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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force										Date: February 2019		
Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
3600: Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)					PE 0604032F I Directed Energy Prototyping							
COST (\$ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
Total Program Element	-	0.000	50.000	10.000	0.000	10.000	15.000	5.000	0.000	0.000	0.000	80.000
640200: DE Prototyping	-	0.000	50.000	10.000	0.000	10.000	15.000	5.000	0.000	0.000	0.000	80.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Directed Energy Prototyping Program integrates, demonstrates, evaluates, and prototypes high energy laser, high power microwave and other electromagnetic radiation or particle beam technologies. This Program addresses capability needs in airbase defense, precision strike and aircraft protect capabilities. The Directed Energy Prototyping Program bridges the gap between technology demonstration and successful acquisition and operation or operational capability implementation.

Prototyping enables integration, test, evaluation and demonstration of emerging weapon technologies as a bridge between the laboratory and 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 in partnership with Program Executive officers, schoolhouses, simulation facilities, major commands, combatant commands, and developmental planning organizations.

The Directed Energy Prototyping Program Element is new for FY 2019. In FY 2019, the entirety of Directed Energy Prototyping efforts was transferred from PE 0604858F, Technology Transition Program, Project 645351, Prototyping, in order to provide increased transparency to Congress on Air Force Prototyping activities as directed in the Department of Defense Appropriation Act 2019. This is an administrative realignment and not a new start.

In addition, this program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. It may also include necessary civilian pay expenses required to perform analysis and developmental activities required in support of the transition of weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.

As directed in the FY 2018 NDAA, Sec 825, amendment to PL 114-92 FY 2016 NDAA, Sec 828 Penalty for Cost Overruns, the FY 2018 Air Force penalty total is \$14.373M. The calculated percentage reduction to each research, development, test and evaluation and procurement account will be allocated proportionally from all programs, projects, or activities under such account.

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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget		0.000	0.000	0.000	0.000	0.000
Current President's Budget		0.000	50.000	10.000	0.000	10.000
Total Adjustments		0.000	50.000	10.000	0.000	10.000
• Congressional General Reductions		0.000	0.000			
• Congressional Directed Reductions		0.000	0.000			
• Congressional Rescissions		0.000	0.000			
• Congressional Adds		0.000	50.000			
• Congressional Directed Transfers		0.000	0.000			
• Reprogrammings		0.000	0.000			
• SBIR/STTR Transfer		0.000	0.000			
• Other Adjustments		0.000	0.000	10.000	0.000	10.000
Congressional Add Details (\$ in Millions, and Includes General Reductions)						
Project: 640200: DE Prototyping						
Congressional Add: Program Increase - Directed Energy Prototyping						
Congressional Add Subtotals for Project: 640200						
Congressional Add Totals for all Projects						
Change Summary Explanation						
Increase in FY 2020 for directed energy counter-unmanned aerial system (c-UAS) prototyping.						
C. Accomplishments/Planned Programs (\$ in Millions)				FY 2018	FY 2019	FY 2020
Title: Directed Energy Capabilities				0.000	0.000	10.000
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.						
In FY 2018, this work was performed under the FY 2018 Directed Energy Prototyping Congressional Add in PE 0604858F, Tech Transition Program, Project 645351, Prototyping.						
FY 2019 Plans:						

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C. Accomplishments/Planned Programs (\$ in Millions)											
In FY 2019, this work is performed under the FY 2019 Directed Energy Prototyping Congressional add within this Project.								FY 2018	FY 2019	FY 2020	
FY 2020 Plans: Obtain High Power Microwave counter-Unmanned Aerial Vehicle prototypes currently available and evaluate them for mission effectiveness and fielding, logistics, and deployment requirements. These assets may be made available for experimentation and test by the Directed Energy Experimentation Campaign, the Joint Directed Energy Test Center, White Sands Missile Range or other Air Force agency or Command. May conduct additional Directed Energy Prototyping work as directed by Air Force senior leadership.											
FY 2019 to FY 2020 Increase/Decrease Statement: FY 2020 increased compared to FY 2019 by \$10.000 million. Funding increased due to additional emphasis on the counter unmanned aerial system high power microwave solutions.											
Accomplishments/Planned Programs Subtotals								0.000	0.000	10.000	
								FY 2018	FY 2019		
Congressional Add: Program Increase - Directed Energy Prototyping								0.000	50.000		
FY 2018 Accomplishments: FY 2018 Congressional Add is reported under PE 0604858F, Tech Transition Program, Project 645351, Prototyping.											
FY 2019 Plans: Conduct Congressionally directed efforts.											
Congressional Adds Subtotals								0.000	50.000		
D. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• RDTE 04 0604858F: <i>Tech Transition Program</i>	67.464	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	67.464
Remarks											
In FY 2018, Directed Energy Prototyping is reported under PE 0604858F, Tech Transition Program, Project 645351, Prototyping, as a Congressional Add.											
E. Acquisition Strategy											
For Directed Energy Prototyping, the Air Force will conduct market research and plan to award contracts for commercially available, non-developmental Directed Energy Systems for counter-Unmanned Aerial Vehicles. The government agency responsible for managing this program is the Air Force Life Cycle Management Center, Program Development & Integration Directorate, Wright-Patterson Air Force Base, Ohio.											

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F. 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-3, RDT&E Project Cost Analysis: PB 2020 Air Force												Date: February 2019			
Appropriation/Budget Activity						R-1 Program Element (Number/Name)				Project (Number/Name)					
3600 / 4						PE 0604032F / Directed Energy Prototyping				640200 / DE Prototyping					
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Directed Energy Airbase Defense Prototypes	Various	TBD : TBD	-	0.000		45.000		-		-		-	Continuing	Continuing	-
Directed Energy Airbase Defense Prototyping and Operational Testing	C/TBD	TBD : TBD	-	-		-		8.000		-		8.000	Continuing	Continuing	-
Subtotal			-	0.000		45.000		8.000		-		8.000	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Directed Energy Prototyping Program Administration	Various	Not specified. : TBD	-	-		5.000		2.000		-		2.000	Continuing	Continuing	-
Subtotal			-	-		5.000		2.000		-		2.000	Continuing	Continuing	N/A
			Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	0.000		50.000		10.000		-		10.000	Continuing	Continuing	N/A
Remarks															
In FY 2018, Directed Energy Prototyping is reported under PE 0604858F, Tech Transition Program, Project 645351, Prototyping															

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force	Date: February 2019
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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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	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
<i>Operational Prototypes</i>																												
System Acquisition																												
Competitive Downselect and test																												
<i>Build and operational test</i>																												
Initial build and test																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Air Force			Date: February 2019
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>	

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Operational Prototypes</i>				
System Acquisition	1	2019	3	2019
Competitive Downselect and test	4	2019	3	2020
<i>Build and operational test</i>				
Initial build and test	3	2020	4	2022

Note

In FY 2018, Directed Energy Prototyping work is reported under PE 0604858F, Tech Transition Program, Project 645351

Related Directed Energy Weapons Experimentation Campaign Activities for the Operational Prototypes are reported under PE 0604858F, Tech Transition Program, Project 645350, Experimentation from 1st Quarter FY 2020 through 4th quarter FY 2020.