

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Air Force										Date: February 2015		
Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 5: System Development & Demonstration (SDD)					R-1 Program Element (Number/Name) PE 0604933F / ICBM Fuze Modernization							
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	65.370	76.553	59.826	142.551	-	142.551	190.973	180.205	169.655	159.157	152.373	1,196.663
655082: ICBM FUZE SUPPORT	65.370	76.553	59.826	142.551	-	142.551	190.973	180.205	169.655	159.157	152.373	1,196.663
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
Program MDAP/MAIS Code: 0498												
Note Prior years funding \$9.740M in PE 0604222F FY11 and \$39.717M in PE 0604851F FY12 was also executed.												
A. Mission Description and Budget Item Justification The ICBM Fuze Modernization program designs and develops a form, fit, function replacement for the Mk21 fuze. The legacy Mk21 fuze is three times past its design life and ongoing Mk21 fuze refurbishment does not meet Nuclear Weapon Stockpile Plan requirements. The Mk21 Reentry Vehicle and fuze will be deployed on the current Minuteman III (MM III) and future Ground Based Strategic Deterrent (GBSD). Previous plans to integrate and test the Mk21 fuze replacement with the NNSA W78/88-1 Life Extension Program warhead were deferred. The US Air Force (USAF) will develop the Mk21 fuze utilizing the National Nuclear Security Administration (NNSA) complex consisting of Sandia National Labs-California (SNL-CA), Sandia National Labs-New Mexico (SNL-NM), and National Security Campus (NSC, formerly Kansas City Plant); as well as a USAF weapons system integration contractor. The ICBM Fuze Modernization program will leverage technologies, parts, components and development/production capabilities resulting from extensive fuze work performed by the US Navy (USN) and NNSA on the Mk5 Alt 370 Fuze program. Common USN & USAF fuze components include the Radar Module (RM), Thermal Battery Assembly (TBA) and Path Length Module (PLM). USN & USAF fuze components that are partially common and use common technologies include the Missile Interface and Controller Module (MICM), Launch Safety Device (LSD), Firing Set Integration Module (FSIM) and Thermal Protection Device (TPD). The ICBM Fuze Modernization program will also integrate the fuze into associated MM III weapon system hardware, support equipment, data, flight test hardware, and training materials. It will also conduct required system testing (including ground and flight tests). The program coordinates USAF Mk21 fuze replacement development efforts with the Department of Energy (DOE) to synchronize USAF arming and fuze development activities with the DOE warhead requirements. When prudent, the ICBM Fuze Modernization program will conduct trade studies and initiate conceptual designs to address operational system issues and meet future requirements. As a cooperative USAF, USN and NNSA weapon acquisition, the USAF will implement joint Department of Defense (DoD)-DOE Nuclear Weapons Life Cycle Activities. The ICBM Fuze Modernization program will be tailored to use joint DoD/DOE Instruction 5030.55 for Nuclear Acquisition (also known as the Phase 6.X processes) for routine nuclear stockpile activities to align with USN and NNSA operations.												

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Air Force				Date: February 2015		
Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 5: System Development & Demonstration (SDD)		R-1 Program Element (Number/Name) PE 0604933F I ICBM Fuze Modernization				
In the FY16 budget request, Mk21 fuze program rebaseline planning was completed and funding adjusted to match the USAF Service Cost Position. Rebaseline plans include additional efforts to leverage all common USN technologies and acceleration of Mk21 flight test vehicle development by SNL-CA supporting critical flight testing beginning in FY19.						
This program is in Budget Activity 5, System Development and Demonstration (SDD). The program was authorized to enter Phase 6.3 "Development Engineering" which is the equivalent of Milestone B. The program is conducting engineering development tasks aimed at meeting validated requirements prior to Phase 6.4 "Production Engineering," which is scheduled for FY19 (Objective).						
B. Program Change Summary (\$ in Millions)		FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget		118.411	59.826	88.473	-	88.473
Current President's Budget		76.553	59.826	142.551	-	142.551
Total Adjustments		-41.858	-	54.078	-	54.078
• Congressional General Reductions		-	-			
• Congressional Directed Reductions		-	-			
• Congressional Rescissions		-14.000	-			
• Congressional Adds		-	-			
• Congressional Directed Transfers		-	-			
• Reprogrammings		-18.387	-			
• SBIR/STTR Transfer		-9.471	-			
• Other Adjustments		-	-	54.078	-	54.078
Change Summary Explanation						
FY2014 funding reflects a \$14M Congressional Rescission, \$18.387M transfer to higher AF priorities, and \$9.471M transfer to SBIR/STTR.						
FY2016 funding reflects an increase of \$54.078M based on completion of Mk21 fuze program rebaseline planning and to match the USAF Service Cost Position. Rebaseline plans include additional effort to leverage all common USN technologies and acceleration of Mk21 flight test vehicle development by SNL-CA supporting critical flight testing beginning in FY19.						
C. Accomplishments/Planned Programs (\$ in Millions)				FY 2014	FY 2015	FY 2016
Title: Fuze Design and Development				52.629	42.914	115.732
Description: Design and develop the Mk21 fuze required to support the ICBM W87 warhead. Coordinate design and development efforts with the ICBM weapon system integrator and support flight testing.						
FY 2014 Accomplishments:						

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Air Force		Date: February 2015		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 5: System Development & Demonstration (SDD)</i>		R-1 Program Element (Number/Name) PE 0604933F / ICBM Fuze Modernization		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
Matured development of common parts, components, and technology for application to Mk21 replacement fuze. Implemented nuclear surety themes informed by trades as directed by NSPD-28. Supported integration and flight test planning. Conducted trade studies and initiated conceptual designs to address operational system issues and meet future requirements. Completed Phase 6.2A and received approval to enter Phase 6.3. FY 2015 Plans: Continue to mature development of common parts, components, and technology for application to the Mk21 replacement fuze. Continue component conceptual design development of common and unique parts. Conduct Component Conceptual Design Review and Initial Baseline Review. Implement nuclear surety themes informed by trades as directed by NNSA. SNL-NM will continue to test common components in conjunction with group builds supporting production planning for the Radar, Thermal Battery Assembly, and Path Length Module to verify that the current Navy/AF design continues to meet the AF functional requirements and unique applicable environments at the component level. SNL will complete more concentrated detail design analysis and tests on the remaining components with AF unique sub-components (MICM, LSD, TPD and FSIM). SNL-CA will begin detailed Arming and Fuzing Assembly (AFA) qualification plans and the efforts to prepare and develop the Flight Test Vehicle for meeting the established objectives of the Flight Test Unit 1 (FTU1). FY 2016 Plans: Finalize development of common parts, components, and technology for application to Mk21 replacement fuze. Finalize component conceptual design development of common components to include Arming and Fuzing Assembly (AFA) prototype builds. Ramp-up conceptual design development of AF unique components. Ramp up Re-entry Vehicle (RV) integration, systems engineering at SNL-CA, system qualification and flight test planning and flight test vehicle (Joint Test Assembly or JTA) development. SNL-NM will begin testing of common components in conjunction with the group builds supporting production planning for the Radar, Battery, and Path Length Module. SNL will continue to analyze the design and perform tests on the remaining four components with AF unique sub-components (MICM, LSD, TPD and FSIM). SNL-CA will continue to solidify the detailed AFA qualification plans and the efforts to prepare and develop the Flight Test Vehicle for meeting the established objectives of the FTU1.				
Title: Weapon System Integration/Systems Engineering Description: Integrate Mk21 fuze and warhead designs and the MM III weapon system. Validate designs through ground test and integration test beds. Plan and conduct necessary ground and flight testing. Coordinate design, development and flight test efforts with fuze developer. FY 2014 Accomplishments:		17.811	16.912	26.819

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Air Force		Date: February 2015		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I</i> BA 5: <i>System Development & Demonstration (SDD)</i>		R-1 Program Element (Number/Name) PE 0604933F / <i>ICBM Fuze Modernization</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
Continued developing MM III weapon system hardware and software modifications to support Mk21 replacement fuze designs. Created a flight test plan for fuze related developmental hardware including extended range tests. FY 2015 Plans: Continue to provide Systems Engineering, Integration, and Management expertise in support of USAF and SNL development of the Mk21 replacement fuze. Integrate AFA with the MMIII weapon system for partially and fully completed components during the development build. Test and verify SNL developed Lab Test Units and corresponding Ground Test Units using the MMIII Integrated Test Bed. Testing will confirm the functionality of the fuze through simulated missions for signal performance, data accuracy and the required fuzing options. FY 2016 Plans: Ramp-up Systems Engineering, Integration, and Management expertise in support of USAF and SNL development of the Mk21 replacement fuze. Continue to integrate AFA with the MMIII weapon system during the development build. Continue to test and verify SNL developed Lab Test Units and corresponding Ground Test Units via the MMIII Integrated Test Bed. Assess the program's impact on Minuteman III system-level effectiveness.				
Title: W78/88-1 Life Extension Program Analysis - Lead Project Office (AFNWC) Description: Coordinate USAF ICBM Fuze Modernization program efforts with NNSA W78/88-1 LEP developmental efforts. Synchronize USAF arming and fuzing and DOE warhead requirements. Study and assess weapon system cost, schedule and performance impacts. FY 2014 Accomplishments: Evaluated performance requirements, physical characteristics, logistical and operational concepts and physical environments. Developed common Military Characteristics and Stockpile-to-Target Sequence requirements. Developed and validated modeling and simulation and supported developmental planning. Completed W78/88-1 study which developed options for W78/88-1 LEP continuation once this portion of the program is reestablished. FY 2015 Plans: This effort has been discontinued as a result of the deferral of the W78/88-1 LEP effort beyond the FYDP. FY 2016 Plans: This effort has been discontinued as a result of the deferral of the W78/88-1 LEP effort beyond the FYDP.		6.113	-	-
Accomplishments/Planned Programs Subtotals		76.553	59.826	142.551

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Air Force									Date: February 2015		
Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 5: System Development & Demonstration (SDD)					R-1 Program Element (Number/Name) PE 0604933F I ICBM Fuze Modernization						
D. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
• MPAF: BA05: Line Item # M30MLG: Minuteman III Modifications	-	4.649	13.700	-	13.700	17.235	6.372	9.934	12.217	765.494	829.601
Remarks											
Other Program Funding Summary reflects equipment buys in FY15-19 as part of a life of type buy that will enable the ICBM Fuze Modernization program to continue leveraging from the Navy's design, development and production activities.											
E. Acquisition Strategy											
The USAF Mk21 fuze will be modernized in a collaborative effort with the USN Mk5 fuze reducing total program cost and development time by leveraging potential compatibility and commonality of ICBM and Submarine Launched Ballistic Missile warheads and fuze components. The USN Mk5 fuze will be developed first, followed by the USAF Mk21 fuze. The USN Mk5 fuze entered Phase 6.3 Development Engineering in August 2012. USAF Mk21 fuze entered Phase 6.3 in August 2013. Both services participate in all design and development efforts to ensure use of adaptable components, subassemblies and technology. Both services will use NNSA/SNL to perform fuze design and development. The USAF will separately compete and contract for MM III unique missile modification and fuze integration efforts utilizing a combination of the Integration Support Contract (ISC) for SETA and the Reentry System/Reentry Vehicle Integration Contract for weapons system integration. Both services will use NSC to perform production and sustainment.											
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.											

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Air Force												Date: February 2015			
Appropriation/Budget Activity 3600 / 5						R-1 Program Element (Number/Name) PE 0604933F / ICBM Fuze Modernization				Project (Number/Name) 655082 / ICBM FUZE SUPPORT					
Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 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
Preliminary Design Development	MIPR	Sandia National Labs : Albuquerque, NM	38.112	45.110	Jan 2014	44.230	Jan 2015	82.158	Jan 2016	-		82.158	519.063	728.673	-
EMD	Various	Various : ,	2.006	0.155	Mar 2014	0.176	Dec 2014	-		-		-	-	2.337	TBD
National Security Campus (formerly Kansas City Plant)	MIPR	National Security Campus : Kansas City, MO	0.000	5.731	Jan 2014	-		25.013	Jan 2016	-		25.013	116.331	147.075	-
Sandia External Production (SEP)	MIPR	Sandia National Labs : Albuquerque, NM	0.000	-		-		8.561	Jan 2016	-		8.561	48.178	56.739	-
Weapon System Integration - ICBM Prime	C/CPAF	Northrop Grumman : Clearfield, UT	13.641	12.771	Dec 2013	-		-		-		-	-	26.412	26.412
Weapon System Integration - RS/RV SSC	SS/CPAF	Lockheed Martin : Valley Forge, PA	0.000	-		7.748	Jan 2015	18.152	Dec 2015	-		18.152	133.694	159.594	159.594
Subtotal			53.759	63.767		52.154		133.884		-		133.884	817.266	1,120.830	-
Support (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 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
Engineering Support - BAH	C/FP	Booz Allen Hamilton : Clearfield, UT	3.257	-		-		-		-		-	-	3.257	20.060
Engineering Support - BAE	C/CPAF	BAE : Clearfield, UT	0.000	3.204	Dec 2013	2.100	Jul 2015	1.708	Jun 2016	-		1.708	13.414	20.426	20.426
Subtotal			3.257	3.204		2.100		1.708		-		1.708	13.414	23.683	40.486
Test and Evaluation (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 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
Lead Project Office Support	MIPR	AFNWC : Albuquerque, NM	4.407	6.113	Jul 2014	-		-		-		-	-	10.520	10.520

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Air Force												Date: February 2015			
Appropriation/Budget Activity 3600 / 5						R-1 Program Element (Number/Name) PE 0604933F / ICBM Fuze Modernization				Project (Number/Name) 655082 / ICBM FUZE SUPPORT					
Test and Evaluation (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 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
Finite Element Model Validation	C/CPFF	LMTF : Little Mountain, UT	0.155	1.788	Dec 2013	-		-		-		-	-	1.943	2.563
Subtotal			4.562	7.901		-		-		-		-	-	12.463	13.083
Management Services (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 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
Cost and Financial Management	C/FFP	Tecolote : Salt Lake City, UT	0.350	0.306	Aug 2014	0.892	Dec 2014	-		-		-	2.370	3.918	4.918
FFRDC Support	SS/FFP	Aerospace : Los Angeles, CA	0.000	-		2.302	Jan 2015	2.300	Jan 2016	-		2.300	6.393	10.995	10.995
Program Management Administration	Various	Various : Various, UT	3.442	1.375	Nov 2013	2.378	Nov 2014	4.659	Nov 2015	-		4.659	12.920	24.774	TBD
Subtotal			3.792	1.681		5.572		6.959		-		6.959	21.683	39.687	-
			Prior Years	FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			65.370	76.553		59.826		142.551		-		142.551	852.363	1,196.663	-
Remarks															

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2016 Air Force	Date: February 2015
---	----------------------------

Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0604933F / ICBM Fuze Modernization	Project (Number/Name) 655082 / ICBM FUZE SUPPORT
--	---	--

	FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	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
Phase 6.3 Developmental Engineering																												
Phase 6.4 Production Engineering																												
Component - Conceptual Design Review (Oct 2014)																												
Integrated Baseline Review (Mar 2015)																												
Baseline Design Review (Mar 2017)																												
Prototype Design Review (Feb 2018)																												
Final Design Review (Dec 2019)																												

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2016 Air Force			Date: February 2015
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0604933F / ICBM Fuze Modernization	Project (Number/Name) 655082 / ICBM FUZE SUPPORT	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Phase 6.3 Developmental Engineering	1	2014	1	2019
Phase 6.4 Production Engineering	2	2019	4	2020
Component - Conceptual Design Review (Oct 2014)	1	2015	1	2015
Integrated Baseline Review (Mar 2015)	2	2015	2	2015
Baseline Design Review (Mar 2017)	2	2017	2	2017
Prototype Design Review (Feb 2018)	2	2018	2	2018
Final Design Review (Dec 2019)	1	2020	1	2020