| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Air Force | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>3600: *Research, Development, Test & Evaluation, Air Force* / BA 3: *Advanced Technology Development (ATD)* | | | | | R-1 Program Element (Number/Name)<br>PE 0603605F / *Advanced Weapons Technology* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| Total Program Element | - | 18.519 | 33.542 | 30.195 | - | 30.195 | 31.064 | 38.677 | 30.238 | 30.840 | Continuing | Continuing |
| 633151: *Lasers and Imaging Development and Integration* | - | 9.277 | 16.011 | 13.385 | - | 13.385 | 12.824 | 11.987 | 12.237 | 12.480 | Continuing | Continuing |
| 633152: *High Power Microwave Development and Integration* | - | 9.242 | 17.531 | 16.810 | - | 16.810 | 18.240 | 26.690 | 18.001 | 18.360 | 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 including 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. 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 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 19.000 | 23.542 | 32.295 | - | 32.295 |
| Current President's Budget | 18.519 | 33.542 | 30.195 | - | 30.195 |
| Total Adjustments | -0.481 | 10.000 | -2.100 | - | -2.100 |
| • Congressional General Reductions | - | - | | | |
| • Congressional Directed Reductions | - | - | | | |
| • Congressional Rescissions | - | - | | | |
| • Congressional Adds | - | 10.000 | | | |
| • Congressional Directed Transfers | - | - | | | |
| • Reprogrammings | - | - | | | |
| • SBIR/STTR Transfer | -0.481 | - | | | |
| • Other Adjustments | - | - | -2.100 | - | -2.100 |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2014 | FY 2015 |
|---|---|---|
| **Project:** 633152: *High Power Microwave Development and Integration* | | |
| Congressional Add: *Counter-electronics high power microwave advanced missile* | - | 10.000 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Air Force | Date: February 2015 |
|---|---|
| **Appropriation/Budget Activity**<br>3600: *Research, Development, Test & Evaluation, Air Force* / BA 3: *Advanced Technology Development (ATD)* | **R-1 Program Element (Number/Name)**<br>PE 0603605F / *Advanced Weapons Technology* |

| Congressional Add Details ($ in Millions, and Includes General Reductions) | FY 2014 | FY 2015 |
|---|---|---|
| Congressional Add Subtotals for Project: 633152 | - | 10.000 |
| Congressional Add Totals for all Projects | - | 10.000 |

**Change Summary Explanation**

Decrease in FY16 is due to higher DoD priorities.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force | | | | | | | | | | | Date: February 2015 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>3600 / 3 | | | | | R-1 Program Element (Number/Name)<br>PE 0603605F / *Advanced Weapons Technology* | | | | Project (Number/Name)<br>633151 / *Lasers and Imaging Development and Integration* | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2014** | **FY 2015** | **FY 2016 Base** | **FY 2016 OCO** | **FY 2016 Total** | **FY 2017** | **FY 2018** | **FY 2019** | **FY 2020** | **Cost To Complete** | **Total Cost** |
| 633151: *Lasers and Imaging Development and Integration* | - | 9.277 | 16.011 | 13.385 | - | 13.385 | 12.824 | 11.987 | 12.237 | 12.480 | Continuing | Continuing |

**A. Mission Description and Budget Item Justification**

This project provides for the development, integration, demonstration, and detailed assessment of HEL device 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 2014 | FY 2015 | FY 2016 |
|---|---|---|---|
| ***Title:*** High Energy Laser/Beam Control | 9.277 | 16.011 | 13.385 |
| ***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 military utility.<br><br>***FY 2014 Accomplishments:***<br>With DARPA, continued to prepare for the integration of their high energy electric laser device and the Air Force beam control system on level ground and prepared to conduct high energy laser tests against various targets including rockets, artillery, and mortars (RAM). Continued to investigate concepts and technology requirements for future HEL applications such as aircraft self-protection<br><br>***FY 2015 Plans:***<br>With DARPA, integrate their electric high energy laser with the Air Force beam control system and begin to conduct high power testing against counter-RAM targets using the integrated high energy electric laser system on level ground and prepare to conduct high energy laser tests from a 3000 foot peak against various targets including ground targets and surface-to-air missiles. Document field lethality data, modeling and simulation tools, and lessons learned on the tests. Begin design of a full scale turret with aero-effects mitigation.<br><br>***FY 2016 Plans:***<br>Continue experiments with the joint DARPA and Air Force high energy laser system from a 3000 foot peak against various targets including ground targets and surface-to-air missiles. Begin preperation for integration of a moderate power laser system into a pod for aircraft self-protection ground demo. Start developing lethality data, modeling and simulation tools for the ground demo. Complete the design of a full scale turret with aero-effects mitigation and plan for testing. | | | |
| **Accomplishments/Planned Programs Subtotals** | 9.277 | 16.011 | 13.385 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>3600 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603605F / *Advanced Weapons Technology* | **Project (Number/Name)**<br>633151 / *Lasers and Imaging Development and Integration* |

**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.

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force | | | Date: February 2015 |
|---|---|---|---|
| Appropriation/Budget Activity<br>3600 / 3 | R-1 Program Element (Number/Name)<br>PE 0603605F / *Advanced Weapons Technology* | Project (Number/Name)<br>633152 / *High Power Microwave Development and Integration* | |

| COST ($ in Millions) | Prior Years | FY 2014 | FY 2015 | FY 2016 Base | FY 2016 OCO | FY 2016 Total | FY 2017 | FY 2018 | FY 2019 | FY 2020 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 633152: *High Power Microwave Development and Integration* | - | 9.242 | 17.531 | 16.810 | - | 16.810 | 18.240 | 26.690 | 18.001 | 18.360 | 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. It also provides inputs to the susceptibility, vulnerability, and lethality databases.

| B. Accomplishments/Planned Programs ($ in Millions) | FY 2014 | FY 2015 | FY 2016 |
|---|---|---|---|
| ***Title:*** HPEM Technologies | 9.242 | 7.531 | 16.810 |
| ***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.<br><br>***FY 2014 Accomplishments:***<br>Evaluated four candidate source technologies for potential use in a multi-target, reusable HPM counter-electronics munition demonstrator. Developed and evaluated technologies to reduce size, weight, and power consumption for a compact multi-pulse system in an integrated platform with anti-tamper and battle damage assessment capabilities.<br><br>***FY 2015 Plans:***<br>Begin design 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 red directed energy threats on blue assets.<br><br>***FY 2016 Plans:***<br>Refine design 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 red directed energy threats on blue assets. Begin initial preparations for the Next Generation High Power Microwave demonstration. | | | |
| **Accomplishments/Planned Programs Subtotals** | 9.242 | 7.531 | 16.810 |

| | FY 2014 | FY 2015 |
|---|---|---|
| ***Congressional Add:*** Counter-electronics high power microwave advanced missile | - | 10.000 |
| ***FY 2015 Plans:*** Conduct Congressionally directed effort. | | |
| **Congressional Adds Subtotals** | - | 10.000 |

| Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force | | Date: February 2015 |
|---|---|---|
| **Appropriation/Budget Activity**<br>3600 / 3 | **R-1 Program Element (Number/Name)**<br>PE 0603605F / *Advanced Weapons Technology* | **Project (Number/Name)**<br>633152 / *High Power Microwave Development and Integration* |

**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.