Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Air Force											Date: May 2017	
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 0603605F / *Advanced Weapons Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2016**	**FY 2017**	**FY 2018 Base**	**FY 2018 OCO**	**FY 2018 Total**	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**Cost To Complete**	**Total Cost**
Total Program Element	-	37.301	39.064	45.502	0.000	45.502	45.271	37.240	31.458	32.088	Continuing	Continuing
633151: *High Power Solid State Laser Technology*	-	16.865	20.824	24.635	0.000	24.635	27.912	18.880	12.730	12.985	Continuing	Continuing
633152: *High Power Microwave Development and Integration*	-	20.436	18.240	20.867	0.000	20.867	17.359	18.360	18.728	19.103	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program provides for the development, integration, demonstration, and detailed assessment of directed energy weapon technologies for potential application on Air Force platforms. These include high energy laser (HEL), high power electromagnetics (HPEM), and other unconventional weapon generation and transmission technologies, which can support a wide range of Air Force applications. The program develops a corresponding susceptibility, vulnerability, and lethality database for directed energy weapons. This program also develops advanced optical imaging for space situational awareness. Efforts in this program have been coordinated through the Department of Defense (DoD) Science and Technology (S&T) Executive Committee process to harmonize efforts and eliminate duplication.

This program is in Budget Activity 3, Advanced Technology Development because this budget activity includes development of subsystems and components and efforts to integrate subsystems and components into system prototypes for field experiments and/or tests in a simulated environment.

B. Program Change Summary ($ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total
Previous President's Budget	35.195	39.064	38.677	0.000	38.677
Current President's Budget	37.301	39.064	45.502	0.000	45.502
Total Adjustments	2.106	0.000	6.825	0.000	6.825
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	3.134	0.000			
• SBIR/STTR Transfer	-1.028	0.000			
• Other Adjustments	0.000	0.000	6.825	0.000	6.825

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2016	FY 2017
Project: 633152: *High Power Microwave Development and Integration*		
Congressional Add: *Counter-electronics high power microwave advanced missile*	5.000	-

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Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2016	FY 2017
Congressional Add Subtotals for Project: 633152	5.000	-
Congressional Add Totals for all Projects	5.000	-

Change Summary Explanation

FY 2017 increase reflects reprogramming for Air Dominance activities and to support Research and Development Projects, 10 U.S.C. Section 2358.

FY 2018 increase due to increased priority of high energy laser research.

Exhibit R-2A, RDT&E Project Justification: FY 2018 Air Force			Date: May 2017
Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603605F / *Advanced Weapons Technology*	Project (Number/Name) 633151 / *High Power Solid State Laser Technology*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
633151: *High Power Solid State Laser Technology*	-	16.865	20.824	24.635	0.000	24.635	27.912	18.880	12.730	12.985	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project provides for the development, integration, demonstration, and detailed assessment of HEL devices, advanced imaging and beam control technologies needed for applications such as force protection, force application, precision engagement, and aircraft self-protection. Laser system concept assessments to include vulnerability assessments and target effect testing are performed.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: High Energy Laser/Beam Control	16.865	20.824	24.635
Description: Develop and demonstrate advanced beam control technologies, integrated laser systems, and aircraft self-protection laser technologies. Demonstrate beam control components integrated with HELs for Air Force utility. ***FY 2016 Accomplishments:*** Completed experiments with the joint DARPA and Air Force HEL system against various targets including ground targets and surface-to-air missiles. Continued to document field lethality data, modeling and simulation tools, and lessons learned on the tests. Began preparation for integration of a moderate power laser system into a pod for aircraft self-protection ground demo. Continued with the design of a full scale turret with aero-effects mitigation, integrate with light weight beam director and control system, and plan for testing. ***FY 2017 Plans:*** Continue the integration of a moderate power laser system into a pod for aircraft self protection ground demo. Complete the integration/verification of the beam control systems into a pod. Continue the development of vulnerability criteria for the Air Superiority mission. Complete verification tests of the moderate power ground-to-air fiber laser weapons system demonstration. ***FY 2018 Plans:*** Continue the integration of a low power laser system into a pod for Phase 1 aircraft self-protect demonstration. In addition to the laser source, continue with integration of the laser control subsystem for directing the laser onto the target for aircraft self-protect demonstration. Continue development of ground support and aircraft interface.			
Accomplishments/Planned Programs Subtotals	16.865	20.824	24.635

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: FY 2018 Air Force		Date: May 2017
Appropriation/Budget Activity 3600 / 3	**R-1 Program Element (Number/Name)** PE 0603605F / *Advanced Weapons Technology*	**Project (Number/Name)** 633151 / *High Power Solid State Laser Technology*

C. Other Program Funding Summary ($ in Millions)

Remarks

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: FY 2018 Air Force			Date: May 2017
Appropriation/Budget Activity 3600 / 3	R-1 Program Element (Number/Name) PE 0603605F / *Advanced Weapons Technology*	Project (Number/Name) 633152 / *High Power Microwave Development and Integration*	

COST ($ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
633152: *High Power Microwave Development and Integration*	-	20.436	18.240	20.867	0.000	20.867	17.359	18.360	18.728	19.103	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project develops and demonstrates HPEM and other unconventional weapon generation and transmission technologies that support a wide range of Air Force missions such as the potential disruption, degradation, damage, or destruction of an adversary's electronic infrastructure and military capability and non-lethal, anti-personnel weapon applications. It also provides inputs to the susceptibility, vulnerability, and lethality databases.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2016	FY 2017	FY 2018
Title: HPEM Technologies	15.436	18.240	20.867
Description: Develop and evaluate HPEM and other unconventional weapon technologies for various platforms, including aerial, for applications such as counter-electronics. Develop and evaluate HPEM technologies for non-lethal, anti-personnel weapon applications. ***FY 2016 Accomplishments:*** Refined design of a class of reusable, multi-pulse, multi-target counter-electronics payloads capable of being hosted in various advanced platforms. Characterized, modeled, tested and evaluated red directed energy threats on blue assets. Began initial preparations of advanced system technologies for the High power Joint Electromagnetic Non-Kinetic Strike (HiJENKS) high power microwave (HPM) flight demonstration. ***FY 2017 Plans:*** Continue the design and evaluation of the utility of a class of reusable, multi-pulse, multi-target counter-electronics payloads capable of being hosted in various advanced platforms. Continue to characterize, model, test and evaluate current and projected blue directed energy threats on red assets. Continue the system design effort with the Navy for the HiJENKS HPM flight demonstration. ***FY 2018 Plans:*** Finalize design and evaluation of the utility of a class of reusable, multi-pulse, multi-target counter-electronics payloads capable of being hosted in various advanced platforms. Characterize, model, test and evaluate current and projected blue directed energy threats on red assets. Begin the HiJENKS HPM flight demonstration with the Navy.			
Accomplishments/Planned Programs Subtotals	15.436	18.240	20.867

Exhibit R-2A, RDT&E Project Justification: FY 2018 Air Force		Date: May 2017
Appropriation/Budget Activity 3600 / 3	**R-1 Program Element (Number/Name)** PE 0603605F / *Advanced Weapons Technology*	**Project (Number/Name)** 633152 / *High Power Microwave Development and Integration*

	FY 2016	FY 2017
Congressional Add: Counter-electronics high power microwave advanced missile	5.000	-
FY 2016 Accomplishments: Conduct Congressionally directed effort.		
Congressional Adds Subtotals	5.000	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

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.