Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Office of the Secretary Of Defense	Date: May 2021
Appropriation/Budget Activity 0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 0603924D8Z *I High Energy Laser Advanced Development*

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	-	78.057	112.842	107.397	-	107.397	-	-	-	-	-	-
924: *High Energy Laser Initiative*	-	78.057	112.842	107.397	-	107.397	-	-	-	-	-	-

Note

Beginning in FY 2022 this Program will focus on Advanced Technology Development for Directed Energy (DE) technologies divided into the following areas: (1) DE Sources; (2) Beam Control & Propagation; (3) Lethality & Vulnerability; and (4) Power & Thermal Management to reflect the Department of Defense Science and Technology (S&T) strategy and Office of the Secretary of Defense (OSD) Science and Technology (S&T) priorities for DE.

A. Mission Description and Budget Item Justification

This program element funds Directed Energy (DE) advanced technology development aimed at translating technology solutions for broadly defined military problems into demonstrated performance pay-offs, increased capabilities, increased supportability, and/or increased affordability. DE weapons systems have many potential advantages, including speed-of-light time-to-target, high precision, nearly unlimited magazine depth, low cost per kill, and reduced logistics requirements because of no need for stocks of munitions or warheads. As a result, DE systems have the potential to perform a wide variety of military missions. Activities conducted under this program element will develop and demonstrate the technology necessary to enable DE system missions across the Department of Defense (DoD).

B. Program Change Summary ($ in Millions)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	80.723	105.410	108.663	-	108.663
Current President's Budget	78.057	112.842	107.397	-	107.397
Total Adjustments	-2.666	7.432	-1.266	-	-1.266
• Congressional General Reductions	-	-0.068			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	7.500			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.652	-			
• Program Adjustment	-	-	-1.266	-	-1.266
• Cancelled Account	-0.014	-	-	-	-

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2020	FY 2021
Project: 924: *High Energy Laser Initiative*		
Congressional Add: *Power and Thermal Systems*	-	7.432

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Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2020	FY 2021
Congressional Add Subtotals for Project: 924	-	7.432
Congressional Add Totals for all Projects	-	7.432

Exhibit R-2A, RDT&E Project Justification: PB 2022 Office of the Secretary Of Defense			Date: May 2021
Appropriation/Budget Activity 0400 / 3	R-1 Program Element (Number/Name) PE 0603924D8Z / *High Energy Laser Advanced Development*	Project (Number/Name) 924 / *High Energy Laser Initiative*	

COST ($ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
924: *High Energy Laser Initiative*	-	78.057	112.842	107.397	-	107.397	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY 2022 this Program will focus on Directed Energy (DE) technologies divided into the following areas: (1) DE Sources; (2) Beam Control & Propagation; (3) Lethality & Vulnerability; and (4) Power & Thermal Management to reflect the Department of Defense Science and Technology (S&T) strategy and Office of the Secretary of Defense (OSD) Science and Technology (S&T) priorities for DE.

A. Mission Description and Budget Item Justification

This program element is part of an overall Department strategy in Directed Energy (DE) weapon system advanced technology development. This effort will focus on scaling the output power of DE systems to reach operationally effective power levels applicable to broad mission areas across the DoD. Additionally, efforts will also pursue improvements in common DE system components such as beam control & propagation, lethality & vulnerability, and efficient power and thermal management approaches. This program element complements, and will be closely coordinated with other DoD DE efforts directed at specific Service and Agency missions.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
Title: Directed Energy Advanced Development	78.057	105.410	107.397
Description: This effort is focused on increasing the capabilities of Directed Energy (DE) weapons up to the level needed for multi-Service missions, both tactical and strategic, such as (but not limited to) integrated air and missile defense against hard targets. It leverages and/or builds upon other investments in DE by the Services and Agencies. ***FY 2021 Plans:*** - Laser Scaling: Designs for 300 kW class high energy laser (HEL) systems will be finalized and the system elements will be integrated into prototype 300 kW systems. Architectures and systems will be developed for laser scaling from 300 kW to achieve 500 kW. - Propagation and Beam Control: Continue research on thermal blooming of 300-500 kW class lasers, including data collection, modeling and simulation, and scaled field experiments. - High Energy Laser lethality: Collect additional data on laser and high power microwave damage effects (including cyber and electronic warfare applications) and experimentation results from the services, including modeling and simulation results. Data continues to be integrated into the unified database, which was developed in FY 2020. Investigating power & thermal management technologies for 300-500 kW laser systems under the High Energy Laser scaling effort. ***FY 2022 Plans:***			

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Appropriation/Budget Activity 0400 / 3	**R-1 Program Element (Number/Name)** PE 0603924D8Z / *High Energy Laser Advanced Development*	**Project (Number/Name)** 924 / *High Energy Laser Initiative*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2020	FY 2021	FY 2022
- Directed Energy Sources: Ongoing 300 kW-class high energy laser (HEL) sources will be completed and tested. The HEL sources will be transitioned and integrated into Service HEL system testbeds and demonstrators. The additional 300 kW-class HEL source, started in FY21, will be matured and initial elements will be integrated into the laser system. Planning for 500 kW-class laser source development will begin as open architectures and components are matured to support scaling from 300 to 500 kW. - Beam Control & Propagation: Continue to collect data on thermal blooming effects of high-power lasers, including the effects of aerosols. Continue to model beam propagation for Service HEL tactical engagements. Collect data on thermal blooming effects at higher laser powers to validate HEL propagation models. Advance technologies for atmospheric compensation and thermal blooming mitigation. Evaluate beam control efforts across the Department and develop an investment strategy for cross-cutting technology development in beam control systems. - Lethality & Vulnerability: Collect lethality damage effects on common threats across the services for high energy lasers and high power microwaves. These results, along with additional data from the services, include modeling and simulation analysis that will be used by the services to generate key vulnerability modules (VMs) for use in DE weapons effectiveness, mission and campaign level utility studies. The establishment of a unified lethality database that began in FY2020 and will be completed in early FY2022. As new lethality and vulnerability data are collected by the Services, the information will be integrated into the unified lethality database. Investigate the military utility of pulsed lasers. - Power & Thermal: Complete efforts begun in FY 2021 and evaluate technologies for further advanced development investments. ***FY 2021 to FY 2022 Increase/Decrease Statement:*** Increase is due to minor budget fluctuations.			
Accomplishments/Planned Programs Subtotals	78.057	105.410	107.397

	FY 2020	FY 2021
Congressional Add: Power and Thermal Systems	-	7.432
FY 2021 Plans: Investigating power & thermal management technologies for 300-500 kW laser systems under the High Energy Laser scaling effort.		
Congressional Adds Subtotals	-	7.432

C. Other Program Funding Summary ($ in Millions)

N/A

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C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

N/A