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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force										Date: February 2019		
Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development					R-1 Program Element (Number/Name) PE 0101122F I Air-Launched Cruise Missile (ALCM)							
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	-	0.446	5.955	10.217	0.000	10.217	8.436	5.460	1.206	0.518	Continuing	Continuing
674797: ALCM Upgrades	-	0.446	5.955	10.217	0.000	10.217	8.436	5.460	1.206	0.518	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 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 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. Program Change Summary (\$ in Millions)		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	
Previous President's Budget		0.463	5.955	10.421	0.000	10.421	
Current President's Budget		0.446	5.955	10.217	0.000	10.217	
Total Adjustments		-0.017	0.000	-0.204	0.000	-0.204	
• 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		-0.017	0.000				
• Other Adjustments		0.000	0.000	-0.204	0.000	-0.204	
Change Summary Explanation							
FY18: -\$0.017M for SBIR							
FY20: -\$0.204M re-phased to future budget years							
C. Accomplishments/Planned Programs (\$ in Millions)					FY 2018	FY 2019	FY 2020
Title: Inertial Navigation Element (INE)					0.000	4.955	6.776
Description: Conducting analysis and engineering efforts to ensure short and long term supportability of the ALCM Inertial Navigation Element (INE).							
FY 2019 Plans: Assessing the engineering feasibility of recreating the INE memory modules technology of the circuit cards for technology insertion into the ALCM to offset memory module serviceability end of life. Development of working engineering samples to assess ability to create 'like new' devices.							
FY 2020 Plans: Complete development and certification that INE unit is ready for production.							
FY 2019 to FY 2020 Increase/Decrease Statement: Increase in development efforts in FY20.							
Title: ALCM Test Plan Development and Evaluation					0.446	1.000	3.441
Description: Develop test procedures to implement CJCS-directed requirement for Electromagnetic (EM) testing for nuclear systems.							

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C. Accomplishments/Planned Programs (\$ in Millions)								FY 2018	FY 2019	FY 2020	
FY 2019 Plans: Develop a test plan for an active system test of the ALCM to be exposed to a neutron/gamma environment. Intent of the test is to assess survivability of a legacy mission critical system in a CBRN environment per DoDI 3150.09 and AFI 10-2607.											
FY 2020 Plans: Continue testing in a CBRN environment.											
FY 2019 to FY 2020 Increase/Decrease Statement: Reflects increase in testing activities in FY20.											
Accomplishments/Planned Programs Subtotals								0.446	5.955	10.217	
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
• MPAF 03 Line Item MALCBG: <i>ALCM, Missile Modifications</i>	31.675	47.632	77.387	-	77.387	80.837	83.498	69.296	-	Continuing	Continuing
• MPAF 04 Line Item MALCBG: <i>ALCM, Replenishment Spares</i>	2.942	2.280	2.321	-	2.321	2.359	2.407	2.451	-	Continuing	Continuing
• OPAF 03 Line Item MALCBG: <i>ALCM, Electronics & Telecommunications Equipment (BP83)</i>	1.757	1.775	1.806	-	1.806	1.840	1.873	1.906	-	Continuing	Continuing
• MPAF 04 Line Item 999/Replen: <i>Spa...: ALCM, Initial Spares</i>	0.304	0.308	0.119	-	0.119	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.											

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Phase 1 - Short-term parts shortage mitigation analyses with Tomahawk Reference Measuring Unit and Computer 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		
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 3600 / 7						R-1 Program Element (Number/Name) PE 0101122F / Air-Launched Cruise Missile (ALCM)				Project (Number/Name) 674797 / ALCM Upgrades					
Test and Evaluation (\$ 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
INE LRU Sustainment Assessment	TBD	NG : UT	-	0.000		4.935	Oct 2018	6.776	Oct 2019	-		6.776	Continuing	Continuing	-
CBRN Test Plan Development & Evaluation	Various	WSMR, Boeing : NV	-	0.426	May 2018	1.000	Jun 2019	3.421	Dec 2019	-		3.421	Continuing	Continuing	-
Subtotal			-	0.426		5.935		10.197		-		10.197	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
PMA - Government Costs	Various	Various : Various	-	0.020		0.020		0.020		-		0.020	Continuing	Continuing	-
Subtotal			-	0.020		0.020		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 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	0.446		5.955		10.217		-		10.217	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force										Date: February 2019									
Appropriation/Budget Activity					R-1 Program Element (Number/Name)					Project (Number/Name)									
3600 / 7					PE 0101122F / Air-Launched Cruise Missile (ALCM)					674797 / ALCM Upgrades									

	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
INE Sustainment																												
INE Line Replaceable Unit Assessment																												
CBRN Test																												
CBRN Test Plan Development																												
CBRN Test Execution																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101122F / Air-Launched Cruise Missile (ALCM)	Project (Number/Name) 674797 / ALCM Upgrades

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
INE Sustainment				
INE Line Replaceable Unit Assessment	2	2019	4	2022
CBRN Test				
CBRN Test Plan Development	1	2018	4	2024
CBRN Test Execution	1	2020	4	2020