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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Army **Date:** February 2020

Appropriation/Budget Activity 2040: <i>Research, Development, Test & Evaluation, Army / BA 2: Applied Research</i>	R-1 Program Element (Number/Name) PE 0602307A / <i>Advanced Weapons Technology</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	43.454	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	43.454
042: <i>High Energy Laser Technology</i>	-	28.454	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	28.454
NA5: <i>Advanced Weapons Components (CA)</i>	-	15.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	15.000

Note
 In Fiscal Year (FY) 2020, this Program Element (PE) is realigned with continuity of effort to the following PE:
 * 0602150A Air and Missile Defense Technology

A. Mission Description and Budget Item Justification
 This PE investigates enabling technologies for High Energy Laser (HEL) weapons. Project 042 develops component technologies such as efficient, high energy, solid state lasers; advanced beam control components; and lethality / effectiveness measurements that enable better models and simulations for future HEL weapon designs.
 Work in this PE is related to, and fully complements, efforts in PE 0601101A (In-House Laboratory Independent Research), PE 0602120A (Sensors and Electronic Survivability), PE 0603004A (Weapons and Munitions Advanced Technology) and Air Force PE 0602890F (HEL Research).
 The cited work is consistent with the Assistant Secretary of Defense for Research and Engineering Science and Technology priority focus areas and the Army Modernization Strategy.
 Work is performed by the United States Army Space and Missile Defense Command/Army Forces Strategic Command (USASMDC / ARSTRAT) in Huntsville, AL, and the High Energy Laser Systems Test Facility at White Sands Missile Range, NM.

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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	44.468	0.000	0.000	-	0.000
Current President's Budget	43.454	0.000	0.000	-	0.000
Total Adjustments	-1.014	0.000	0.000	-	0.000
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-1.014	-			

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

Project: NA5: *Advanced Weapons Components (CA)*

Congressional Add: *High energy laser technology*

Congressional Add: *COE in high energy and laser and optical technology*

Congressional Add Subtotals for Project: NA5

Congressional Add Totals for all Projects

	FY 2019	FY 2020
	10.000	-
	5.000	-
Congressional Add Subtotals for Project: NA5	15.000	-
Congressional Add Totals for all Projects	15.000	-

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Appropriation/Budget Activity 2040 / 2	R-1 Program Element (Number/Name) PE 0602307A / <i>Advanced Weapons Technology</i>	Project (Number/Name) 042 / <i>High Energy Laser Technology</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
<i>042: High Energy Laser Technology</i>	-	28.454	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	28.454

Note

In Fiscal Year (FY) 2020 this Project is realigned to:
 Program Element (PE) 0602150A Air and Missile Defense Technology
 * Project AC9 High Energy Laser Tactical Vehicle Demonstrator Technology
 * Project AD2 High Energy Laser (HEL) Enabling and Support Technology
 * Project AD9 Close Combat High Energy Laser Technology

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 laser systems 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 validates laser lethality performance and conducts analyses against a variety of targets and investigates the impact of low-cost laser countermeasures. This project includes laboratory efforts for HEL applied research as well as concepts analysis for United States Army Space and Missile Defense Command/Army Forces Strategic Command (USASMDC/ARSTRAT) Technical Center competencies in directed energy, missile defense, and space technical areas. 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.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Solid State Laser Effects	4.051	-	-
Description: This effort provides the underlying data required to support high energy laser weapon system effectiveness analyses. This activity includes the full spectrum of lethality testing from fundamental physics investigations to the engagement of flying targets in relevant scenarios. This activity is primarily executed at the Solid State Laser Testbed (SSLT) facility at White Sands Missile Range, New Mexico.			
Title: Advanced Beam Control Component Development	17.419	-	-
Description: This effort investigates technologies to enable lighter, more agile beam control systems that are robust enough to be used in Army platforms. This work is done in collaboration with the HEL JTO and other Services.			
Title: High Efficiency Laser Development	5.951	-	-

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Appropriation/Budget Activity 2040 / 2	R-1 Program Element (Number/Name) PE 0602307A / <i>Advanced Weapons Technology</i>	Project (Number/Name) 042 / <i>High Energy Laser Technology</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Description: This effort develops component technologies that increase SSL efficiencies, which will lead to reductions in size and weight for multiple subsystems that greatly improve the ability to integrate SSL systems into Army weapon platforms. This work is done in collaboration with the HEL JTO and other Services. Selected laser design will be fabricated and integrated onto an Army platform to demonstrate a high energy laser system functionality and is fully coordinated with PE 0603004A (Weapons and Munitions Advanced Technology) / Project L96 (High Energy Laser Technology Demo).			
Title: HEL Research and Development and Concepts Analysis Laboratories	1.033	-	-
Description: This effort focuses on developing in-house expertise through SSL assessments and starting in FY15, other USASMDC/ARSTRAT technical core competencies, including air and missile defense, responsive space, and small satellites.			
Accomplishments/Planned Programs Subtotals	28.454	-	-

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

Remarks

D. Acquisition Strategy
N/A

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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
NA5: <i>Advanced Weapons Components (CA)</i>	-	15.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	15.000

Note

Congressional increase for Program increase

A. Mission Description and Budget Item Justification

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

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020
Congressional Add: High energy laser technology	10.000	-
FY 2019 Accomplishments: High energy laser technology		
Congressional Add: COE in high energy and laser and optical technology	5.000	-
FY 2019 Accomplishments: COE in high energy and laser and optical technology		
Congressional Adds Subtotals	15.000	-

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

N/A

Remarks

D. Acquisition Strategy

N/A