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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2023 Air Force **Date:** April 2022

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force / BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0604932F / <i>Long Range Standoff Weapon</i>
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COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
Total Program Element	1,898.362	373.499	599.042	928.850	0.000	928.850	964.245	720.878	599.740	278.122	85.600	6,448.338
657011: <i>LONG RANGE STAND-OFF</i>	1,898.362	373.499	599.042	928.850	0.000	928.850	964.245	720.878	599.740	278.122	85.600	6,448.338
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Program MDAP/MAIS Code:** 489

**A. Mission Description and Budget Item Justification**

The Long Range Stand Off (LRSO) Cruise Missile is a long range survivable stand-off weapon capable of delivering lethal nuclear effect on strategic targets. LRSO will replace the currently fielded Air Launched Cruise Missile (ALCM) and will be integrated on both legacy and future bomber aircraft. The LRSO weapon system will be capable of penetrating and surviving advanced Integrated Air Defense Systems (IADS) from significant stand-off range to prosecute strategic targets in support of the Air Force's global attack capability and strategic deterrence core function.

Funds may be used to address emerging or short-notice Diminishing Manufacturing and Material Shortage (DMSMS) issues.

The program is conducting Development, Verification, and Test activities to execute design maturation, reliability growth and manufacturing maturation to support Critical Design Review. The program is also conducting Engineering and Manufacturing Development tasks to validate requirements to support Development and Operational Testing and Production Readiness.

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 FY21 \$0.618M was expended for civilian pay expenses in this program element, and in FY22 \$0 forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
Previous President's Budget	384.727	609.042	0.000	0.000	0.000
Current President's Budget	373.499	599.042	928.850	0.000	928.850
Total Adjustments	-11.228	-10.000	928.850	0.000	928.850
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-10.000			
• 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	-11.228	0.000			
• Other Adjustments	0.000	0.000	928.850	0.000	928.850

**Change Summary Explanation**

FY2021 reduction for Small Business Innovative Research (SBIR)

FY2022 Congressional reduction of 10.000M for "Re-phase funds for EMD contract award."

The FY2022 President's Budget submittal did not reflect FY 2023 through FY 2026 funding. Therefore, any additional explanation of the change between the two budget positions for FY 2023 cannot be made in a relevant manner.

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
<b>Title:</b> Long Range Stand-Off (LRSO) Weapon Development	305.933	489.848	764.540
<b>Description:</b> Long Range Standoff weapon development includes the Cruise Missile, the logistics support systems, mission planning and sub-system test and evaluation.			
<b>FY 2022 Plans:</b>			
Program will continue to design, develop, integrate and test the LRSO system through the EMD contract. Specific areas of concentration will include:			
- qualification testing and nuclear hardness testing in support of component selection assessment.			
- continue sub-system critical design reviews in preparation for System Critical Design Review, ensuring the design adequately meets the warfighter's performance requirements in the Capabilities Development Document (CDD).			
- systems engineering and early demonstrated flight testing to own the technical baseline for requirements traceability.			
- activities to support reliability growth, manufacturability, and maintainability.			

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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
<p>- continue test activities, such as, but not limited to, envelope testing, separation control testing and powered flight.</p> <p><b>FY 2023 Plans:</b> The program will continue to design, develop, integrate and test the LRSO weapon system through the Engineering and Manufacturing Development contract. Activities include, but are not limited to, the following:</p> <ul style="list-style-type: none"> <li>- continue efforts to finalize the system design and conduct verification and test activities in support of the Critical Design Review.</li> <li>- continue reliability growth, manufacturability, and maintainability maturation activities in preparation for formal Development Test and Evaluation activities.</li> <li>- continue systems engineering activities focusing on design for reliability and design for manufacturing tenants.</li> <li>- continue test activities, such as, but not limited to, continued envelope testing and weapon system flight tests.</li> <li>- continue planning for Production Readiness Reviews prior to the build of the Initial Operational Test &amp; Evaluation (IOT&amp;E) units.</li> <li>- continue qualification and nuclear hardness testing to verify the system operates in intended environments.</li> <li>- continue planning and development of the logistics support systems.</li> <li>- produce associated trainers, test equipment and support equipment.</li> <li>- continue to plan, develop, and mature support systems to include Common Support Equipment/Peculiar Support Equipment and transportation equipment.</li> <li>- continue planning for the use of Model Based System Engineering tools during Operations and Sustainment phase in order to transform supply chain management.</li> <li>- continue to mature the weapon system by conducting trade studies, system engineering, test activities, and system modeling and simulation.</li> <li>- continue to further develop analytical, information technology, and data management capabilities.</li> <li>- continue to implement information systems and information technology design to support EMD execution.</li> <li>- continue to expand and mature the analytical, information technology, test, and data management capabilities to ensure access to weapon system design information is properly controlled and securely transmitted between government and contractors.</li> <li>- continue to modify, modernize, and expand the analytic environment and labs to support EMD activities to enable full execution of the program's capability to own the technical baseline throughout the program life cycle. This involves establishing a digital engineering system including a supporting environment/infrastructure to perform digital activities, collaborate with and communicate across stakeholders.</li> <li>- continue to plan and execute critical software risk reduction activities.</li> <li>- continue to, through best program practices, ensure the following are met: requirements flow down, requirement allocation to hardware and software, and the requirements compliance matrix.</li> </ul> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b></p>				

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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
Funding increased due to prime contractor and subcontractor manpower and material increases to support verification activities in support and conduct the Critical Design Review (CDR). Additionally, activities after CDR for the purchase of hardware in support of Developmental Test and Evaluation (DT&E) ramp up.				
<b>Title:</b> All-Up-Round		37.058	73.912	127.631
<b>Description:</b> All-Up-Round activities include payload integration and platform integration. Further, these efforts include activities and assets related to weapon design compatibility and qualification, and other nuclear certification activities with both threshold and objective aircraft.				
<b>FY 2022 Plans:</b> Continue program practices that ensure the following are met: - requirements flow down, requirement allocation to hardware and software, requirements compliance matrix, system performance, reliability, maintainability, product assurance, testability, producibility and supportability. - facility and security infrastructure upgrades to enable secure connectivity and communication between Department of Defense (DoD), Department of Energy (DOE), and industry. - efforts to conduct parallel development, design, and test activities with the DOE to ensure the LRSO adequately integrates the DOE designed warhead into the system. - safety studies and other nuclear certification activities. - aircraft Integration efforts including activities associated with integration on threshold aircraft and aircraft mission planning system upgrades to accommodate the new weapon. - activities and assets related to weapon design compatibility and qualification, and other nuclear certification with both threshold and objective aircraft. - development of mission planning upgrade needs, OFP development and integration to deliver the OFP test tapes, planning activities necessary to integrate LRSO with aircraft, and ensuring the logical, electrical, and physical interfaces of the LRSO as defined in the ICD.				
<b>FY 2023 Plans:</b> The program will: - continue through program practices to ensure the following are met: requirements flow down, requirement allocation to hardware and software, requirements compliance matrix, system performance, reliability, maintainability, product assurance, testability, producibility and supportability. - continue facility and security infrastructure upgrades to enable secure connectivity and communication between Department of Defense (DoD), Department of Energy (DOE), and industry. - continue efforts to conduct parallel development, design, and test activities with the DOE to ensure the LRSO adequately integrates the DOE designed warhead into the system.				

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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
<ul style="list-style-type: none"> <li>- conduct safety studies and nuclear certification activities.</li> <li>- continue to perform aircraft integration efforts including activities associated with integration on threshold aircraft and aircraft mission planning system upgrades to accommodate the new weapon.</li> <li>- conduct joint DoD and DOE ground and flight activities to verify the missile to warhead interface and demonstrate the system meets performance specifications.</li> <li>- continue to collaborate with National Nuclear Security Administration to ensure seamless integration of DOE warhead assets into the cruise missile.</li> <li>- continue to execute and improve the unified certification strategy which meets nuclear surety, cyber security, and nuclear safety requirements.</li> <li>- continue other activities necessary for All-Up-Round integration. These efforts include: developing mission planning upgrade needs, Operational Flight Program (OFP) development and integration to deliver the OFP test tapes, planning activities necessary to integrate LRSO with aircraft, and ensuring the logical, electrical, and physical interfaces of the LRSO as defined in the Interface Control Document (ICD).</li> </ul> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> Funding increased due to ramp up and increased level of effort of aircraft integration and warhead integration activities to support a successful CDR and increased aircraft carriage equipment hardware prior to developmental flight test.</p>				
<p><b>Title:</b> Test Support</p> <p><b>Description:</b> Conduct Test Support activities to support weapon development</p> <p><b>FY 2022 Plans:</b> Continue to:  <ul style="list-style-type: none"> <li>- perform design validation, verification, test, nuclear certification (to include design and operational certification) and system qualification activities.</li> <li>- perform weapon system environment testing.</li> <li>- continue test planning and execution activities to support LRSO weapon development, All-Up-Round technical integration, and aircraft integration.</li> </ul> </p> <p><b>FY 2023 Plans:</b> The Government formally arranges and funds the use of Government flight test support for ground and flight test activities. The program will:  <ul style="list-style-type: none"> <li>- continue to perform design validation, verification, test, nuclear certification activities (to include design and operational certification) and system qualification activities.</li> </ul> </p>		30.508	35.282	36.679

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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2023 Air Force	<b>Date:</b> April 2022
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2021	FY 2022	FY 2023
- continue test planning and execution activities to support LRSO weapon development, All-Up-Round technical integration, warhead integration and aircraft integration. - continue coordination with external test agencies in preparation for operational and post-production flight testing.  <b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> Funding increased due to expanded aircraft integration testing, continued EMD flight testing, and pre-DT&E execution.			
<b>Accomplishments/Planned Programs Subtotals</b>	373.499	599.042	928.850

<b>D. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u> <u>Base</u>	<u>FY 2023</u> <u>OCO</u>	<u>FY 2023</u> <u>Total</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• MPAF 02 MLRSO1: <i>Long Range Stand-Off Weapon</i>	0.000	0.000	31.454	-	31.454	69.238	139.963	302.973	1,096.067	8,129.822	9,769.517
• OPAF 03 833140: <i>Strategic Command And Control</i>	0.000	0.000	20.442	-	20.442	0.000	0.000	0.000	0.000	0.000	20.442

**Remarks**

**E. Acquisition Strategy**  
 The acquisition strategy focuses on the development of the All Up Round Weapon System, integration with the nuclear warhead, executing aircraft integration activities, and conducting test and evaluation with a continued robust reliability and manufacturing approach. The program obtained a successful MS A decision in July 2016 and subsequently released a Request for Proposals. The program competitively selected two prime contractors in August 2017 to execute the Technology Maturation and Risk Reduction (TMRR) phase. The selected prime contractors executed the Cost-Plus-Fixed-Fee (CPFF) contracts during TMRR with activities focused on developing and maturing subsystem and system designs. In FY20, LRSO pivoted to sole source TMRR contractor, enabling Development RFP (dRFP) release & MS B. MS B was approved via an Acquisition Decision Memorandum in June 2021 and a contract for Engineering and Manufacturing Development was awarded in July 2021.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force** **Date:** April 2022

<b>Appropriation/Budget Activity</b> 3600 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604932F / Long Range Standoff Weapon	<b>Project (Number/Name)</b> 657011 / LONG RANGE STAND-OFF
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<b>Product Development (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
Long Range Standoff Weapon Development	SS/CPFF	Various : TBD	1,523.203	274.224	Oct 2020	453.671	Oct 2021	727.751	Oct 2022	-		727.751	2,041.086	5,019.935	-
<b>Subtotal</b>			1,523.203	274.224		453.671		727.751		-		727.751	2,041.086	5,019.935	N/A

<b>Support (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
Aircraft Integration Planning	Various	Various : TBD	81.910	25.182	Oct 2020	29.996	Oct 2021	22.300	Oct 2022	-		22.300	48.100	207.488	-
All-Up-Round Activities	Various	Various : TBD	42.294	11.876	Jan 2021	43.916	Jan 2022	105.331	Oct 2022	-		105.331	250.992	454.409	-
<b>Subtotal</b>			124.204	37.058		73.912		127.631		-		127.631	299.092	661.897	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
Test Support	Various	Various : TBD	121.360	30.508	Jan 2021	35.282	Jan 2022	36.679	Jan 2023	-		36.679	202.237	426.066	-
<b>Subtotal</b>			121.360	30.508		35.282		36.679		-		36.679	202.237	426.066	N/A

<b>Management Services (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
Program Management Administration	Various	Various : TBD	129.595	31.709	Oct 2020	36.177	Oct 2021	36.789	Oct 2022	-		36.789	106.170	340.440	-
<b>Subtotal</b>			129.595	31.709		36.177		36.789		-		36.789	106.170	340.440	N/A





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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2023 Air Force		<b>Date:</b> April 2022
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Long Range StandOff Weapon</i></b>				
Technology Maturation and Risk Reduction Phase	1	2021	4	2022
Milestone B Decision	3	2021	3	2021
Engineering and Manufacturing Development Phase	4	2021	2	2027
CDR	2	2023	2	2023
Milestone C Decision	3	2027	3	2027