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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 0604327F / <i>Hard and Deeply Buried Target Defeat System (HDBTDS) Program</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	0.000	12.826	141.826	19.266	0.000	19.266	0.000	0.000	0.000	0.000	0.000	173.918
645341: <i>Direct Strike Penetrator Systems</i>	0.000	12.826	141.826	19.266	0.000	19.266	0.000	0.000	0.000	0.000	0.000	173.918
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The Direct Strike Penetrator Systems program develops and modifies a family of advanced precision-guided penetrator munitions to include evaluation of integrated technologies for the development/integration of advanced position, navigation, and timing (PNT) capabilities (i.e., Global Positioning System (GPS), non-GPS, optical, passive, active, etc.) and smart fuze systems, and all penetrator components, that will provide the Air Force with improved ability to attack Hard and Deeply Buried Targets (HDBT), such as bunker and tunnel facilities, using air-to-surface conventional munitions. Systems developed include, but are not limited to Massive Ordnance Penetrator (MOP), GBU-72 Advanced 5,000-lb Penetrator Weapon System (A5K), and Section 804 Rapid Prototype/Rapid Fielding activities. Systems developed will be integrated onto current and future platforms to reduce the number of weapons required to hold HDBTs at risk and will result in more targets engaged per mission flown. Direct Strike Penetrators will provide critical global strike capability not met by inventory conventional weapons and will hold at risk the best protected high value assets essential to an enemy's war fighting ability. The project also provides an opportunity to quickly insert emerging technologies into existing and developing aircraft munitions and fuzes.

A Hard Target Munitions (HTM) Analysis-of-Alternatives (AoA) was conducted in 2014 to determine the best weapons and/or development efforts for addressing the HDBT mission area. The HTM AoA determined that it was necessary to develop a family of HTMs in order to apply effects to the entire range of HDBT sets. The Air Force is using the AoA to develop, produce and modify HDBT weapons identified as the most effective and affordable. Modeling and simulation is used to assess and characterize current inventory and to drive design and explore the utility of new classes of penetrator munitions.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In FY22 0.192M was expended for civilian pay expenses in this program element, and in FY23 0.0M is forecasted for civilian pay expenses in this program element.

This program leverages Digital acquisition tenets of open, agile, and digital. Common component development, in collaboration with other weapon systems, to reduce redundant costs between systems with similar subsystems requirements. Invests in analytical, information management, data management, digital environments, networks, facilities, and security infrastructure upgrades directly supporting development and sustainment of this program's capabilities, while leveraging DoD and DAF enterprise IT solutions.

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Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)	R-1 Program Element (Number/Name) PE 0604327F I Hard and Deeply Buried Target Defeat System (HDBTDS) Program
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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.

B. Program Change Summary (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	12.886	106.826	19.222	0.000	19.222
Current President's Budget	12.826	141.826	19.266	0.000	19.266
Total Adjustments	-0.060	35.000	0.044	0.000	0.044
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	35.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-0.060	0.000	0.044	0.000	0.044

Change Summary Explanation

FY22 decreased by \$0.060 due to SBIR.

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024
<p>Title: Massive Ordnance Penetrator (MOP) Modification</p> <p>Description: Modify the Massive Ordnance Penetrator (MOP) weapon for enhanced capability to hold additional Hard and Deeply Buried Targets at risk in multiple Combatant Commands (COCOMs). The modification will be primarily software-based and the existing inventory of Guided Bomb Unit (GBU)-57E/B will be retrofitted. Construct relevant hard and deeply buried targets for testing. Execute MOP testing in support of modification efforts to included sub-scale and full-scale ground and flight tests. Analyze MOP weapon effectiveness.</p> <p>FY 2023 Plans: Continue long-lead target build and test & evaluation of MOP Modification for enhanced capability as well as accuracy enhancement effort to hold hard and deeply buried targets at risk.</p> <p>FY 2024 Plans: Continue long-lead target build and test & evaluation of MOP Modification for enhanced capability as well as accuracy enhancement efforts to hold hard and deeply buried targets at risk. Effort projected for completion in FY2024.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement:</p>	4.587	139.251	19.266

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024
Funding decreased due to program moving out of EMD phase.			
Title: Advanced 5,000 lb (A5K) Penetrator	8.239	2.575	0.000
Description: GBU-72 Advanced 5,000 lb (A5K) Penetrator is an improved 5,000 lb class penetrator to address capability gaps identified in the HTM AoA. Conduct A5K design, development, integration, modeling and simulation, and testing to improve performance against increasingly hardened targets. This effort utilizes existing and improved technologies to field an integrated penetrator weapon system to include: an improved penetrator warhead, a smart fuze system that can detect layers/voids, and a modified Joint Direct Attack Munition (JDAM) tail kit for all weather, precision guidance, navigation, and control.			
FY 2023 Plans: Continuation to support the finalization of DT/OT testing, remediation activities, integration, and modeling/simulation to improve the performance against increasingly hardened targets for the Advanced 5,000 pound (A5K) Penetrator weapon system.			
FY 2024 Plans: No A5K activity in FY24.			
FY 2023 to FY 2024 Increase/Decrease Statement: Funding decreased due to program moving out of EMD phase.			
Accomplishments/Planned Programs Subtotals	12.826	141.826	19.266

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u> <u>Base</u>	<u>FY 2024</u> <u>OCO</u>	<u>FY 2024</u> <u>Total</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>FY 2028</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• PAAF 01 353190: Massive Ordnance Penetrator (MOP)	15.500	19.743	14.047	-	14.047	8.752	0.000	0.000	0.000	0.000	58.042
• PAAF 01 353020: General Purpose Bombs	160.976	148.102	142.118	-	142.118	144.453	180.435	176.511	180.323	0.000	1,132.918
• RDTE 05 0604602F: Armament/ Ordnance Development	8.821	5.279	5.918	-	5.918	7.144	7.324	7.474	7.745	0.000	49.705
• RDTE 04 0604201F: PNT Resiliency	46.022	12.010	18.041	-	18.041	0.000	0.000	0.000	0.000	0.000	76.073

Remarks
Program Support Costs (PSC) Other Government Costs: Travel, Government Purchase Card (GPC), Program Support Personnel.

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E. Acquisition Strategy

MOP uses sole source cost type contracts to complete development, test, and evaluation activities.

The initial GBU-72/A5K penetrator design was accomplished through modeling, simulation, and analysis producing potential designs. The designs were developed based on the performance parameters of survivability, lethality, accuracy and penetration. The Government determined the optimum A5K design to then manufacture production representative prototypes to include warheads, fuzes and modified JDAM kits. These assets will be used to conduct and successfully complete qualification testing and integration.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force												Date: March 2023			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
3600 / 4				PE 0604327F / Hard and Deeply Buried Target Defeat System (HDBTDS) Program				645341 / Direct Strike Penetrator Systems							
Product Development (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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
MOP Modification and Integration	SS/ Various	Boeing : St Louis, MO	0.000	2.000	Jun 2022	-		-		-		-	Continuing	Continuing	-
MOP Test Asset, Replenish (Cong Add \$)	SS/CPFF	Boeing : St Louis, MO	0.000	-		35.000	Sep 2023	-		-		-	0.000	35.000	-
Subtotal			0.000	2.000		35.000		-		-		-	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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
MOP System Contractor Support	MIPR	DOTC : Albuquerque, NM	0.000	0.000	Sep 2022	-		2.143	Dec 2023	-		2.143	Continuing	Continuing	-
A5K System T&E Contractor Support	MIPR	DOTC/ARA/NGIS : Albuquerque, NM	0.000	0.162	May 2022	-		-		-		-	0.000	0.162	-
A5K System T&E Government Support	MIPR	MCAAP : McAlester, OK	0.000	0.331	Nov 2022	-		-		-		-	0.000	0.331	-
DCA Civ Pay	Allot	AFLCMC/EBD : Eglin AFB, FL	0.000	0.192	Oct 2021	-		-		-		-	0.000	0.192	-
Subtotal			0.000	0.685		-		2.143		-		2.143	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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
MOP Test & Evaluation	Various	AFLCMC : Eglin, Holloman, Edw, FL	0.000	1.000	Sep 2022	25.634	Dec 2022	4.669	Dec 2023	-		4.669	Continuing	Continuing	-
MOP Target Construction and Instrumentation	Various	DTRA : Albuquerque, NM	0.000	1.195	Mar 2023	76.904	Jan 2023	11.204		-		11.204	Continuing	Continuing	-
A5K Developmental Test & Evaluation	Various	96 TW, 780 TS : Eglin, Holloman, FL	0.000	6.000	Jul 2022	0.508	Jan 2023	-		-		-	0.000	6.508	-

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Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604327F / <i>Hard and Deeply Buried Target Defeat System (HDBTDS) Program</i>	Project (Number/Name) 645341 / <i>Direct Strike Penetrator Systems</i>
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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			
A5K Operational Test & Evaluation	Various	96 TW, Det 1 : Eglin, WSMR, FL	0.000	1.461	Dec 2022	0.416	May 2023	-		-		-	0.000	1.877	-
Subtotal			0.000	9.656		103.462		15.873		-		15.873	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			
MOP Program Management Administration (PMA)	Various	AFLCMC/EBD : Eglin AFB, FL	0.000	0.200	Mar 2022	3.220	Oct 2022	1.250	Dec 2023	-		1.250	Continuing	Continuing	-
A5K Program Management Administration (PMA)	Various	AFLCMC/EBD : Eglin AFB, FL	0.000	0.285	Mar 2022	0.144	Jan 2023	-		-		-	0.000	0.429	-
M-Code Program Management Administration (PMA)	Various	AFLCMC/EBD : Eglin AFB, FL	0.000	-		-		-		-		-	0.000	0.000	-
Subtotal			0.000	0.485		3.364		1.250		-		1.250	Continuing	Continuing	N/A

Remarks
Program Management Administration (PMA) funding increased to support additional MOP Modification testing activities.

	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	0.000	12.826	141.826	19.266	-	19.266	Continuing	Continuing	N/A

Remarks
Program Support Costs (PSC) Other Government Costs: Travel, Government Purchase Card (GPC), Program Support Personnel.

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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 0604327F / <i>Hard and Deeply Buried Target Defeat System (HDBTDS) Program</i>	Project (Number/Name) 645341 / <i>Direct Strike Penetrator Systems</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Direct Strike Penetrator Systems</i>				
MOP Modification Analysis and Testing	1	2022	4	2025
A5K Design, Development and Testing	1	2022	4	2024
M-Code/EAJ Development/Integration	1	2022	4	2024

Note
M-code will be fielded through the individual A5K procurement funding line.