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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604032F / <i>Directed Energy Prototyping</i>
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	15.498	4.269	1.246	0.000	1.246	4.106	4.209	4.294	4.449	0.000	38.071
640200: <i>DE Prototyping</i>	-	15.498	4.269	1.246	0.000	1.246	4.106	4.209	4.294	4.449	0.000	38.071
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The Air Force Life Cycle Management Center, Architecture and Integration Directorate Directed Energy Prototyping Program acquires and evaluates prototype high energy laser, high power microwave and/or other electromagnetic radiation or particle beam technologies as a future integral component of the Airbase defense mission. The Directed Energy Prototyping Program bridges the gap between lab based technology demonstration under a controlled environment, and demonstration of a system in realistic environments with the intent of establishing successful acquisition, and operation or operational capability implementation.

This prototyping effort enables the ability to integrate the directed energy prototype systems with other operational systems required for the mission (e.g. radar, command and control, etc.), conduct test and evaluation activities, and mature emerging directed energy technology systems based on prototyping activities to enable rapid fielding to the warfighter. The Directed Energy Prototyping Program allows acquisition program managers (capability developers) and warfighters (capability recipients and end users) to prototype, integrate, evaluate, and demonstrate candidate weapon technologies and assess them in an operational environment with the intent of iteratively maturing directed energy technologies to a production representative design.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In Prior Years \$0.852M was expended for civilian pay expenses in this program element, and in CY 2022 \$0.973M is forecasted for civilian pay expenses in this program element.

This effort is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P), because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

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B. Program Change Summary (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	15.820	4.269	4.080	0.000	4.080
Current President's Budget	15.498	4.269	1.246	0.000	1.246
Total Adjustments	-0.322	0.000	-2.834	0.000	-2.834
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.322	0.000			
• Other Adjustments	0.000	0.000	-2.834	0.000	-2.834

Change Summary Explanation

FY 2024 decrease due to higher Air Force priorities.

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Directed Energy Capabilities	15.498	4.269	1.246	0.000	1.246
Description: Prototypes and evaluates Directed energy weapon technologies for Airbase Defense against unmanned aerial vehicles and cruise missiles, Precision Strike against electronic and conventional targets and Aircraft Defense against incoming threats.					
FY 2023 Plans: Initiate government capability/ field effectiveness testing. Complete acquisition of contracted high energy laser counter small Unmanned aerial system. Continue to work with Air Force futures, the Joint counter small Unmanned Ariel System Office, and others to refine requirements and architecture for defense of critical infrastructure and base defense. Continue coordinating with major/combatant commands to incorporate new directed energy prototypes into integration and testing. Initiate test data analyze to determine reliability, manufacturability, maintainability and mission effectiveness. In conjunction with major/combatant commands, determine if these systems are ready for another round of improvement for transition to a program of record.					
FY 2024 Base Plans: Continue field effectiveness testing of Directed Energy Counter Unmanned Aerial System effectors to OCONUS locations. Continue to work with Air Force futures, the Joint counter small Unmanned Ariel System Office, and others to refine requirements and architecture for defense of critical infrastructure and base defense. Continue					

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
coordinating with major/combatant commands to incorporate new directed energy prototypes into integration and testing. Continue test data and initiate fielded data analysis to determine reliability, manufacturability, maintainability and mission effectiveness. In conjunction with major/combatant commands, determine if these systems are ready for another round of improvement for transition to a program of record. FY 2024 OCO Plans: N/A FY 2023 to FY 2024 Increase/Decrease Statement: Decrease of \$3.023M from FY 2023 to FY 2024 reflects completion of testing activities with current generation of counter-Unmanned Aerial System Prototypes					
Accomplishments/Planned Programs Subtotals	15.498	4.269	1.246	0.000	1.246

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

Remarks
Not Applicable

E. Acquisition Strategy
 During FY 2020, the Air Force Life Cycle Management Center, Architecture and Integration Directorate, Wright-Patterson Air Force Base, Ohio conducted a source selection evaluating eight (8) ground-based Counter unmanned Aerial Systems for prototype development. In Fourth Quarter FY 2020, three (3) vendors were selected for award using Other Transaction Authority based on a best value determination with Technical being the most important factor. During FY 2021, these three (3) prototypes were selected based on operational capability/suitability assessment supporting the Airbase defense mission. In FY 2022, a high energy laser system was transferred into the program from AFRL/RS 0604858F. In FY 2023, a congressional interest item added an upgraded unit that will be deliver in early FY 2024. Acceptance testing and characterization test will occur from FY 2022 through early FY 2023. Prototypes will undergo field assessment in FY 2023 and FY 2024 at OCONUS locations. In FY 2023 with potential updates in FY 2024, an acquisition readiness assessment will be made while documenting design, sustainment, and initial operational concepts of operation information to inform a production representative unit in FY 2025. This will lead to a decision for a program of record in FY 2027. The program will also seek to leverage industry and sister service prototypes for field evaluation and acquisition readiness assessments in the best interest of the Air Force.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604032F / <i>Directed Energy Prototyping</i>	Project (Number/Name) 640200 / <i>DE Prototyping</i>
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Product Development (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
High Energy Laser Prototypes	C/FFP	Various : Various	-	6.800	Mar 2022	-		-		-		-	Continuing	Continuing	-
High Power Microwave Prototypes	C/CPAF	Not specified. : Various	-	4.395	Jul 2022	1.000	Jun 2023	-		-		-	Continuing	Continuing	-
Subtotal			-	11.195		1.000		-		-		-	Continuing	Continuing	N/A

Remarks
Other Transactions Authorities used for High Energy Laser Prototype contracts.

Test and Evaluation (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Directed Energy C-UAS Prototype Technical Maturation and Improvements	Various	Various : Various	-	2.697	Apr 2022	2.000	Apr 2023	0.596	Jan 2024	-		0.596	Continuing	Continuing	-
Subtotal			-	2.697		2.000		0.596		-		0.596	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Directed Energy Prototyping Program Administration	Various	AFLCMC : Various	-	0.678	Oct 2021	0.419	Oct 2022	0.650	Oct 2023	-		0.650	Continuing	Continuing	-
Direct Cite Authority	TBD	AFLCMC : Various	-	0.928	Oct 2021	0.850	Oct 2022	0.000	Oct 2023	-		0.000	Continuing	Continuing	-
Subtotal			-	1.606		1.269		0.650		-		0.650	Continuing	Continuing	N/A

			Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	15.498	4.269	1.246	-	1.246	Continuing	Continuing	N/A

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	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
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Remarks	<p>FY 2022 - FY 2028 will concentrate on prototyping and maturing high energy laser and high power microwave systems for base area defense in preparation for transition to program of record. The program makes use of Other Transactional Authorities (OTA). Continued support will be provided by the Directed Energy Transition Management Office, Kirtland Air Force Base, New Mexico.</p>
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Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force **Date:** March 2023

Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604032F / <i>Directed Energy Prototyping</i>	Project (Number/Name) 640200 / <i>DE Prototyping</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Field Suitability Assessment				
Government assessment of suitability and effectiveness for field operations	1	2023	2	2024
Directed Energy Counter-Unmanned System (C-UAS) technical maturation				
Incremental improvements to of Directed Energy C-UAS Prototype systems to provide increased Airbase defense c-UAS capability to warfighter	1	2022	1	2024
Directed Energy Base Defense technical maturation				
Mature Directed Energy technologies to enhance the Airbase defense layered architecture. Increasing defensive capabilities to include cruise missiles and other airborne threats.	4	2023	4	2027
Field Assessments				
Government assessment of suitability and effectiveness for acquired c-UAS prototype systems	3	2023	4	2027
Directed Energy Acquisition Readiness Assessment				
Analyze field data to determine reliability, maintainability and suitability for transition to program of record	1	2023	4	2027

Note

FY 2022 - FY 2028 will concentrate on maturing high energy laser and high power microwave systems for base area defense in preparation for transition of prototype weapon systems to program(s) of record. The program makes use of Other Transactional Authorities (OTA). Continued support will be provided by the Directed Energy Transition Management Office, Kirtland Air Force Base, New Mexico.