Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research					R-1 ITEM NOMENCLATURE PE 0602307A ADVANCED WEAPONS TECHNOLOGY					
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	24.354	23.187	19.678						Continuing	Continuing
NA5: Advanced Weapons Components (CA)	5.797	3.588	.000						Continuing	Continuing
042: HIGH ENERGY LASER TECHNOLOGY	18.557	19.599	19.678						Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element (PE) investigates enabling technologies for High Energy Laser (HEL) weapons. The major efforts under this PE develop component technologies such as efficient, high energy, solid state laser designs and adaptive optics, and lethality / effectiveness measurements that enable better models and simulations for future HEL weapon designs. Project NA5 funds congressional special interest items.

Work in this project is related to, and fully coordinated with, efforts in PE 0602890F (HEL Research) and PE 0603924F (HEL Advanced Technology Program), PE 0605605A (DOD High Energy Laser Systems Test Facility (HELSTF)), PE 0602120A (Sensors and Electronic Survivability), PE 0603004A (Weapons and Munitions Advanced Technology) Project L96, and to PE 0603005A (Combat Vehicle and Automotive Advanced Technology) Project 441.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work is performed by the U.S. Army Space and Missile Defense Command (SMDC), in Huntsville, AL, and the High Energy Laser Systems Test Facility, White Sands Missile Range, NM.

Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification	DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602307A ADVANCED WEAPONS TECHNOLOGY

B. Program Change Summary ($ in Millions)

	FY 2008	FY 2009	FY 2010	FY 2011
Previous President's Budget	32.705	19.664	19.499	
Current BES/President's Budget	24.354	23.187	19.678	
Total Adjustments	-8.351	3.523	.179	
Congressional Program Reductions	.000	-.077		
Congressional Rescissions	.000	.000		
Total Congressional Increases	.000	3.600		
Total Reprogrammings	-7.434	.000		
SBIR/STTR Transfer	-.917	.000		

Change Summary Explanation

FY 2008 funding was decreased due to
- transfers of congressional interest items of $7340 for proper execution
- below threshold reprogrammings (BTR) of $94

All FY 2009 increases are due to congressional adds.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602307A ADVANCED WEAPONS TECHNOLOGY					PROJECT NUMBER NA5	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
NA5: Advanced Weapons Components (CA)	5.797	3.588	.000						Continuing	Continuing

A. Mission Description and Budget Item Justification

Congressional Interest Item funding provided for Advanced Weapons Components applied research.

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Remote Video Weapon Sight, USSOCOM Phase III	.967	1.937	.000	
Army Missile and Space Technology Initiative	4.830	1.550	.000	
SBIR/STTR	.000	.101	.000	
Total	5.797	3.588	.000	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.

Exhibit R-2a, PB 2010 Army RDT&E Project Justification								DATE: May 2009		
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research				R-1 ITEM NOMENCLATURE PE 0602307A ADVANCED WEAPONS TECHNOLOGY					PROJECT NUMBER 042	
COST ($ in Millions)	**FY 2008 Actual**	**FY 2009 Estimate**	**FY 2010 Estimate**	**FY 2011 Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
042: HIGH ENERGY LASER TECHNOLOGY	18.557	19.599	19.678						Continuing	Continuing

A. Mission Description and Budget Item Justification

This project investigates and develops advanced technologies for High Energy Laser (HEL) weapon systems to enable more efficient lasers with greater power output. This includes technologies to support development of alternate laser sources; precision optical pointing and tracking components; adaptive optics to overcome laser degradation due to atmospheric effects; and thermal management systems to remove excess heat. In addition, this effort conducts laser lethality testing and analysis against a variety of targets and investigates the impact of low-cost laser countermeasures. Solid State Laser (SSL) efforts continue to leverage other funds provided by the HEL Joint Technology Office (JTO), the Air Force, and the Navy to develop multiple technical approaches that reduce program risk and maintain competition.

Work in this project is related to, and fully coordinated with, efforts in PE 0602890F (HEL Research) and PE 0603924F (HEL Advanced Technology Program), PE 0605605A (DOD High Energy Laser Systems Test Facility (HELSTF)), PE 0602120A (Sensors and Electronic Survivability), PE 0603004A (Weapons and Munitions Advanced Technology) Project L96, and to PE 0603005A (Combat Vehicle and Automotive Advanced Technology) Project 441.

The cited work is consistent with the Director, Defense Research and Engineering Strategic Plan, the Army Modernization Strategy and the Army Science and Technology Master Plan.

Work is performed by the US Army Space and Missile Defense Command (SMDC), in Huntsville, AL, and the High Energy Laser Systems Test Facility (HELSTF), White Sands Missile Range, NM.

B. Accomplishments/Planned Program ($ in Millions)	**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
Advanced Beam Control Component Development: This effort investigates technologies to enable lighter, more agile beam control systems that are robust enough to be used in Army ground platforms. This work is done in collaboration with the HEL JTO and other Services. In FY09, research and demonstrate beam control components that would be suitable for integration into an existing beam control system. This includes development and field testing of adaptive optics (AO) consisting of deformable mirrors (DMs) with high stroke and bandwidth to overcome ground level atmospheric degradation. In FY10, will design advanced architectures for beam control systems that incorporate AO and will develop component technologies that improve compactness, pointing accuracy, and agility of beam directors for improved compatibility with	.000	4.844	5.317	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009			
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602307A ADVANCED WEAPONS TECHNOLOGY			PROJECT NUMBER 042	
B. Accomplishments/Planned Program ($ in Millions)		**FY 2008**	**FY 2009**	**FY 2010**	**FY 2011**
future all-electric tactical platforms. This includes high power eye-safe illuminators to acquire threats at longer ranges and low-absorbing HEL windows, shared aperture optics, and mirror coatings to minimize system losses.					
Solid State Laser Effects: This effort provides the underlying data required to support system engineering designs for laser weapon systems. In FY08, performed lethality testing of advanced fuses of candidate Rockets, Artillery, and Mortar (RAM) targets in order to explore various kill mechanisms. In FY09, continue lethality testing of RAM warheads and fuses and begin expanding the program to emphasize targets other than RAM, such as Unmanned Aerial System (UAS) components, Man Portable Air Defense Systems (MANPADS), Anti-Tank Guided Missiles, and Rocket Propelled Grenades (RPGs). Use results to improve and validate the vulnerability models for use in Army engagement codes such as Extended Air Defense Simulation (EADSIM), Interactive Distributed Early Entry Analysis Simulation (IDEEAS), and other distributed interactive simulation tools. In FY10, will conduct expanded full scale static lethality testing against RAM targets, UASs, and other high priority threats to determine the laser energy required to defeat them.		1.401	1.453	2.152	
High Efficiency Laser Development: This effort develops component technologies that lead to increased laser wall-plug efficiencies. In FY09, initiate design of components, such as diode arrays, high throughput optical elements, and fiber optic/ceramic slab gain media, for developing high efficiency (greater than 30% wall-plug efficiency) SSLs. In FY10, in cooperation with the HEL Joint Technology Office (JTO) and other Services, will continue to design and develop reliable electric laser component technologies that improve SSL efficiencies, such as improved gain media, pump power sources, optical elements, and diode arrays; and will begin to explore thermal management technologies.		.000	.969	6.892	
HEL Research and Development Laboratory: This effort focuses on developing in-house expertise through SSL assessments. In FY10, in cooperation with the Army Aviation and Missile Research Development Engineering Center (AMRDEC), will conduct low-to-medium power studies on a 600-meter test range to investigate SSL atmospheric propagation and target interaction phenomenology. Data analysis and model development will be initiated to support atmospheric correction algorithm development and to provide validated inputs to wargaming modeling and simulation efforts.		.000	.000	.492	
Small Business Innovative Research/Small Business Technology Transfer Programs		.000	.549	.000	
		17.156	11.784	4.825	

Exhibit R-2a, PB 2010 Army RDT&E Project Justification		DATE: May 2009
APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 2 - Applied Research	R-1 ITEM NOMENCLATURE PE 0602307A ADVANCED WEAPONS TECHNOLOGY	PROJECT NUMBER 042

B. Accomplishments/Planned Program ($ in Millions)	FY 2008	FY 2009	FY 2010	FY 2011
Solid State Laser (SSL) Development, Phase 3 - 100 kW: The goal of this Joint High Power Solid State Laser (JHPSSL) Phase 3 effort is to develop and demonstrate 100-kW-class, near-diffraction-limited diode-pumped solid-state lasers that have architectures that are favorable for tactical weapon applications. In FY08, continued laboratory performance testing and increased power output in order to evaluate laser characteristics and achieve medium power (25 to 50 kW) laser output. In FY09, leveraging joint and other Service funding, as well as technology progress, complete integration and performance testing of two 100 kW SSL devices; select the most promising laser and component technologies for use in High Energy Laser Technology Demonstrator (HEL TD) risk reduction activities; support systems engineering of the selected SSL Phase 3 technology for use on the mobile HEL TD platform; and begin integration of one of the devices with an existing beam control subsystem (BCS) at HELSTF to evaluate high power SSL performance at tactical ranges of interest. In FY10, will complete integration of the laser device with the existing BCS and will begin evaluation of high power SSL performance against a variety of target types at tactical ranges of interest as a risk reduction activity for the HEL TD.				
Total	18.557	19.599	19.678	

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.