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Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Air Force **DATE:** February 2011

APPROPRIATION/BUDGET ACTIVITY				R-1 ITEM NOMENCLATURE							
3600: <i>Research, Development, Test & Evaluation, Air Force</i> BA 3: <i>Advanced Technology Development (ATD)</i>				PE 0603605F: <i>Advanced Weapons Technology</i>							
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
Total Program Element	44.045	17.461	28.683	-	28.683	32.749	34.542	35.944	36.555	Continuing	Continuing
633150: <i>Advanced Optics Technology</i>	9.460	-	-	-	-	-	-	-	-	Continuing	Continuing
633151: <i>Lasers and Imaging Development and Integration</i>	21.084	6.883	16.487	-	16.487	21.563	22.887	23.452	23.851	Continuing	Continuing
633152: <i>High Power Microwave Development and Integration</i>	13.501	10.578	12.196	-	12.196	11.186	11.655	12.492	12.704	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, high power microwave (HPM), 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 data base for directed energy weapons. This program also develops and demonstrates technologies, derived from laser beam control, that support optical ground-based space situational awareness. Efforts in this program have been coordinated through the Reliance 21 process to harmonize efforts and eliminate duplication. This program is in Budget Activity 3, Advanced Technology Development, since it develops and demonstrates technologies for existing system upgrades and/or new system developments that have military utility and address warfighter needs.

B. Program Change Summary (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	44.794	17.461	28.683	-	28.683
Current President's Budget	44.045	17.461	28.683	-	28.683
Total Adjustments	-0.749	-	-	-	-
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-0.001	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.748	-			
• Other Adjustments	-	-	-	-	-

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: 633150: *Advanced Optics Technology*

Congressional Add: *Applications of LIDAR to Vehicles with Analysis (ALVA).*

FY 2010	FY 2011
5.975	-

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<u>Congressional Add Details (\$ in Millions, and Includes General Reductions)</u>		FY 2010	FY 2011
Congressional Add: <i>Real-time Optical Surveillance Applications (ROSA).</i>		3.485	-
Congressional Add Subtotals for Project: 633150		9.460	-
Project: 633151: <i>Lasers and Imaging Development and Integration</i>			
Congressional Add: <i>Advanced Tactical Laser.</i>		2.231	-
Congressional Add: <i>Advanced Fiber Lasers Systems and Components.</i>		3.187	-
Congressional Add Subtotals for Project: 633151		5.418	-
Congressional Add Totals for all Projects		14.878	-

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force									DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 3600: <i>Research, Development, Test & Evaluation, Air Force</i> BA 3: <i>Advanced Technology Development (ATD)</i>				R-1 ITEM NOMENCLATURE PE 0603605F: <i>Advanced Weapons Technology</i>				PROJECT 633150: <i>Advanced Optics Technology</i>			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
633150: <i>Advanced Optics Technology</i>	9.460	-	-	-	-	-	-	-	-	Continuing	Continuing

Note
Note: Funding in this project is due to Congressional adds.

A. Mission Description and Budget Item Justification
This project develops advanced optical technologies for various strategic and tactical beam control applications.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2010	FY 2011
Congressional Add: Applications of LIDAR to Vehicles with Analysis (ALVA). FY 2010 Accomplishments: Conducted Congressionally-directed effort. FY 2011 Plans:	5.975	-
Congressional Add: Real-time Optical Surveillance Applications (ROSA). FY 2010 Accomplishments: Conducted Congressionally-directed effort. FY 2011 Plans:	3.485	-
Congressional Adds Subtotals	9.460	-

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
• Activity Not Provided: <i>Title Not Provided</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

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.

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Exhibit R-2A, RDT&E Project Justification: PB 2012 Air Force									DATE: February 2011		
APPROPRIATION/BUDGET ACTIVITY 3600: Research, Development, Test & Evaluation, Air Force BA 3: Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603605F: Advanced Weapons Technology				PROJECT 633151: Lasers and Imaging Development and Integration			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
633151: Lasers and Imaging Development and Integration	21.084	6.883	16.487	-	16.487	21.563	22.887	23.452	23.851	Continuing	Continuing
A. Mission Description and Budget Item Justification											
This project provides for the development, integration, demonstration, and detailed assessment of high energy laser and beam control technologies needed for applications such as aircraft self-protection, force protection, force application, precision engagement. It also develops and demonstrates ground-based optical space situational awareness technologies. Laser system concept assessments to include vulnerability assessments and target effect testing are preformed.											
B. Accomplishments/Planned Programs (\$ in Millions)							FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Title: Major Thrust 1. Description: Develop and demonstrate laser technologies for applications such as aircraft self-protection. FY 2010 Accomplishments: Developed and demonstrated aircraft self-protection components to counter missile threats. FY 2011 Plans: Investigate integrated breadboard aircraft self-protection technologies compatible with mid-wave infrared detection and jamming capabilities. Validate aircraft self-protection fly-out model codes with effects/lethality data. FY 2012 Base Plans: Develop an integrated breadboard to demonstrate focal plane array damage technologies for aircraft self-protection. FY 2012 OCO Plans:							2.209	2.693	1.733	-	1.733
Title: Major Thrust 2. Description: Develop and demonstrate advanced beam control technologies and demonstrate beam control components integrated with high energy lasers. FY 2010 Accomplishments:							5.758	4.190	14.754	-	14.754

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APPROPRIATION/BUDGET ACTIVITY 3600: Research, Development, Test & Evaluation, Air Force BA 3: Advanced Technology Development (ATD)	R-1 ITEM NOMENCLATURE PE 0603605F: Advanced Weapons Technology	PROJECT 633151: Lasers and Imaging Development and Integration				
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
With Defense Advanced Research Projects Agency (DARPA), completed major beam control subsystem development, integration, and checkout and conducted low-power beam control field testing to validate target acquisition, tracking, and beam pointing performance. FY 2011 Plans: With DARPA, integrate their high power solid state laser device with the appropriate beam control subsystems and complete checkout and subsystem performance testing in preparation for the FY 2012 ground demonstrations. FY 2012 Base Plans: Demonstrate an integrated high energy electric laser device with a beam control subsystem on the ground. Develop technologies and concepts for the integration of a high power electric laser and a beam control system on a large aircraft. FY 2012 OCO Plans:						
Title: Major Thrust 3. Description: Develop, integrate, and demonstrate advanced technologies for various ground-based space situational awareness applications. FY 2010 Accomplishments: Built advanced ground diagnostic system for characterizing laser propagation through atmospheric turbulence. Conducted initial assessment of system performance in a variety of atmospheric conditions. Conducted brassboard integration of advanced sensing and wavefront control technologies. Based on changes in space acquisition, the remaining efforts in this thrust were moved to PE 0602605F, Directed Energy Technology in order to better match available technology with transition opportunities in the future. FY 2011 Plans: FY 2012 Base Plans: FY 2012 OCO Plans:		7.699	-	-	-	-
Accomplishments/Planned Programs Subtotals		15.666	6.883	16.487	-	16.487

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APPROPRIATION/BUDGET ACTIVITY 3600: <i>Research, Development, Test & Evaluation, Air Force</i> BA 3: <i>Advanced Technology Development (ATD)</i>			R-1 ITEM NOMENCLATURE PE 0603605F: <i>Advanced Weapons Technology</i>			PROJECT 633151: <i>Lasers and Imaging Development and Integration</i>					
						FY 2010	FY 2011				
Congressional Add: Advanced Tactical Laser.						2.231	-				
FY 2010 Accomplishments: Conducted Congressionally-directed effort.											
FY 2011 Plans:											
Congressional Add: Advanced Fiber Lasers Systems and Components.						3.187	-				
FY 2010 Accomplishments: Conducted Congressionally-directed effort.											
FY 2011 Plans:											
Congressional Adds Subtotals						5.418	-				

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
• Activity Not Provided: <i>Title Not Provided</i>	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

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.

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APPROPRIATION/BUDGET ACTIVITY 3600: Research, Development, Test & Evaluation, Air Force BA 3: Advanced Technology Development (ATD)				R-1 ITEM NOMENCLATURE PE 0603605F: Advanced Weapons Technology				PROJECT 633152: High Power Microwave Development and Integration			
COST (\$ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
633152: High Power Microwave Development and Integration	13.501	10.578	12.196	-	12.196	11.186	11.655	12.492	12.704	Continuing	Continuing
A. Mission Description and Budget Item Justification											
This project develops and demonstrates high power microwave (HPM) 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 develops a susceptibility, vulnerability, and lethality data base.											
B. Accomplishments/Planned Programs (\$ in Millions)							FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Title: Major Thrust 1.							0.550	0.652	-	-	-
Description: Develop and evaluate HPM technologies for non-lethal, anti-personnel weapon applications such as ground force protection from a stand-off aircraft.											
FY 2010 Accomplishments: Conducted engagement modeling and simulation supporting next generation system requirements refinement and associated flowdown to technical system requirements. Developed, analyzed, and evaluated source and thermal subsystem options for next-generation non-lethal systems. Provided technical expertise and background to external organizations tailoring Active Denial concepts and capabilities to their needs and glean data relevant to airborne applications.											
FY 2011 Plans: Develop and evaluate technologies for Air Force non-lethal weapons applications. Begin prime power hardware development for next generation transmitters. Provide technical expertise and background to external organizations tailoring Active Denial concepts and capabilities to their needs and glean data relevant to airborne applications.											
FY 2012 Base Plans: This thrust has been temporarily zeroed due to higher Air Force priorities.											
FY 2012 OCO Plans:											
Title: Major Thrust 2.							12.951	9.926	12.196	-	12.196

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B. Accomplishments/Planned Programs (\$ in Millions)							FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
<p>Description: Develop and evaluate HPM and other unconventional weapon technologies including integration on various platforms, including aerial for applications such as counter-electronics.</p> <p>FY 2010 Accomplishments: As a part of Counter-electronics HPM Advance Missile Project (CHAMP) Joint Capability Technology Demonstration (JCTD), integrated narrowband HPM components into a aerial platform for counter-electronics demonstrations. Conducted ground testing of CHAMP including effects testing and environmental testing of the integrated system. Refined and implemented HPM source component technology to overcome unforeseen issues in application systems.</p> <p>FY 2011 Plans: Complete the integration of narrowband HPM components into the CHAMP aerial platform. Conduct additional ground testing of the CHAMP HPM system including effects testing and characterization of the performance. Conduct an inert flight test with the aerial platform to verify the guidance system accuracy, platform controllability for beam pointing, and timing for triggering of the HPM payload.</p> <p>FY 2012 Base Plans: Complete the integration of narrowband HPM components into the CHAMP aerial platform. Conduct flight test of the HPM payload for the CHAMP JCTD.</p> <p>FY 2012 OCO Plans:</p>											
Accomplishments/Planned Programs Subtotals							13.501	10.578	12.196	-	12.196
C. Other Program Funding Summary (\$ in Millions)											
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D. Acquisition Strategy											
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