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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 0604183F / <i>Hypersonics Prototyping - Hypersonic Attack Cruise Missile (HACM)</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	-	183.889	423.359	381.528	0.000	381.528	557.138	451.667	277.505	205.269	0.000	2,480.355
644183: <i>Hypersonic Attack Cruise Missile (HACM)</i>	-	183.889	423.359	381.528	0.000	381.528	557.138	451.667	277.505	205.269	0.000	2,480.355
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

Hypersonic Attack Cruise Missile (HACM) is a hypersonic air-launched weapon that will enable the U.S. to hold fixed, high value, time-sensitive targets at risk in contested environments from standoff distances. The Air Force is developing an air-launched boost-glide hypersonic weapon - the AGM-183A Air-launched Rapid Response Weapon (ARRW) - as well as the air-breathing HACM capability. ARRW and HACM are complementary. HACM offers a smaller form factor than ARRW for fighter integration and expanded bomber capacity, and thereby imposes cost on potential adversaries with additional complexity with vastly different trajectories than boost glide.

The program leverages Southern Cross Integrated Flight Research Experiment (SCIFiRE) investment, a bi-lateral U.S./Australian air-breathing hypersonic cruise missile prototyping effort which is a prelude to HACM. The HACM program will integrate advanced technologies and mature designs into an All-Up Round (AUR) prototype that will demonstrate a field-able long range prompt strike capability. HACM will design, develop, manufacture, and test (testing will occur in both the U.S. and Australia) a number of prototype vehicles to inform future HACM acquisition decisions. HACM will mature hypersonic technologies and processes to include: subsystem integration, infrastructure and testing advancements, Digital Engineering (DE), Weapons Open Systems Architecture (WOSA), modeling and simulation, analytics, and high performance computing environments.

Implements Digital Acquisition tenants of Open, Agile, and Digital; builds and establishes industrial base innovation around the program's enterprise for modularity and adaptability for the life cycle of the weapons system. Leverages common component development, in collaboration with other weapon systems, to reduce redundant costs between systems with similar subsystems requirements. Invests in analytical, data management, digital environments, networks, facilities, and security infrastructure upgrades supporting development of this program's capabilities, while leveraging DoD and DAF enterprise IT solutions. Expands program office staff, facilities, and security infrastructure to support the required classification levels for this program's activities. Engages with DoD, DAF, and industry stakeholders to refine threat analysis, refine inventory requirements, and plan upgrade requirements. Capitalizes on and incorporates successful laboratory research and development efforts applicable to this program's capability.

The total cost of the HACM Middle Tier of Acquisition effort is 1901.59 million, including RDT&E. The HACM is fully funded across the Future Years Defense Program.

This PE is not a new start. HACM was previously listed under both 0604033F/BPAC 643883 and PE 0604183F/BPAC 644183 and was consolidated to this PE (0604183F/BPAC 644183).

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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 FY 2022 1.151M was expensed for civilian pay expenses in this program element, and in FY 2023 8.208M, and FY 2024 8.381M 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.

B. Program Change Summary (\$ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	190.116	144.891	117.282	0.000	117.282
Current President's Budget	183.889	423.359	381.528	0.000	381.528
Total Adjustments	-6.227	278.468	264.246	0.000	264.246
• 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	-6.227	0.000			
• Other Adjustments	0.000	278.468	264.246	0.000	264.246

Change Summary Explanation

HACM was listed under PE 0604183F/BPAC 644183 in FY 2022 and in FY 2023 0604033F/BPAC 643883 and 0604183F/BPAC 644183. Funding was consolidated to this PE (0604183F/ BPAC 644183) during the FY 2023 Omnibus Appropriation Bill.

FY23 \$316.887M tech adjustment from PE 0604033F/BPAC 643883, -\$38.000M Mark in FY23 Omnibus Appropriation Act, \$0.419M FFRDC reduction.

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024
Title: HACM Development	152.714	370.791	303.923
Description: A single performer purchasing hardware and completing a critical design, and initial long-lead flight test asset hardware, to include aircraft integration assets.			
FY 2023 Plans: Effort will utilize a single industry performer to build upon preliminary design activities and mature HACM to critical design. The effort will continue model-based engineering activities and the DE ecosystem to complete critical design analysis, design			

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2022	FY 2023	FY 2024
<p>verification testing, systems integration, lab development, initial qualification testing, initial flight test hardware orders, aircraft integration assets, and WOSA compliance evaluation.</p> <p>FY 2024 Plans: Effort will utilize a single industry performer to build upon preliminary design activities and mature HACM to critical design. The effort will continue model-based engineering activities and the DE ecosystem to complete critical design analysis, design verification testing, systems integration, lab development, initial qualification testing, initial flight test hardware orders, aircraft integration assets, and WOSA compliance evaluation.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: FY2024 decreased compared to FY 2023 by \$66.868 million. Funding decreased due to phasing of hardware requirements. Significant hardware purchases were planned in FY23.</p>				
<p>Title: Integration, Qualification, and Test</p> <p>Description: This effort includes the government costs associated to assembly, integration and test of subsystems for qualification testing as well as prototype systems for system qualification, ground test and flight testing. The effort includes the planning, execution and analysis to complete the defined HACM test strategy.</p> <p>FY 2023 Plans: Effort continues the assembly, integration and test of subsystems for qualification testing as well as prototype systems for system qualification, ground test and flight testing.</p> <p>FY 2024 Plans: Effort continues the assembly, integration and test of subsystems for qualification testing as well as prototype systems for system qualification, ground test and flight testing.</p> <p>FY 2023 to FY 2024 Increase/Decrease Statement: FY 2024 increased compared to FY 2023 by \$25.829 million. Funding increased due to Inert Measurement Vehicle (IMV) flight testing and other testing requirements leading up to the first All Up Round (AUR) flight test.</p>		7.186	26.824	52.653
<p>Title: Program Support</p> <p>Description: Program Support Cost (PSC) includes contractor services: Engineering, Professional, and Administrative Support Services (EPASS) and or/other contract support. May also include mission planning, travel, Government Purchase Card (GPC), Direct Cite Authority (DCA) civilian pay, costs associated to meet future security upgrades/requirements, and/or other government costs.</p> <p>FY 2023 Plans:</p>		23.989	25.744	24.952

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2022	FY 2023	FY 2024
Efforts include DE, WOSA development/support, DE Infrastructure, mission planning, tech orders and DCA civilian pay.			
FY 2024 Plans: Efforts include DE, WOSA development/support, DE Infrastructure, mission planning, tech orders and DCA civilian pay.			
FY 2023 to FY 2024 Increase/Decrease Statement: FY2024 decreased compared to FY 2023 by \$0.792 million. Funding increased due to additional contractor and government manpower costs.			
Accomplishments/Planned Programs Subtotals	183.889	423.359	381.528

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>
• MPAF 02 0101101F: N/A	-	-	-	-	-	-	-	245.715	250.952	0.000	496.667

Remarks

E. Acquisition Strategy
The program leverages the Southern Cross Integrated Flight Research Experiment (SCIFiRE) investment, a bi-lateral U.S. / Australia effort which matures air-breathing cruise missile technology. Through SCIFiRE, HACM leverages efforts from the DARPA / Air Force Hypersonic Air-breathing Weapon Concept (HAWC) and the OUSD(R&E) Hypersonics Flight Demonstration (HyFly2) science and technology demonstrations. The HACM prototype will demonstrate a multi-mission weapon concept to be fielded as a long range prompt strike capability. Includes scope to develop/test/demonstrate prototype weapon through Digital Model-Based System Engineering (MBSE) process, implementing WOSA and Agile Software Development. The program will prioritize integration on the F-15E platform to enable quick entry into flight test.

Acquisition Strategy approved Dec 2021 which designated HACM as a Section 804 Middle Tier of Acquisition (MTA) Pathway (Rapid Prototyping). In Feb 2022 the OSD MTA Advisory Board concurred with HACM designation as a Rapid Prototyping MTA Pathway. The Air Force awarded a Cost Plus Fixed Fee (CPFF) contract in Sep 2022 to Raytheon Missiles and Defense to procure all long lead parts, materials and labor for HACM Critical Design Review, development, integration, qualification, and fight testing of AURs.

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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 0604183F / Hypersonics Prototyping - Hypersonic Attack Cruise Missile (HACM)				644183 / Hypersonic Attack Cruise Missile (HACM)							
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
HACM Prime Contractor Support, Analysis, Technical Risk Reduction, and Development	C/CPFF	Raytheon: Tucson : TBD	-	152.714	Sep 2022	370.791	Mar 2023	303.923	Dec 2023	-		303.923	Continuing	Continuing	-
Subtotal			-	152.714		370.791		303.923		-		303.923	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
Development & Prototyping	C/CPFF	Multiple: TBD: Various : TBD	-	8.128	Jun 2022	7.993	Mar 2023	9.210	Dec 2023	-		9.210	Continuing	Continuing	-
Direct Cite Authority Civilian Pay	Allot	Not specified: TBD : TBD	-	1.151	Sep 2022	8.208	Oct 2022	8.381	Oct 2023	-		8.381	Continuing	Continuing	-
Subtotal			-	9.279		16.201		17.591		-		17.591	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
Test & Evaluation	C/TBD	Multiple: TBD: Various : TBD	-	7.186	Aug 2022	26.824	Mar 2023	52.653	Dec 2023	-		52.653	Continuing	Continuing	-
Subtotal			-	7.186		26.824		52.653		-		52.653	Continuing	Continuing	N/A
Management Services (\$ 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
Management Services	C/TBD	Multiple: TBD: Various : TBD	-	14.710	Jun 2022	9.543	Oct 2022	7.361	Oct 2023	-		7.361	Continuing	Continuing	-
Subtotal			-	14.710		9.543		7.361		-		7.361	Continuing	Continuing	N/A

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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 0604183F / <i>Hypersonics Prototyping - Hypersonic Attack Cruise Missile (HACM)</i>	Project (Number/Name) 644183 / <i>Hypersonic Attack Cruise Missile (HACM)</i>
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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			

Remarks
Includes A&AS support requirements plus TDY and office supplies.

	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	-	183.889	423.359	381.528	-	381.528	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604183F / <i>Hypersonics Prototyping - Hypersonic Attack Cruise Missile (HACM)</i>	Project (Number/Name) 644183 / <i>Hypersonic Attack Cruise Missile (HACM)</i>

	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	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>Hypersonic Attack Cruise Missile (HACM)</i>																												
Preliminary Design				■																								
Critical Design				■	■	■	■	■																				
HACM Development				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Integration, Qualification, and Test				■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

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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 0604183F / <i>Hypersonics Prototyping - Hypersonic Attack Cruise Missile (HACM)</i>	Project (Number/Name) 644183 / <i>Hypersonic Attack Cruise Missile (HACM)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Hypersonic Attack Cruise Missile (HACM)</i>				
Preliminary Design	4	2022	4	2022
Critical Design	4	2022	4	2023
HACM Development	4	2022	2	2027
Integration, Qualification, and Test	4	2022	2	2027