated technologies for a 100KW lab demonstration, with emphasis on technologies that can support 1 megawatt future FEL performance. ***FY 2014 Plans:*** Demonstrate technologies that can support 100kW future FEL performance. Conduct an industry proposal call for FY14. ***FY 2015 Plans:*** Complete technologies that can support 100kW future FEL performance. Effort transitioned to Navy program 0602114N.	0.475	0.500	0.200
Title: Advanced High Energy Laser (HEL) Technologies ***Description:*** Investigate new technologies that have revolutionary potential HEL applications. ***FY 2013 Accomplishments:*** Explored novel laser technologies to improve efficiency and decrease mass/volume. Evaluated new materials for HEL applications, to include optics in a high-gain vacuum. Continued to scale electrically pumped alkali laser pump sources to increased power levels. Performed system study of diode pumped alkali lasers. Demonstrated applications for short pulse laser technology. Conducted a Service and Agency call for FY13 and awarded three new projects. ***FY 2014 Plans:*** Explore novel laser technologies to improve efficiency and decrease mass/volume. Evaluate new materials for HEL 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. In close coordination with the HEL, air space control, and satellite communities establish and begin a Predictive Avoidance and Air Space Deconfliction (PAAD) program to develop a prototype standalone capability that will interface with aviation, surface and space situational awareness systems and an HEL weapons systems to demonstrate an initial capability. Conduct an industry proposal call for FY 2014. ***FY 2015 Plans:***	3.946	8.800	7.490

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
Explore novel laser technologies to improve efficiency and decrease mass/volume. Evaluate new materials for HEL applications. Continue to improve understanding of short pulse laser technology to include material interaction and propagation. Continue to scale electrically pumped alkali lasers to KW-class power levels. Continue development of the PAAD system and begin initial testing on HEL test range(s). Conduct a reduced Service and Agency call for FY15.			
Title: Laser Beam Control Technologies ***Description:*** Develop technology to support high performance beam control systems and integrated demonstrations. ***FY 2013 Accomplishments:*** Developed beam control technologies for laser weapon use on multiple platforms (aircraft, ground vehicles and shipboard systems) and in stressing environments. Began development of a predictive avoidance fire control system for use on multiple platforms. Conducted a Service and Agency call for FY13 and awarded seven new projects. ***FY 2014 Plans:*** Continue development of beam control technologies for laser weapon use on multiple platforms (aircraft, ground vehicles and shipboard systems) in stressing environments. Continue development of a predictive avoidance fire control system for use on multiple platforms. Develop and begin execution of a program plan for joint beam director technologies to improve throughput efficiency and decrease weight. Develop and begin execution of a program plan for kill assessment technologies. Conduct an industry proposal call for FY14. ***FY 2015 Plans:*** Continue development of beam control technologies for laser weapon use on multiple platforms (aircraft, ground vehicles and shipboard systems) in stressing environments. Continue development of a predictive avoidance fire control system for use on multiple platforms. Continue execution of the program plan for joint beam director technologies to improve throughput efficiency and decrease weight. Continue execution of a program plan for kill assessment technologies. Conduct a Service and Agency call for FY15. Initiate a joint beam control product improvement program to accelerate and advance the development of HEL beam control hardware and technologies for HEL weapon system prototypes.	6.717	8.290	12.050
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 2013 Accomplishments:***	3.357	3.590	3.630

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
In close coordination with existing HEL models, integrated lethality data into campaign-level HEL system models. Conducted laser vulnerability experiments on materials, components, and targets. ***FY 2014 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. ***FY 2015 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.			
Title: High Energy Laser (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 2013 Accomplishments:*** Provided maintenance, verification, validation, and accreditation for updated system level HEL models. Conducted mission-level HEL engagement scenarios and wargame HEL concepts. Incorporated 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. Continue development of a risk assessment for illumination of objects in space by tactical laser weapons. ***FY 2015 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. Continue development of a risk assessment for illumination of objects in space by tactical laser weapons.	2.955	3.320	2.920
Accomplishments/Planned Programs Subtotals	34.233	40.155	37.496

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

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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.