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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2021 Air Force **Date:** February 2020

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101122F / <i>Air-Launched Cruise Missile (ALCM)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	5.741	10.217	1.433	0.000	1.433	0.459	1.000	0.517	0.526	Continuing	Continuing
674797: <i>ALCM Upgrades</i>	-	5.741	10.217	1.433	0.000	1.433	0.459	1.000	0.517	0.526	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

The AGM-86B, Air Launched Cruise Missile (ALCM), is a subsonic, air-to-surface strategic nuclear missile, operational since 1982. Armed with a W-80 warhead, it is designed to evade air and ground-based defenses in order to strike targets at any location within any enemy's territory. The ALCM is designed for B-52H internal and external carriage.

RDT&E funds support development of new tests and evaluation procedures, software, and equipment. RDT&E funds also provide sustainment solutions for Line Replaceable Units (LRU) and technology insertion to ensure ALCM sustainability supports Air Force strategic nuclear deterrence and Global Strike mission requirements through 2030. Additionally, RDT&E funds support aging and surveillance analysis to pro-actively identify components which will degrade system reliability.

The ALCM Test Plan Development and Evaluation program develops plans and procedures for testing nuclear systems, and implements those procedures as directed by the Chairman, Joint Chiefs of Staff (CJCS) and to satisfy the recurring requirements to test Chemical, Biological, Radiological, and Nuclear (CBRN) susceptibility.

An extensive Service Life Extension Program (SLEP) is in place to address age related issues and to ensure reliability and sustainability through 2030. Technology insertion is anticipated to address serviceability of components at or near end of life.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver ALCM weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605831F or 0605833F.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021 Base</b>	<b>FY 2021 OCO</b>	<b>FY 2021 Total</b>
Previous President's Budget	5.955	10.217	8.436	0.000	8.436
Current President's Budget	5.741	10.217	1.433	0.000	1.433
Total Adjustments	-0.214	0.000	-7.003	0.000	-7.003
• 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	0.000	0.000			
• Other Adjustments	-0.214	0.000	-7.003	0.000	-7.003

**Change Summary Explanation**

FY21 funding reduced for higher Air Force priorities

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>FY 2021</b>
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<p><b>Title:</b> Inertial Navigation Element (INE)</p> <p><b>Description:</b> Conducting analysis and engineering efforts to ensure short and long term supportability of the ALCM Inertial Navigation Element (INE).</p> <p><b>FY 2020 Plans:</b> Complete development and certification that INE unit is ready for production.</p> <p><b>FY 2021 Plans:</b> No FY21 requirement or INE, all development complete in FY21.</p> <p><b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> INE development completed in FY20</p>	2.840	1.057	0.000
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<p><b>Title:</b> ALCM Test Plan Development and Evaluation</p> <p><b>Description:</b> Develop test procedures to implement CJCS-directed requirement for Electromagnetic (EM) testing for nuclear systems.</p> <p><b>FY 2020 Plans:</b></p>	2.901	9.160	1.433
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2019	FY 2020	FY 2021
Continue testing in a CBRN environment.			
<b>FY 2021 Plans:</b> Execute Neutron Test in support of ALCM Chemical Biological Radiological and Neutron (CBRN) Survivability Requirement IAW AFI 10-2607			
<b>FY 2020 to FY 2021 Increase/Decrease Statement:</b> Executing test identification for future CBRN tests to meet AF 10-2607 Survivability requirement			
<b>Accomplishments/Planned Programs Subtotals</b>	5.741	10.217	1.433

<b>D. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• MPAF 03 Line Item MALCBG: <i>ALCM, Missile Modifications</i>	47.632	77.387	80.837	-	80.837	83.498	69.296	-	-	Continuing	Continuing
• MPAF 04 Line Item MALCBG: <i>ALCM, Replenishment Spares</i>	2.280	2.321	2.359	-	2.359	2.407	2.451	-	-	Continuing	Continuing
• OPAF 03 Line Item MALCBG: <i>ALCM, Electronics &amp; Telecommunications Equipment (BP83)</i>	1.775	1.806	1.840	-	1.840	1.873	1.906	-	-	Continuing	Continuing
• MPAF 04 Line Item 999/Replen Spa...: <i>ALCM, Initial Spares</i>	0.308	0.119	0.328	-	0.328	0.435	0.441	-	-	Continuing	Continuing

**Remarks**

**E. Acquisition Strategy**  
Previously, the Air Launched Cruise Missile (ALCM) was assessed in the nuclear environment for Chemical, Biological, Radiological and Nuclear (CBRN) Survivability for High Altitude Electromagnetic Pulse (HEMP) and Total Ionizing Dose at White Sands Missile Range (WSMR).  
  
Follow-on test development will assess the neutron and gamma component in the nuclear environment for CBRN survivability. Test development and execution will utilize organic and contractor agencies.  
  
INE SLEP plans for a three phase reliability assessment with comprehensive plan to address short and long term supportability.  
Phase 1 - Short-term parts shortage mitigation analyses with Tomahawk Reference Measuring Unit and Computer

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Phase 2 - Definition of scope of efforts and establishing the manufacturing methodology		
Phase 3 - Delivery of working engineering samples, certification of production, and production of INE's equal to the function and reliability of 'like new' devices		

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force** **Date:** February 2020

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101122F / Air-Launched Cruise Missile (ALCM)	<b>Project (Number/Name)</b> 674797 / ALCM Upgrades
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<b>Test and Evaluation (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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 and Evaluation	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
INE LRU Sustainment Assessment	TBD	NG : UT	-	2.840	Jun 2019	1.057	Jan 2020	-		-		-	Continuing	Continuing	-
CBRN Test Plan Development & Evaluation	Various	WSMR, Boeing : NV	-	0.867	Feb 2019	0.810	Dec 2019	1.413	Feb 2021	-		1.413	Continuing	Continuing	-
<b>Subtotal</b>			-	3.707		1.867		1.413		-		1.413	Continuing	Continuing	N/A

<b>Management Services (\$ in Millions)</b>				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Management and Engineering Services for research, development, test and evaluation on ALCM	C/CPAF	Not specified. : TBD	-	2.014		8.330		-		-		-	Continuing	Continuing	-
PMA - Government Costs	Various	Various : Various	-	0.020		0.020		0.020		-		0.020	Continuing	Continuing	-
<b>Subtotal</b>			-	2.034		8.350		0.020		-		0.020	Continuing	Continuing	N/A

**Remarks**  
Test Development and Evaluation PMA is for Supplies and Travel in support of project number 674797

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	-	5.741	10.217	1.433	-	1.433	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile: PB 2021 Air Force</b>		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101122F / Air-Launched Cruise Missile (ALCM)	<b>Project (Number/Name)</b> 674797 / ALCM Upgrades

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

<b>INE Sustainment</b>	
INE Line Replaceable Unit Assessment	[REDACTED]
<b>CBRN Test</b>	
CBRN Test Plan Development	[REDACTED]
CBRN Test Execution	[REDACTED]

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2021 Air Force		<b>Date:</b> February 2020
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101122F / <i>Air-Launched Cruise Missile (ALCM)</i>	<b>Project (Number/Name)</b> 674797 / <i>ALCM Upgrades</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>INE Sustainment</b>				
INE Line Replaceable Unit Assessment	2	2019	4	2022
<b>CBRN Test</b>				
CBRN Test Plan Development	1	2019	4	2025
CBRN Test Execution	1	2020	4	2020