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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Air Force	Date: February 2015
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>					R-1 Program Element (Number/Name) PE 0101213F / <i>Minuteman Squadrons</i>							
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	-	-	139.109	178.929	-	178.929	193.228	181.622	82.937	79.172	Continuing	Continuing
672983: <i>MM Ground and Comm Equipment</i>	-	-	23.678	78.359	-	78.359	124.075	135.872	63.463	73.093	Continuing	Continuing
672984: <i>MM III Baseline Support</i>	-	-	21.934	51.173	-	51.173	43.606	26.656	15.172	-	-	158.541
672985: <i>MM Support Equip</i>	-	-	40.466	16.552	-	16.552	25.547	19.094	4.302	6.079	Continuing	Continuing
672986: <i>MM Crypto Mods</i>	-	-	36.672	32.845	-	32.845	-	-	-	-	-	69.517
672987: <i>MM Ops Equip</i>	-	-	16.359	-	-	-	-	-	-	-	-	16.359

Note

In FY 2016, Project 672984, MM III Baseline Support, includes new start efforts for LGM-30G Cadmium Replacement Program (CaDRP) and LGM-30G Squadron Data Simulator (SDS).

In FY 2016, Project 672985, MM Support Equip, the LGM-30G Payload Transporter Replacement (PTR) program was re-established and transferred from PE 0604851F, ICBM - EMD, Project 655037, Support Equipment, in order to consolidate ICBM efforts.

In FY 2016, Project 672987, MM Ops Equipment, the two ongoing efforts will be transferred into PE 0605230F, Ground Based Strategic Deterrent (GBSD), Project 641025. The efforts being transferred are Guidance Modernization Program (GMP) and Solid Rocket Motor Modernization (SRMM).

A. Mission Description and Budget Item Justification

The MM III Ground and Comm Equipment program replaces obsolete/unsupportable ground-based weapon system equipment located at Launch Control Centers (LCCs) and Launch Facilities (LFs) necessary to continue MM III operations through 2030. Current efforts include development, qualification, integration, and testing of replacement equipment such as the LGM-30G ALCS, LGM-30G Automatic Switching Unit (ASU), LGM-30G FRBP II, LGM-30G LCCB, LGM-30G Launch Control Center Block Upgrade (LCCBU), and LGM-30G RVA II.

MM III Baseline Support program replaces or upgrades obsolete/unsupportable flight test unique equipment installed on the missile during flight test, used to test MM III systems on the ground, or located at test facilities to collect, process, and analyze test data. Flight test equipment supports test and evaluation of newly developed or modified MM III capabilities and to conduct MM III Operational Test Launches (OTLs) determining ICBM force readiness, reliability and capability shortfalls. Efforts include development, qualification, integration and testing of replacement equipment such as LGM-30G CaDRP, LGM-30G FT3, LGM-30G Ground Test Upgrade (GTU), and LGM-30G SDS. As other similar equipment is identified for replacement, it will be added to this program. MM III Baseline Support also provides for other MM III unique government costs, studies of system performance, contract closeout costs, cost trades and acquisition planning activities, up to and including proposal preparation, for future capabilities.

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Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development		R-1 Program Element (Number/Name) PE 0101213F I Minuteman Squadrons				
MM Support Equipment program designs, develops, and tests replacement of obsolete/non-serviceable weapon system support equipment. Current efforts include design, development, and testing of support equipment such as LGM-30G Code Systems Media (CSM), LGM-30G Performance Assessment Data System Communications Equipment Interface Unit (PADS CEIU), LGM-30G PTR, LGM-30G Reentry Field Support Equipment (RFSE), LGM-30G Reentry Support Equipment Replacement Program (RSERP), LGM-30G Strategic Targeting and Applications Computer System (STACS), and LGM-30G Transporter Erector Replacement Program (TERP). As other similar equipment is identified for replacement, it will be added to this program.						
MM Crypto Mods executes USSTRATCOM, Air Force Global Strike Command, and Nuclear Weapon Safety Center requirements by implementing the KS-60 capabilities in the ICBM Crypto Unit II (ICU II) of remote key/code change and irreversible transformations mandated in the approved Capabilities Development Document (dated 4 Jan 05) and addresses Nuclear Weapon System Safety Group Operational Safety Review requirements 98-2, 00-1 and 02-2. As other similar equipment is identified for replacement, it will be added to this program.						
MM Operational Equipment program efforts will identify viable concepts and material solutions in support of the Air Force's Ground Based Strategic Deterrent. Funding supports design, development, test, integration and replacement of weapon system equipment including flight systems; Nuclear Command, Control and Communications (NC3); launch and control facilities; and Security/Ground Equipment upgrades. Efforts within the MM Operational Equipment program will ensure MM III operation through 2030 as well as support future Ground Based Strategic Deterrent (GBSD) requirements. Guidance Modernization Program (GMP) and Solid Rocket Motor Modernization (SRMM) will be transferred into PE 0605230F, Ground Based Strategic Deterrent, Project 641025. As other similar equipment is identified for replacement, it will be added to this program.						
This program is in Budget Activity 7, Operational System Development, because this budget activity includes developmental 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 years.						
B. Program Change Summary (\$ in Millions)		FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget		-	139.109	173.067	-	173.067
Current President's Budget		-	139.109	178.929	-	178.929
Total Adjustments		-	-	5.862	-	5.862
• Congressional General Reductions		-	-			
• Congressional Directed Reductions		-	-			
• Congressional Rescissions		-	-			
• Congressional Adds		-	-			
• Congressional Directed Transfers		-	-			
• Reprogrammings		-	-			
• SBIR/STTR Transfer		-	-			
• Other Adjustments		-	-	5.862	-	5.862

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<u>Change Summary Explanation</u> FY 2016 funding reflects a net increase of \$5.862M, consisting of an increase of \$37.705M in Project 672983, Ground and Comm; an increase of \$7.013M in Project 672984, Baseline Support; an increase of \$6.963M in Project 672985, Support Equipment; an increase of \$18.147; and a decrease of \$63.966M in Project 672987, Ops Equipment.		

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force									Date: February 2015			
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons				Project (Number/Name) 672983 / MM Ground and Comm Equipment			
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
672983: MM Ground and Comm Equipment	-	-	23.678	78.359	-	78.359	124.075	135.872	63.463	73.093	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
Note												
In FY 2016, Project 672983, MM Ground and Comm Equipment, Ultra-High Frequency (UHF) Receiver was renamed to LGM-30G Air Launch Control System Replacement, Increment I (ALCS).												
In FY 2016, Project 672983, MM Ground and Comm Equipment, includes new start efforts for LGM-30G Fast Rising B-Plug Phase II (FRBP II), LGM-30G Launch Control Center Break-In-Kit (LCCB), and LGM-30G Remote Visual Assessment II (RVA II).												
A. Mission Description and Budget Item Justification												
The MM III Ground and Comm Equipment program replaces obsolete/unsupportable ground-based weapon system equipment located at Launch Control Centers (LCCs) and Launch Facilities (LFs) necessary to continue MM III operations through 2030. Current efforts include development, qualification, integration, and testing of replacement equipment such as the LGM-30G ALCS, LGM-30G ASU, LGM-30G FRBP II, LGM-30G LCCB, LGM-30G LCCBU, and LGM-30G RVA II.												
B. Accomplishments/Planned Programs (\$ in Millions)								FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: LGM-30G Launch Control Center Block Upgrade (LCCBU)								-	15.778	5.698	-	5.698
Description: The LCCBU program will address elements within the LCC that are experiencing supportability issues. The LCCBU program is an overarching modification effort that replaces LCC components. Components will be procured as a single modification kit and installed as a single kit at each LCC. It will consist of five primary replacement efforts: 1) Higher Authority Command/Rapid Message Processing Equipment (HAC/RMPE) Service Life Extension replaces the Journal Memory Loader with a modern data storage solution to increase available memory required to support annual software changes and mitigate Floppy Disk obsolescence concerns, 2) Floppy Disk Drive (FDD) replaces the legacy FDDs which are no longer manufactured with a modern, supportable hardware solution, 3) Voice Communications Control Panel (VCCP) Replacement replaces the current deficient equipment to provide the voice communications quality required to perform the ICBM mission, 4) Weapon System Console (WSC) Printer Replacement replaces current printer that is no longer produced and is unsupportable due to aging hardware and a lack of qualified vendors for replacement/repair components, and 5) Oxygen Regeneration Unit (ORU) replaces the current obsolete system to provide the crew with breathable air during periods when the LCC is locked down. All LCCBU efforts will support the 45 operational LCCs and additional support equipment/test/maintenance locations.												

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
FY 2014 Accomplishments: N/A						
FY 2015 Plans: - Investigate and mature the appropriate set of technologies to be used as replacement solutions. - LCCBU will research solutions for the VCCP first, while continuing develop strategies for the replacement of the other components.						
FY 2016 Base Plans: - Continue to identify/mature potential hardware solutions to replace the current components. - Prepare for the Preliminary Design Review, Milestone B and Engineering and Manufacturing Development phase in FY17.						
FY 2016 OCO Plans: N/A						
Title: LGM-30G Airborne Launch Control System Replacement, Increment I (ALCS)		-	3.300	59.134	-	59.134
Description: ALCS will replace the legacy nuclear command and control (NC2) system that provides the capability to launch MM III ICBMs from an airborne platform (E-6B). The system consists of an Ultra High Frequency (UHF) radio programmer group at each Launch Facility (LF) and a suite of airborne equipment. While not part of the Air Force's management, the current system does use/require the Navy's UHF C3 data path to transmit signals from the E-6B. ALCS will be managed in two increments to provide a low risk approach to meeting GBSD alternate launch requirements while also addressing obsolescence/sustainability issues with the current ALCS MM III system. Increment 1 will replace the existing ALCS equipment with a focus on existing MM III alternate launch capabilities and incorporate GBSD design considerations to reduce risk to Increment II. Increment II will meet alternate launch capabilities required for the GBSD system and leverage the previously developed/fielded Increment I system as much as possible.						
FY 2014 Accomplishments: N/A						
FY 2015 Plans: - Complete Materiel Development Decision for ALCS and enter the acquisition process conducting pre-Milestone B activities.						

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
<p>- Develop acquisition documentation, to include Acquisition Strategy Document, Source Selection Plan, Request for Proposal, and requirements document.</p> <p>FY 2016 Base Plans:</p> <p>- Conduct a source selection and award multiple contracts to mature/document ALCS material solution through System Requirements Review.</p> <p>- Contractors will design solutions and identify requirements tradespace for consideration between Increments I and II. Designs will include ground equipment at the LFs, airborne equipment on the E-6B, NC2 cryptographic solutions, and required test/support equipment. Develop the ALCS CDD.</p> <p>- Acquire test equipment to install at the AF's NC2 lab to enable low risk weapon system integration of Increment I, reduce risk for Increment II, and provide a first ever, end-to-end test capability for ALCS.</p> <p>FY 2016 OCO Plans:</p> <p>N/A</p>						
<p>Title: LGM-30G Automatic Switching Unit (ASU)</p> <p>Description: This will replace the current Minuteman ASU and Minuteman Power Processor (MPP). The ASU is controlled by the MPP, which contains software and electronics to measure incoming and standby power characteristics. Technical data does not exist for repair or reprogramming of the MPP. Current equipment and lack of repair/reprogram capability cause inadvertent source transfers by the MPP. The legacy ASU electrical contacts have exceeded their service life and unnecessary power source transfers cause stress on mission critical components.</p> <p>FY 2014 Accomplishments:</p> <p>N/A</p> <p>FY 2015 Plans:</p> <p>- Develop technical requirement documents to establish the procurement criteria for the replacement transfer switch and controller.</p> <p>- Begin design, development and test of ASU replacement.</p> <p>FY 2016 Base Plans:</p> <p>- Continue design, development and test of ASU replacement.</p> <p>- Develop technical requirement documents to establish the procurement criteria for the replacement transfer switch and controller.</p>		-	4.600	5.400	-	5.400

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B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Conduct Preliminary Design Review, a successful Milestone B, and Critical Design Review. FY 2016 OCO Plans: N/A						
Title: LGM-30G Remote Visual Assessment II (RVA II) - FY16 New Start Description: This program will design and develop additional capabilities to the current RVA System. RVA II will improve user capability, provide enhanced situational awareness, and meet DoD Cyber Security requirements. Additionally, these capabilities will provide the RVA feed to the fielded ground vehicles, helicopters, backup power and provide auto-activation of the Outer Zone/Inner Zone (OZ/IZ) alarms to the RVA system. FY 2014 Accomplishments: N/A FY 2015 Plans: N/A FY 2016 Base Plans: - Begin design, development, verification of RVA II requirements and conduct Preliminary Design Review (PDR). - Conduct a successful Milestone B briefing and enter EMD phase. FY 2016 OCO Plans: N/A		-	-	3.824	-	3.824
Title: LGM-30G Launch Control Center Break-In-Kit (LCCB) - FY16 New Start Description: This program will develop a kit that will enable personnel to extract incapacitated missile combat crew members in the event the LCC crew becomes unresponsive and cannot open the LCC Blast Door after a security situation. The LCCB is a new capability and has not been previously fielded. FY 2014 Accomplishments: N/A FY 2015 Plans: N/A FY 2016 Base Plans: - Begin design, development, fabrication and prototype construction of LCCBs.		-	-	0.793	-	0.793

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B. Accomplishments/Planned Programs (\$ in Millions)							FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Conduct a successful Preliminary Design Review.											
FY 2016 OCO Plans: N/A											
Title: LGM-30G Fast Rising B-Plug Phase II (FRBP II) - FY16 New Start							-	-	3.510	-	3.510
Description: The FRBP Phase II will update hardware and software of the current system to address obsolescence issues as well as decrease susceptibility to uncommanded raises (UCR). Current setup can experience UCRs due to single point failures and transient voltages in the system.											
FY 2014 Accomplishments: N/A											
FY 2015 Plans: N/A											
FY 2016 Base Plans: - Develop a modification kit that redesigns hardware and software of the existing Fast Rising B-Plug to be reduce or eliminate likelihood of uncommanded raises. - Conduct a successful Milestone B and Preliminary Design Review.											
FY 2016 OCO Plans: N/A											
Accomplishments/Planned Programs Subtotals							-	23.678	78.359	-	78.359
C. 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: BA 03: M30MLG: Minuteman III Modifications	21.585	1.020	-	-	-	6.062	38.066	64.569	53.753	Continuing	Continuing
• MPAF: BA 04: M30MLG: Minuteman III Initial Spares	-	-	-	-	-	0.446	1.349	0.063	-	Continuing	Continuing
Remarks											

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force			Date: February 2015
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101213F / <i>Minuteman Squadrons</i>	Project (Number/Name) 672983 / <i>MM Ground and Comm Equipment</i>	

D. Acquisition Strategy

Support and test equipment replacement efforts are reviewed to determine the best method for execution, including vendor qualification and procurement with no development required, develop and/or modification with organic depot capabilities or development with industry. Industry development efforts will be executed through contracts available under the Future ICBM Sustainment and Acquisition Construct (FISAC) or competitive source selections. Nuclear Surety Cross Check Analysis (NSCCA) and Independent Verification and Validation (IV&V) efforts are contracted separately under a Cost Plus Award Fee (CPAF) Contract.

E. 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 2016 Air Force												Date: February 2015			
Appropriation/Budget Activity 3600 / 7						R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons				Project (Number/Name) 672983 / MM Ground and Comm Equipment					
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
LGM-30G Airborne Launch Control System Replacement Increment I TMRR	C/TBD	TBD : ,	-	-		-		51.734	Apr 2016	-		51.734	Continuing	Continuing	-
LGM-30G Launch Control Center Block Upgrade EMD	C/CPIF	TBD : ,	-	-		15.778	Aug 2015	5.698	Aug 2016	-		5.698	Continuing	Continuing	-
LGM-30G Automatic Switching Unit EMD	C/CPIF	TBD : ,	-	-		4.600	Jul 2015	5.400	Jul 2016	-		5.400	Continuing	Continuing	-
LGM-30G Remote Visual Assessment II TMRR/EMD	C/TBD	TBD : ,	-	-		-		3.125	Dec 2015	-		3.125	Continuing	Continuing	-
LGM-30G Launch Control Center Break-In-Kit	TBD	TBD : ,	-	-		-		0.793	Apr 2016	-		0.793	Continuing	Continuing	-
LGM-30G Fast Rising B-Plug Phase II	TBD	TBD : ,	-	-		-		3.510	Apr 2016	-		3.510	Continuing	Continuing	-
Subtotal			-	-		20.378		70.260		-		70.260	-	-	-
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
LGM-30G Remote Visual Assessment Phase II Engineering Support	TBD	TBD : ,	-	-		-		0.339	Dec 2015	-		0.339	Continuing	Continuing	TBD
LGM-30G Air Launch Control System Replacement Increment I	TBD	TBD : ,	-	-		-		2.000	Feb 2016	-		2.000	Continuing	Continuing	TBD
Subtotal			-	-		-		2.339		-		2.339	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Air Force												Date: February 2015			
Appropriation/Budget Activity 3600 / 7						R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons				Project (Number/Name) 672983 / MM Ground and Comm Equipment					
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
Subtotal			-	-		-		-		-		-	-	-	-
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
LGM-30G Air Launch Control System Replacement Increment I FFRDC	MIPR	MITRE : Bedford, MA	-	-		1.300	Mar 2015	1.400	Mar 2016	-		1.400	Continuing	Continuing	-
LGM-30G Air Launch Control System Replacement Increment I PMA	C/FP	BAE Systems : Roy, UT	-	-		2.000	Mar 2015	4.000	Mar 2016	-		4.000	Continuing	Continuing	-
LGM-30G Remote Visual Assessment Phase II PMA	TBD	TBD :	-	-		-		0.360	Apr 2016	-		0.360	Continuing	Continuing	-
Subtotal			-	-		3.300		5.760		-		5.760	-	-	-
			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			-	-		23.678		78.359		-		78.359	-	-	-
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Air Force			Date: February 2015		
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	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
ASU Technology Maturation and Risk Reduction Phase																												
ASU Preliminary Design Review (PDR) (Feb 2016)																												
ASU Milestone B (Mar 2016)																												
ASU Engineering and Manufacturing Development Phase																												
ASU Critical Design Review (CDR) (Mar 2017)																												
ASU Milestone C (Aug 2017)																												
ASU Production and Deployment Phase																												
ASU Production Readiness Review (Dec 2017)																												
LCCBU Technology Maturation and Risk Reduction Phase																												
LCCBU PDR (Jul 2017)																												
LCCBU Milestone B (Aug 2017)																												
LCCBU Engineering and Manufacturing Development Phase																												
LCCBU CDR (Oct 2017)																												
LCCBU Test Readiness Review (Feb 2018)																												
LCCBU Production and Deployment Phase																												
LCCBU Functional Configuration Audit (FCA) (Apr 2018)																												
LCCBU Physical Configuration Audit (PCA) (Apr 2018)																												
LCCBU Milestone C (Jun 2018)																												
LCCBU Initial Operational Capability (IOC) (Jun 2019)																												

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Appropriation/Budget Activity

3600 / 7

R-1 Program Element (Number/Name)

PE 0101213F / Minuteman Squadrons

Project (Number/Name)

672983 / MM Ground and Comm Equipment

	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
LCCBU Full Operational Capability (FOC) (Sep 2019)																												
ALCS Technology Maturation and Risk Reduction Phase																												
ALCS PDR (Jan 2018)																												
ALCS Milestone B (Apr 2018)																												
ALCS Engineering and Manufacturing Development Phase																												
ALCS CDR (Nov 2019)																												
ALCS Milestone C (May 2020)																												
ALCS Production and Deployment Phase																												
RVA II PDR (Nov 2015)																												
RVA II Milestone B (Jan 2016)																												
RVA II Engineering and Manufacturing Development Phase																												
RVA II CDR (May 2016)																												
RVA II Milestone C (Jun 2016)																												
RVA II Production and Deployment Phase																												
RVA II IOC (Aug 2017)																												
RVA II FOC (Jul 2020)																												
LCCB PDR (Jul 2016)																												
LCCB Milestone B (Sep 2016)																												
LCCB Engineering and Manufacturing Development Phase																												
LCCB CDR (Feb 2017)																												
LCCB Milestone C (Jun 2017)																												
LCCB Production and Deployment Phase																												

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										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		
FRBP II PDR (Feb 2016)																																							
FRBP II Milestone B (May 2016)																																							
FRBP II Engineering and Manufacturing Development Phase																																							
FRBP II CDR (May 2017)																																							
FRBP II Production and Deployment Phase																																							
FRBP II Milestone C (Aug 2018)																																							

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

Events	Start		End	
	Quarter	Year	Quarter	Year
ASU Technology Maturation and Risk Reduction Phase	2	2015	2	2016
ASU Preliminary Design Review (PDR) (Feb 2016)	2	2016	2	2016
ASU Milestone B (Mar 2016)	2	2016	2	2016
ASU Engineering and Manufacturing Development Phase	2	2016	2	2018
ASU Critical Design Review (CDR) (Mar 2017)	2	2017	2	2017
ASU Milestone C (Aug 2017)	4	2017	4	2017
ASU Production and Deployment Phase	4	2017	4	2020
ASU Production Readiness Review (Dec 2017)	1	2018	1	2018
LCCBU Technology Maturation and Risk Reduction Phase	4	2015	4	2017
LCCBU PDR (Jul 2017)	4	2017	4	2017
LCCBU Milestone B (Aug 2017)	4	2017	4	2017
LCCBU Engineering and Manufacturing Development Phase	4	2017	4	2018
LCCBU CDR (Oct 2017)	1	2018	1	2018
LCCBU Test Readiness Review (Feb 2018)	2	2018	2	2018
LCCBU Production and Deployment Phase	3	2018	4	2019
LCCBU Functional Configuration Audit (FCA) (Apr 2018)	3	2018	3	2018
LCCBU Physical Configuration Audit (PCA) (Apr 2018)	3	2018	3	2018
LCCBU Milestone C (Jun 2018)	3	2018	3	2018
LCCBU Initial Operational Capability (IOC) (Jun 2019)	3	2019	3	2019
LCCBU Full Operational Capability (FOC) (Sep 2019)	4	2019	4	2019
ALCS Technology Maturation and Risk Reduction Phase	3	2015	3	2018
ALCS PDR (Jan 2018)	2	2018	2	2018
ALCS Milestone B (Apr 2018)	3	2018	3	2018

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Air Force			Date: February 2015
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101213F / <i>Minuteman Squadrons</i>	Project (Number/Name) 672983 / <i>MM Ground and Comm Equipment</i>	

Events	Start		End	
	Quarter	Year	Quarter	Year
ALCS Engineering and Manufacturing Development Phase	3	2018	4	2020
ALCS CDR (Nov 2019)	1	2020	1	2020
ALCS Milestone C (May 2020)	3	2020	3	2020
ALCS Production and Deployment Phase	3	2020	4	2020
RVA II PDR (Nov 2015)	1	2016	1	2016
RVA II Milestone B (Jan 2016)	2	2016	2	2016
RVA II Engineering and Manufacturing Development Phase	2	2016	3	2017
RVA II CDR (May 2016)	3	2016	3	2016
RVA II Milestone C (Jun 2016)	3	2016	3	2016
RVA II Production and Deployment Phase	4	2016	4	2020
RVA II IOC (Aug 2017)	4	2017	4	2017
RVA II FOC (Jul 2020)	4	2020	4	2020
LCCB PDR (Jul 2016)	4	2016	4	2016
LCCB Milestone B (Sep 2016)	4	2016	4	2016
LCCB Engineering and Manufacturing Development Phase	4	2016	2	2017
LCCB CDR (Feb 2017)	2	2017	2	2017
LCCB Milestone C (Jun 2017)	3	2017	3	2017
LCCB Production and Deployment Phase	3	2017	3	2018
FRBP II PDR (Feb 2016)	2	2016	2	2016
FRBP II Milestone B (May 2016)	3	2016	3	2016
FRBP II Engineering and Manufacturing Development Phase	3	2016	2	2019
FRBP II CDR (May 2017)	3	2017	3	2017
FRBP II Production and Deployment Phase	3	2017	4	2020
FRBP II Milestone C (Aug 2018)	4	2018	4	2018

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force									Date: February 2015			
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons				Project (Number/Name) 672984 / MM III Baseline Support			
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
672984: MM III Baseline Support	-	-	21.934	51.173	-	51.173	43.606	26.656	15.172	-	-	158.541
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
Note												
In FY 2016, Project 672984, MM III Baseline Support, Instrument Wafer Replacement Program (IWRP), Flight Destruct System (FDS), and Launch Support System (LSS) were combined to form the LGM-30G Flight Test Telemetry and Termination (FT3) System.												
In FY 2016, Project 672984, MM III Baseline Support, includes new start efforts for LGM-30G Squadron Data Simulator (SDS) and LGM-30G Cadmium Replacement Program (CaDRP).												
A. Mission Description and Budget Item Justification												
MM III Baseline Support program replaces or upgrades obsolete/unsupportable flight test unique equipment. The equipment is installed on the missile during flight tests, used to test MM III systems on the ground, or located at test facilities to collect, process, and analyze test data. Flight test equipment supports test and evaluation of newly developed or modified MM III capabilities and conducts MM III Operational Test Launches (OTLs) to determine ICBM force readiness, reliability and capability shortfalls. Efforts include development, qualification, integration and testing of replacement equipment such as SDS, CaDRP, FT3, and Ground Test Upgrade (GTU). Similar equipment identified for replacement, will be added to this program. MM III Baseline Support also provides for other MM III unique government costs, studies of system performance, contract closeout costs, cost trades and acquisition planning activities, up to and including proposal preparation, for future capabilities.												
B. Accomplishments/Planned Programs (\$ in Millions)								FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: LGM-30G Flight Test Telemetry and Termination System (FT3)								-	16.434	28.484	-	28.484
Description: FT3 designs, develops, fabricates and tests replacements for the Mod 7 Instrumentation Wafer, associated Signal Conditioner Monitor Group (SCMG), as well as the FDS and the LSS. This will replace the unsupportable instrumentation wafer and FDS that do not meet current Range Safety Standards. The Mod 7 instrumentation wafer transmits missile performance telemetry and position data and receives command destruct messages during MM III OTLs and developmental flight test evaluations. The SCMG and associated cabling capture Reentry System performance data during OTLs and developmental flight tests. FT3 will replace the current MM III OTL flight destruct capability used in the event of a flight anomaly where it would be necessary to destroy the missile. LSS replaces the current unique, specialized test system at Vandenberg AFB used to monitor and control test launch flights and ground support equipment. The current LSS is over 15-years old and experiencing major supportability issues. LSS failure trends are increasing due to hardware aging and obsolescence creating a need for workarounds, waivers and contractor intervention. A new Instrumentation												

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force			Date: February 2015			
Appropriation/Budget Activity 3600 / 7		R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons		Project (Number/Name) 672984 / MM III Baseline Support		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Wafer and FDS are required to continue OTLs through 2030. A new LSS is required to field the Instrumentation Wafer and the FDS. FY 2014 Accomplishments: N/A FY 2015 Plans: -Design, development, fabrication and test of the replacement instrumentation wafer, FDS and LSS. - Determine specific Commercial Off-the-Shelf components and begin review of all Range Safety requirements. - Conduct Preliminary Design Review. FY 2016 Base Plans: - Conduct Milestone B to gain entry into EMD phase. - Finalize design of the system and integrate/verify at component and system level through ground testing. - Conduct the Critical Design Review. FY 2016 OCO Plans: N/A						
Title: LGM-30G Baseline Support Description: This program provides for other MM III unique government costs, studies of system performance, contract closeout costs, cost trades, and acquisition planning activities, up to and including proposal preparation, for future capabilities. FY 2014 Accomplishments: N/A FY 2015 Plans: Conduct studies of system performance, contract closeout costs, cost trades and acquisition planning activities, up to and including proposal preparation, for future capabilities. FY 2016 Base Plans: Conduct studies of system performance, contract closeout costs, cost trades and acquisition planning activities, up to and including proposal preparation, for future capabilities. FY 2016 OCO Plans:		-	0.500	0.500	-	0.500

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force			Date: February 2015		
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons		Project (Number/Name) 672984 / MM III Baseline Support		
B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
N/A					
Title: LGM-30G Ground Test Upgrade (GTU) Description: GTU will design a replacement for the Simulated Electronic Launch Minuteman and Guided Missile Launcher Electronic Circuit test sets. Both test sets enable operational checkout and test of Launch Facilities up to the point of actual MM III launch. Program will address parts obsolescence and combine the two test sets into one using the same interfaces and cables. FY 2014 Accomplishments: N/A FY 2015 Plans: - Conduct technology research for the Programmable Application Specific Integrated Chip (ASIC) as part of the GTU hardware, software integration approach. - Conduct a Preliminary Design Review. FY 2016 Base Plans: - Award the Engineering and Manufacturing Development contract. - Begin design, development, fabrication and testing of replacement equipment for GTU. - Conduct a Preliminary Design Review, Milestone B activities, and a Critical Design Review. FY 2016 OCO Plans: N/A	-	5.000	4.820	-	4.820
Title: LGM-30G Squadron Data Simulator (SDS) - FY16 New Start Description: Design and develop the SDS to replace the current test set. SDS will increase the Mean Time Between Failure, improve user interface, and meet DoD Cyber Security requirements. Additionally, this modeling and simulation tool is used to replicate the message traffic for a selectable number of Launch Control Centers (LCCs) and Launch Facilities (LFs) within an ICBM squadron. FY 2014 Accomplishments: N/A FY 2015 Plans: N/A FY 2016 Base Plans:	-	-	14.686	-	14.686

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force			Date: February 2015		
Appropriation/Budget Activity 3600 / 7		R-1 Program Element (Number/Name) PE 0101213F / <i>Minuteman Squadrons</i>		Project (Number/Name) 672984 / <i>MM III Baseline Support</i>	

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
<ul style="list-style-type: none"> - Begin design, development, fabrication and test of the replacement SDS. - Conduct Milestone B activities. - Complete Preliminary Design Review. - After Milestone B, begin the Engineering, Manufacturing, and Development phase of the program and prepare for verification testing. <p>FY 2016 OCO Plans: N/A</p>					
<p>Title: LGM-30G Cadmium Replacement Program (CaDRP) - FY 16 New Start</p> <p>Description: Cadmium plating is used in LCC and LF motor generators. Motor generator parts are coated with the material to inhibit corrosion, ensure a low electrical signature (bonding and grounding), and aid in the ability to withstand a nuclear environment. Cadmium is an EPA-17 chemical selected for reduction. CaDRP will provide a cadmium replacement coating with the same properties for corrosion inhibiting, bonding and grounding, and nuclear event survivability to meet these directives.</p> <p>FY 2014 Accomplishments: N/A</p> <p>FY 2015 Plans: N/A</p> <p>FY 2016 Base Plans:</p> <ul style="list-style-type: none"> - Begin the development of replacement for Cadmium plating replacement. - Complete Milestone B and prepare for verification testing. <p>FY 2016 OCO Plans: N/A</p>	-	-	2.683	-	2.683
Accomplishments/Planned Programs Subtotals	-	21.934	51.173	-	51.173

C. 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
• RDTE: BA05: PE 0604851F: <i>ICBM - EMD</i>	112.760	-	-	-	-	-	-	-	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force								Date: February 2015			
Appropriation/Budget Activity 3600 / 7				R-1 Program Element (Number/Name) PE 0101213F / <i>Minuteman Squadrons</i>				Project (Number/Name) 672984 / <i>MM III Baseline Support</i>			
C. 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: BA01: M30GLG: <i>Missile Replacement Equipment - Ballistic</i>	-	-	7.689	-	7.689	57.545	5.177	-	-	Continuing	Continuing
Remarks											
D. Acquisition Strategy											
Support and test equipment replacement efforts are reviewed to determine the best method for execution including vendor qualification and procurement with development required, develop and/or modification with organic depot capabilities or development with industry. Industry development efforts will be executed through contracts available under the Defense Engineering Services Program (DESP III) contract competitive source selection procedures. Nuclear Surety Cross Check Analysis (NSCCA) and Independent Verification and Validation (IV&V) efforts are contracted separately under a Cost Plus Award Fee (CPAF) Contract.											
E. 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 2016 Air Force												Date: February 2015			
Appropriation/Budget Activity 3600 / 7						R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons				Project (Number/Name) 672984 / MM III Baseline 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
LGM-30G Ground Test Upgrades	C/CPAF	TBD : ,	-	-		5.000	Mar 2015	4.820	Feb 2016	-		4.820	Continuing	Continuing	-
LGM-30G Flight Test Telemetry and Termination System	C/CPIF	TBD : ,	-	-		8.579	Apr 2015	13.570	Mar 2016	-		13.570	Continuing	Continuing	-
LGM-30G Cadmium Replacement Program	C/CPFF	TBD : ,	-	-		-		2.683	Apr 2016	-		2.683	Continuing	Continuing	-
LGM-30G Squadron Data Simulator	C/CPIF	TBD : ,	-	-		-		10.383	Apr 2016	-		10.383	Continuing	Continuing	-
Subtotal			-	-		13.579		31.456		-		31.456	-	-	-
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
LGM-30G Flight Test Telemetry and Termination System	C/Various	TBD : ,	-	-		2.543	Jun 2015	1.289	Jun 2016	-		1.289	Continuing	Continuing	-
LGM-30G Baseline Support	C/TBD	TBD : ,	-	-		0.500	Mar 2015	-		-		-	Continuing	Continuing	-
Subtotal			-	-		3.043		1.289		-		1.289	-	-	-
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
LGM-30G Squadron Data Simulator	C/CPIF	TBD : ,	-	-		-		3.159	Apr 2016	-		3.159	Continuing	Continuing	-
LGM-30G Flight Test Telemetry and Termination System	C/CPIF	TBD : ,	-	-		4.112	Mar 2015	12.825	Mar 2016	-		12.825	Continuing	Continuing	-
Subtotal			-	-		4.112		15.984		-		15.984	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Air Force												Date: February 2015			
Appropriation/Budget Activity 3600 / 7						R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons				Project (Number/Name) 672984 / MM III Baseline Support					
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
LGM-30G Squadron Data Simulator	C/CPIF	TBD : ,	-	-		-		1.144	Apr 2016	-		1.144	Continuing	Continuing	-
LGM-30G Flight Test Telemetry and Termination System	C/Various	TBD : ,	-	-		1.200	Feb 2015	1.300	Mar 2015	-		1.300	Continuing	Continuing	-
Subtotal			-	-		1.200		2.444		-		2.444	-	-	-
			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			-	-		21.934		51.173		-		51.173	-	-	-
Remarks															

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

Date: February 2015

Appropriation/Budget Activity

3600 / 7

R-1 Program Element (Number/Name)

PE 0101213F / Minuteman Squadrons

Project (Number/Name)

672984 / MM III Baseline 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
GTU PDR (Sep 2015)																												
GTU Milestone B (Nov 2015)																												
GTU Engineering and Manufacturing Development Phase																												
GTU CDR (May 2016)																												
GTU FCA (Aug 2016)																												
GTU Milestone C (Oct 2016)																												
GTU Production and Deployment Phase																												
GTU PCA (Dec 2016)																												
GTU IOC (Feb 2017)																												
GTU FOC (Sep 2017)																												
FT3 PDR (Nov 2015)																												
FT3 Milestone B (Feb 2016)																												
FT3 Engineering and Manufacturing Development Phase																												
FT3 CDR (Feb 2017)																												
FT3 Milestone C (Sep 2017)																												
FT3 Production and Deployment Phase																												
FT3 FCA (Mar 2018)																												
FT3 PCA (Aug 2018)																												
FT3 IOC (Sep 2019)																												
FT3 FOC (Sep 2020)																												
SDS PDR (May 2016)																												
SDS Milestone B (Aug 2016)																												
SDS Engineering and Manufacturing Development Phase																												

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

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101213F / <i>Minuteman Squadrons</i>	Project (Number/Name) 672984 / <i>MM III Baseline Support</i>
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	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
SDS CDR (Aug 2017)																												
SDS Milestone C (Sep 2017)																												
SDS Production and Deployment Phase																												
SDS FCA (Feb 2018)																												
SDS PCA (Apr 2018)																												
SDS FOC (Mar 2019)																												
CaDRP Milestone B (May 2016)																												
CaDRP Engineering and Manufacturing Development Phase																												
CaDRP CDR (Apr 2017)																												
CaDRP FCA (Jun 2017)																												
CaDRP Milestone C (Aug 2017)																												
CaDRP Production and Deployment Phase																												
CaDRP PCA (Nov 2017)																												
CaDRP IOC (Feb 2018)																												
CaDRP FOC (Aug 2018)																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Air Force			Date: February 2015
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101213F / <i>Minuteman Squadrons</i>	Project (Number/Name) 672984 / <i>MM III Baseline Support</i>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
GTU PDR (Sep 2015)	4	2015	4	2015
GTU Milestone B (Nov 2015)	1	2016	1	2016
GTU Engineering and Manufacturing Development Phase	1	2016	2	2017
GTU CDR (May 2016)	3	2016	3	2016
GTU FCA (Aug 2016)	4	2016	4	2016
GTU Milestone C (Oct 2016)	1	2017	1	2017
GTU Production and Deployment Phase	1	2017	4	2017
GTU PCA (Dec 2016)	1	2017	1	2017
GTU IOC (Feb 2017)	2	2017	2	2017
GTU FOC (Sep 2017)	4	2017	4	2017
FT3 PDR (Nov 2015)	1	2016	1	2016
FT3 Milestone B (Feb 2016)	2	2016	2	2016
FT3 Engineering and Manufacturing Development Phase	2	2016	2	2019
FT3 CDR (Feb 2017)	2	2017	2	2017
FT3 Milestone C (Sep 2017)	4	2017	4	2017
FT3 Production and Deployment Phase	4	2017	4	2020
FT3 FCA (Mar 2018)	2	2018	2	2018
FT3 PCA (Aug 2018)	4	2018	4	2018
FT3 IOC (Sep 2019)	4	2019	4	2019
FT3 FOC (Sep 2020)	4	2020	4	2020
SDS PDR (May 2016)	3	2016	3	2016
SDS Milestone B (Aug 2016)	4	2016	4	2016
SDS Engineering and Manufacturing Development Phase	4	2016	2	2018

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Air Force	Date: February 2015
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101213F / <i>Minuteman Squadrons</i>	Project (Number/Name) 672984 / <i>MM III Baseline Support</i>
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Events	Start		End	
	Quarter	Year	Quarter	Year
SDS CDR (Aug 2017)	4	2017	4	2017
SDS Milestone C (Sep 2017)	4	2017	4	2017
SDS Production and Deployment Phase	4	2017	2	2019
SDS FCA (Feb 2018)	2	2018	2	2018
SDS PCA (Apr 2018)	3	2018	3	2018
SDS FOC (Mar 2019)	2	2019	2	2019
CaDRP Milestone B (May 2016)	3	2016	3	2016
CaDRP Engineering and Manufacturing Development Phase	3	2016	1	2018
CaDRP CDR (Apr 2017)	3	2017	3	2017
CaDRP FCA (Jun 2017)	3	2017	3	2017
CaDRP Milestone C (Aug 2017)	4	2017	4	2017
CaDRP Production and Deployment Phase	4	2017	4	2018
CaDRP PCA (Nov 2017)	1	2018	1	2018
CaDRP IOC (Feb 2018)	2	2018	2	2018
CaDRP FOC (Aug 2018)	4	2018	4	2018

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force										Date: February 2015		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons				Project (Number/Name) 672985 / MM Support Equip			
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
672985: MM Support Equip	-	-	40.466	16.552	-	16.552	25.547	19.094	4.302	6.079	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2016, Project 672985, MM Support Equip, the LGM-30G Payload Transporter Replacement (PTR) program was re-established and transferred from PE 0604851F, ICBM - EMD, Project 655037, Support Equipment, in order to consolidate ICBM investment efforts under a common PE.

In FY 2016, Project 672985, MM Support Equip, includes a new start effort for LGM-30G Performance Assessment Data Systems Communications Equipment Interface Unit (PADS CEIU).

A. Mission Description and Budget Item Justification

MM Support Equip program designs, develops, and tests replacement of obsolete/non-serviceable weapon system support equipment. Current efforts include design, development, and testing of support equipment such as LGM-30G RFSE, LGM-30G CSM, LGM-30G STACS, LGM-30G TERP, LGM-30G PTR, LGM-30G PADS CEIU, and LGM-30G RSERP.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: LGM-30G Reentry Field Support Equipment (RFSE)	-	12.476	-	-	-
Description: Design and develop the RFSE to replace the current reentry system test set. RFSE will increase the Mean Time Between Failure, eliminate unneeded Mk12 functions, and add new Mk21 functions. It will provide capability to meet Department of Energy mandated Limited Life Component warhead swaps and to test electrical continuity during buildup of Minuteman III reentry systems.					
FY 2014 Accomplishments: N/A					
FY 2015 Plans: - Complete design, development, fabrication and testing of RFSE units. - Conduct a successful Milestone C briefing.					
FY 2016 Base Plans: N/A					
FY 2016 OCO Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force			Date: February 2015			
Appropriation/Budget Activity 3600 / 7		R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons		Project (Number/Name) 672985 / MM Support Equip		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
N/A						
<p>Title: LGM-30G Code System Media (CSM)</p> <p>Description: The CSM program supports the replacement of obsolete tape cartridges with more modern and available magnetic media. Segment #1, responsible for providing software to accept National Security Agency (NSA) codes, Operations Plan (OPLAN) changes and software updates on compact disk (CD), has been completed. Segment #2 will provide software and hardware necessary to import all other data on CD and produce Wing Codes Processing System products on CD. Segment #2 will also replace the Cartridge Transfer Unit (CTU) with the Data Transfer Units (DTUs). CSM effectively supports the replacement of aging media required to transport and handle mission essential codes and data throughout the ICBM weapon system. The shelf life of the current stock of DC300 tape cartridges and 9-track tapes began to expire in 2015. CSM delivers the capability to load codes/software on MM III ICBMs through 2030 and is critical to code change activities.</p> <p>FY 2014 Accomplishments: N/A</p> <p>FY 2015 Plans:</p> <ul style="list-style-type: none">- Complete design, development, fabrication and testing of CSM software.- Complete first article production, Test Readiness Review, and system qualification testing of DTU.- Verify and deliver of technical data to accompany First Article Test and Evaluations.- Conduct a successful Milestone C briefing. <p>FY 2016 Base Plans: N/A</p> <p>FY 2016 OCO Plans: N/A</p>		-	4.549	-	-	-
<p>Title: LGM-30G Strategic Targeting and Applications Computer System (STACS)</p> <p>Description: Design and develop a replacement for the STACS hardware, software and tape cartridge media, which are becoming obsolete and unsupportable. STACS will provide new targeting computer equipment and software, and CD media for data import and export. STACS enables USSTRATCOM required OPLAN changes and updates to ICBM missile wings for execution.</p> <p>FY 2014 Accomplishments:</p>		-	1.739	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force			Date: February 2015		
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101213F / <i>Minuteman Squadrons</i>		Project (Number/Name) 672985 / <i>MM Support Equip</i>		
B. Accomplishments/Planned Programs (\$ in Millions)	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
N/A					
FY 2015 Plans: - Complete design and development activities. - Complete certification and deliver the STACS replacement to reach FOC. FY 2016 Base Plans: N/A FY 2016 OCO Plans: N/A					
Title: LGM-30G Transporter Erector Replacement Program (TERP) Description: Design and develop the capabilities necessary to replace the current Transporter Erector (TE). The TE is used to emplace, extract and transport MM III boosters to and from the launch facilities. TERP will update existing drawings, specifications and technical orders to eliminate parts obsolescence and address intended usage through 2030 and will qualify the new system prior to production. FY 2014 Accomplishments: N/A FY 2015 Plans: - Complete design, development, fabrication and testing of replacement TE. - Complete first article production and system qualification testing. - Complete FCA/PCA. - Certify design readiness for Full Rate Production decision. - Verification and delivery of tech data to accompany First Article Test and Evaluations. - Conduct a successful Milestone C briefing. FY 2016 Base Plans: N/A FY 2016 OCO Plans: N/A	-	17.787	-	-	-
Title: LGM-30G Reentry Support Equipment Replacement Program (RSERP)	-	3.915	11.877	-	11.877

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force			Date: February 2015			
Appropriation/Budget Activity 3600 / 7		R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons		Project (Number/Name) 672985 / MM Support Equip		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
<p>Description: Design, develop, fabricate and test the RSERP to modify or replace the over 30 year old suite of test equipment necessary to continue checkout, screening, repair, and refurbishment of Mk12A/Mk21 Arming Fuzing Assemblies.</p> <p>FY 2014 Accomplishments: N/A</p> <p>FY 2015 Plans: - Begin the design, development, fabrication, and test of RSERP. - Conduct Milestone B.</p> <p>FY 2016 Base Plans: - Continue to design, develop and fabricate the test program sets. - Conduct the Preliminary Design Review and Critical Design Review for the Automatic Test Equipment.</p> <p>FY 2016 OCO Plans: N/A</p>						
<p>Title: LGM-30G Payload Transporter Replacement (PTR)</p> <p>Description: Designs and develops the capabilities necessary to replace the current Payload Transporter tractor and trailer, mitigating emerging threat technologies and methods. The PTR emplaces, extracts, and transports the MM III reentry system, propulsion system rocket engine, and missile guidance set. The new PTR design increases safety and security during transport activities and improves maintenance operations.</p> <p>FY 2014 Accomplishments: N/A</p> <p>FY 2015 Plans: N/A</p> <p>FY 2016 Base Plans: - Complete design, development, fabrication and testing of PTR. - Complete Test Readiness Review and system qualification testing. - Complete FCA/PCA. - Certify design readiness for Full Rate Production decision. - Verification and delivery of tech data to accompany First Article Test and Evaluations.</p>		-	-	4.000	-	4.000

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force									Date: February 2015		
Appropriation/Budget Activity 3600 / 7				R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons				Project (Number/Name) 672985 / MM Support Equip			
B. Accomplishments/Planned Programs (\$ in Millions)							FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
- Conduct a successful Milestone C briefing.											
FY 2016 OCO Plans: N/A											
Title: LGM-30G Performance Assessment Data System Communications Equipment Interface Unit (PADS CEIU) - FY16 New Start							-	-	0.675	-	0.675
Description: Updates the legacy CEIU to a more robust software language and changes the communication protocol from telephony to internet protocol to address security concerns. PADS CEIU is an interface unit using an analog signal over the telephone line using a standard commercial off the shelf (COTS) Modem. This system is essential as it is the only way to identify high hour Pendulous Integrating Gyroscopic Accelerometers (PIGA) and provides data that eliminates unnecessary Missile Guidance Set (MGS) removals.											
FY 2014 Accomplishments: N/A											
FY 2015 Plans: N/A											
FY 2016 Base Plans: - Begin design and development. - Conduct Preliminary Design Review and Milestone B activities.											
FY 2016 OCO Plans: N/A											
Accomplishments/Planned Programs Subtotals							-	40.466	16.552	-	16.552
C. 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
• RDTE: BA05: PE 0604851F: ICBM - EMD	112.760	-	-	-	-	-	-	-	-	-	-
• MPAF: BA01: M30GLG: Missile Replacement Equipment - Ballistic	38.940	65.568	78.901	-	78.901	59.113	63.259	55.072	43.249	-	-
• MPAF: BA 04: M30GLG: Minuteman III Initial Spares	-	11.144	-	-	-	1.697	0.410	0.009	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force							Date: February 2015		
Appropriation/Budget Activity 3600 / 7				R-1 Program Element (Number/Name) PE 0101213F / <i>Minuteman Squadrons</i>			Project (Number/Name) 672985 / <i>MM Support Equip</i>		

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u> <u>Base</u>	<u>FY 2016</u> <u>OCO</u>	<u>FY 2016</u> <u>Total</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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Remarks

D. Acquisition Strategy

Support and test equipment replacement efforts are reviewed to determine the best method for execution including vendor qualification and procurement with no development required, develop and/or modification with organic depot capabilities or development with industry. Industry development efforts will be executed through contracts available under the Future ICBM Sustainment and Acquisition Construct (FISAC) or competitive source selections. Nuclear Surety Cross Check Analysis (NSCCA) and Independent Verification and Validation (IV&V) efforts are contracted separately under a Cost Plus Award Fee (CPAF) Contract.

E. 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 2016 Air Force												Date: February 2015			
Appropriation/Budget Activity 3600 / 7						R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons				Project (Number/Name) 672985 / MM Support Equip					
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
LGM-30G Code System Media EMD	C/CPIF	Northrop Grumman : Salt Lake City, UT	-	-		3.731	Feb 2015	-		-		-	Continuing	Continuing	TBD
LGM-30G Reentry Field Support Equipment EMD	C/CPIF	Northrop Grumman Technical Services : Salt Lake City, UT	-	-		11.992	Oct 2014	-		-		-	Continuing	Continuing	TBD
LGM-30G Reentry Support Equipment Replacement Program	C/Various	GFE/BAE : ,	-	-		3.525	Dec 2014	10.907	Mar 2016	-		10.907	Continuing	Continuing	TBD
LGM-30G Transporter Erector Replacement Program EMD	C/FPIF	DRS Environmental Systems : Cincinnati, OH	-	-		11.808	Apr 2015	-		-		-	Continuing	Continuing	TBD
LGM-30G Strategic Targeting and Applications Computer System	C/CPFF	Northrop Grumman : Salt Lake City, UT	-	-		1.739	Jan 2015	-		-		-	Continuing	Continuing	TBD
LGM-30G Payload Transporter Replacement (PTR) EMD	C/CPIF	Northrop Grumman : Salt Lake City, UT	-	-		-		4.000	Jan 2015	-		4.000	Continuing	Continuing	TBD
LGM-30G Performance Assessment Data System Communications Equipment Interface Unit (PADS CEIU) Software Development	C/CPFF	TBD : ,	-	-		-		0.675	Mar 2016	-		0.675	Continuing	Continuing	TBD
Subtotal			-	-		32.795		15.582		-		15.582	-	-	-
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
LGM-30G Reentry Field Support Equipment Integration Support	C/FP	BAE : Roy, UT	-	-		0.484	Jan 2015	-		-		-	Continuing	Continuing	TBD
Subtotal			-	-		0.484		-		-		-	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Air Force												Date: February 2015			
Appropriation/Budget Activity 3600 / 7						R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons				Project (Number/Name) 672985 / MM Support Equip					
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
LGM-30G Transporter Erector Replacement Program Organic Support	PO	581 MMXS : Hill AFB, UT	-	-		1.800	Jan 2015	-		-		-	Continuing	Continuing	TBD
Subtotal			-	-		1.800		-		-		-	-	-	-
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
LGM-30G Code System Media Eng Support	MIPR	Aerospace Research : El Segundo, CA	-	-		0.768	Feb 2015	-		-		-	Continuing	Continuing	TBD
LGM-30G Code System Media PMA	Various	Various : ,	-	-		0.050	Oct 2014	-		-		-	Continuing	Continuing	TBD
LGM-30G Reentry Support Equipment Replacement Program	C/FP	BAE Systems : Layton, UT	-	-		0.390	Oct 2014	0.970	Oct 2015	-		0.970	Continuing	Continuing	TBD
LGM-30G Transporter Erector Replacement Program PMA and SPO Support	Various	Various : ,	-	-		1.921	Jun 2015	-		-		-	Continuing	Continuing	TBD
LGM-30G Transporter Erector Replacement Program Support	C/FP	BAE Systems : Layton, UT	-	-		0.769	Nov 2014	-		-		-	Continuing	Continuing	TBD
LGM-30G Transporter Erector Replacement Program Eng Support	MIPR	Aerospace Research : El Segundo, CA	-	-		1.489	Feb 2015	-		-		-	Continuing	Continuing	TBD
Subtotal			-	-		5.387		0.970		-		0.970	-	-	-
			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			-	-		40.466		16.552		-		16.552	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Air Force							Date: February 2015		
Appropriation/Budget Activity 3600 / 7				R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons		Project (Number/Name) 672985 / MM Support Equip			
	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Remarks									

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

Date: February 2015

Appropriation/Budget Activity

3600 / 7

R-1 Program Element (Number/Name)

PE 0101213F / Minuteman Squadrons

Project (Number/Name)

672985 / MM Support Equip

	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
CSM Engineering and Manufacturing Development Phase																												
CSM FCA (Nov 2013)																												
CSM Milestone C (May 2015)																												
CSM Production and Deployment Phase																												
CSM IOC (Nov 2015)																												
CSM FOC (May 2016)																												
RFSE Engineering and Manufacturing Development Phase																												
RFSE FCA (May 2014)																												
RFSE PCA (Aug 2014)																												
RFSE Milestone C (Jun 2015)																												
RFSE Production and Deployment Phase																												
RFSE IOC (May 2016)																												
RFSE FOC (Feb 2017)																												
PTR Engineering and Manufacturing Development Phase																												
PTR Tractor CDR (Feb 2014)																												
PTR Trailer CDR (Aug 2014)																												
PTR FCA (Feb 2016)																												
PTR Milestone C (May 2016)																												
PTR PCA (Jun 2016)																												
PTR Production and Deployment Phase																												
PTR IOC (Aug 2017)																												
PTR FOC (Sep 2020)																												

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

Date: February 2015

Appropriation/Budget Activity

3600 / 7

R-1 Program Element (Number/Name)

PE 0101213F / Minuteman Squadrons

Project (Number/Name)

672985 / MM Support Equip

	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
STACS Engineering and Manufacturing Development Phase																												
STACS FCA/PCA (Aug 2014)																												
STACS FOC (Feb 2015)																												
TERP Engineering and Manufacturing Development Phase																												
TERP CDR (Feb 2014)																												
TERP FCA (Mar 2015)																												
TERP Milestone C (May 2015)																												
TERP PCA (Jun 2015)																												
TERP Production and Deployment Phase																												
TERP IOC (Feb 2016)																												
TERP FOC (Aug 2019)																												
RSERP Milestone B (Nov 2014)																												
RSERP Engineering and Manufacturing Development Phase																												
RSERP Automatic Test Equipment (ATE) PDR (Feb 2016)																												
RSERP ATE CDR (Aug 2016)																												
RSERP Line Replaceable Unit (LRU) PDR (Feb 2017)																												
RSERP Milestone C (Mar 2017)																												
RSERP Production and Deployment Phase																												
RSERP LRU CDR (Jun 2017)																												
RSERP Shop Replaceable Unit (SRU) PDR (May 2018)																												
RSERP IOC (Aug 2018)																												
RSERP SRU CDR (Nov 2018)																												

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Air Force	Date: February 2015
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101213F / <i>Minuteman Squadrons</i>	Project (Number/Name) 672985 / <i>MM Support Equip</i>
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	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
RSERP FOC (Sep 2020)																												
PADS CEIU PDR (May 2016)																												
PADS CEIU Milestone B (Aug 2016)																												
PADS CEIU Engineering and Manufacturing Development Phase																												
PADS CEIU CDR (Jun 2017)																												
PADS CEIU Milestone C (Feb 2019)																												
PADS CEIU FCA/PCA (Mar 2019)																												
PADS CEIU Production and Deployment Phase																												
PADS CEIU IOC/FOC (May 2020)																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Air Force			Date: February 2015
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101213F / <i>Minuteman Squadrons</i>	Project (Number/Name) 672985 / <i>MM Support Equip</i>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
CSM Engineering and Manufacturing Development Phase	1	2014	4	2015
CSM FCA (Nov 2013)	1	2014	1	2014
CSM Milestone C (May 2015)	3	2015	3	2015
CSM Production and Deployment Phase	3	2015	3	2016
CSM IOC (Nov 2015)	1	2016	1	2016
CSM FOC (May 2016)	3	2016	3	2016
RFSE Engineering and Manufacturing Development Phase	1	2014	2	2016
RFSE FCA (May 2014)	3	2014	3	2014
RFSE PCA (Aug 2014)	4	2014	4	2014
RFSE Milestone C (Jun 2015)	3	2015	3	2015
RFSE Production and Deployment Phase	2	2015	2	2017
RFSE IOC (May 2016)	3	2016	3	2016
RFSE FOC (Feb 2017)	2	2017	2	2017
PTR Engineering and Manufacturing Development Phase	1	2014	4	2016
PTR Tractor CDR (Feb 2014)	2	2014	2	2014
PTR Trailer CDR (Aug 2014)	4	2014	4	2014
PTR FCA (Feb 2016)	2	2016	2	2016
PTR Milestone C (May 2016)	3	2016	3	2016
PTR PCA (Jun 2016)	3	2016	3	2016
PTR Production and Deployment Phase	2	2016	4	2020
PTR IOC (Aug 2017)	4	2017	4	2017
PTR FOC (Sep 2020)	4	2020	4	2020
STACS Engineering and Manufacturing Development Phase	1	2014	2	2015

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Air Force				Date: February 2015	
Appropriation/Budget Activity 3600 / 7		R-1 Program Element (Number/Name) PE 0101213F / <i>Minuteman Squadrons</i>		Project (Number/Name) 672985 / <i>MM Support Equip</i>	
		Start		End	
Events	Quarter	Year	Quarter	Year	
STACS FCA/PCA (Aug 2014)	4	2014	4	2014	
STACS FOC (Feb 2015)	2	2015	2	2015	
TERP Engineering and Manufacturing Development Phase	1	2014	4	2015	
TERP CDR (Feb 2014)	2	2014	2	2014	
TERP FCA (Mar 2015)	2	2015	2	2015	
TERP Milestone C (May 2015)	3	2015	3	2015	
TERP PCA (Jun 2015)	3	2015	3	2015	
TERP Production and Deployment Phase	3	2015	3	2020	
TERP IOC (Feb 2016)	2	2016	2	2016	
TERP FOC (Aug 2019)	4	2019	4	2019	
RSERP Milestone B (Nov 2014)	1	2015	1	2015	
RSERP Engineering and Manufacturing Development Phase	1	2015	2	2019	
RSERP Automatic Test Equipment (ATE) PDR (Feb 2016)	2	2016	2	2016	
RSERP ATE CDR (Aug 2016)	4	2016	4	2016	
RSERP Line Replaceable Unit (LRU) PDR (Feb 2017)	2	2017	2	2017	
RSERP Milestone C (Mar 2017)	2	2017	2	2017	
RSERP Production and Deployment Phase	2	2017	4	2020	
RSERP LRU CDR (Jun 2017)	3	2017	3	2017	
RSERP Shop Replaceable Unit (SRU) PDR (May 2018)	3	2018	3	2018	
RSERP IOC (Aug 2018)	4	2018	4	2018	
RSERP SRU CDR (Nov 2018)	1	2019	1	2019	
RSERP FOC (Sep 2020)	4	2020	4	2020	
PADS CEIU PDR (May 2016)	3	2016	3	2016	
PADS CEIU Milestone B (Aug 2016)	4	2016	4	2016	
PADS CEIU Engineering and Manufacturing Development Phase	4	2016	4	2019	
PADS CEIU CDR (Jun 2017)	3	2017	3	2017	

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Air Force			Date: February 2015	
Appropriation/Budget Activity 3600 / 7		R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons		Project (Number/Name) 672985 / MM Support Equip
		Start		End
Events	Quarter	Year	Quarter	Year
PADS CEIU Milestone C (Feb 2019)	2	2019	2	2019
PADS CEIU FCA/PCA (Mar 2019)	2	2019	2	2019
PADS CEIU Production and Deployment Phase	2	2019	3	2020
PADS CEIU IOC/FOC (May 2020)	3	2020	3	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force										Date: February 2015		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons				Project (Number/Name) 672986 / MM Crypto Mods			
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
672986: MM Crypto Mods	-	-	36.672	32.845	-	32.845	-	-	-	-	-	69.517
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

MM Crypto Mods executes USSTRATCOM, Air Force Global Strike Command, and Nuclear Weapon Safety Center requirements by implementing the KS-60 capabilities in ICU II of remote key/code change and irreversible transformation as mandated in the approved Capabilities Development Document (dated 4 Jan 05) and addresses Nuclear Weapon System Safety Group Operational Safety Review requirements 98-2, 00-1 and 02-2. It also incorporates continuous signal lockout capabilities to prevent the widespread loss of status monitoring. These features will greatly increase security during code changes by reducing the frequency of open sites 75 days annually and will reduce associated resource costs for 450 Launch Facilities (LFs) and 45 Launch Control Centers (LCCs). In FY15, ICU II was rebaselined to address emerging nuclear surety requirements.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: LGM-30G ICBM Cryptography Upgrade II (ICU II)	-	36.672	32.845	-	32.845
Description: ICU II completes design and development, implements KS-60 remote key/code change, irreversible transformation capabilities, and prevents continuous signal lockout.					
FY 2014 Accomplishments: N/A					
FY 2015 Plans: - Complete A4 Drawer qualification and weapon system testing with preliminary central processor. - Finalize code and fabricate final central processor design. - Conduct Test Readiness Review for the Field Programmable Gate Array (FPGA).					
FY 2016 Base Plans: Weapon system testing with final central processor, nuclear certification for A4 Drawer, begin new contract effort to develop support equipment. Conduct Test Readiness Review of the Application Specific Integrated Circuit (ASIC).					
FY 2016 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals	-	36.672	32.845	-	32.845

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force			Date: February 2015
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101213F / <i>Minuteman Squadrons</i>	Project (Number/Name) 672986 / <i>MM Crypto Mods</i>	

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u> <u>Base</u>	<u>FY 2016</u> <u>OCO</u>	<u>FY 2016</u> <u>Total</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• RDTE: BA05: PE 0604851F: <i>ICBM - EMD</i>	31.016	-	-	-	-	-	-	-	-	-	-
• MPAF: BA 03: M30MLG: <i>Minuteman III Modifications</i>	-	-	-	-	-	53.820	7.516	20.192	17.701	-	99.229
• MPAF: BA 054: M30MLG: <i>Minuteman III Initial Spares</i>	-	-	-	-	-	1.849	5.774	0.189	-	-	-

Remarks

D. Acquisition Strategy

The contract type of the ICU II Engineering and Manufacturing Development (EMD) Contract is Cost Plus Incentive Fee. Also, ICU II EMD uses a separate contract for Nuclear Surety Cross Check Analysis/Performance Analysis and Technical Evaluation (NSCCA/PATE) Independent Validation & Verification (IV&V). This contract is driven by critical nuclear surety requirements to perform an independent assessment of all modifications to nuclear-certified software.

E. 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 2016 Air Force												Date: February 2015			
Appropriation/Budget Activity 3600 / 7						R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons				Project (Number/Name) 672986 / MM Crypto Mods					
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
LGM-30G ICBM Cryptography Upgrade II EMD	C/CPIF	Northrop Grumman : Clearfield, UT	-	-		27.085	Nov 2014	29.233	Oct 2015	-		29.233	Continuing	Continuing	-
Subtotal			-	-		27.085		29.233		-		29.233	-	-	-
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
LGM-30G ICBM Cryptography Upgrade II Nuclear Surety Support (NSCCA)	C/CPIF	Northrop Grumman : Clearfield, UT	-	-		2.710	Oct 2014	3.237	Oct 2015	-		3.237	Continuing	Continuing	-
LGM-30G ICBM Cryptography Upgrade II Inter-DoD	MIPR	Navy Crane : Crane, IN	-	-		1.662	Nov 2014	-		-		-	Continuing	Continuing	-
Subtotal			-	-		4.372		3.237		-		3.237	-	-	-
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
Subtotal			-	-		-		-		-		-	-	-	-
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
LGM-30G ICBM Cryptography Upgrade II	Various	Various :	-	-		5.215	Jan 2015	0.375	Oct 2015	-		0.375	Continuing	Continuing	-
Subtotal			-	-		5.215		0.375		-		0.375	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Air Force											Date: February 2015			
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons					Project (Number/Name) 672986 / MM Crypto Mods				
	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	-	-		36.672		32.845		-		32.845	-	-	-	

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Air Force			Date: February 2015		
Appropriation/Budget Activity 3600 / 7		R-1 Program Element (Number/Name) PE 0101213F / <i>Minuteman Squadrons</i>		Project (Number/Name) 672986 / <i>MM Crypto Mods</i>	

	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
ICU II Engineering and Manufacturing Development Phase																												
ICU II CDR - A4 Drawer (Apr 2014)																												
ICU II TRR - FPGA (Nov 2014)																												
ICU II Weapon System Test I - Software (May 2015)																												
ICU II TRR - ASIC (Feb 2016)																												
ICU II Weapon System Test II (May 2016)																												
ICU II Milestone C (Jun 2017)																												
ICU II Production and Deployment Phase																												
ICU II FCA/PCA (Aug 2017)																												
ICU II IOC (May 2018)																												
ICU II FOC (Jun 2020)																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Air Force			Date: February 2015
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101213F / <i>Minuteman Squadrons</i>	Project (Number/Name) 672986 / <i>MM Crypto Mods</i>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
ICU II Engineering and Manufacturing Development Phase	1	2014	4	2017
ICU II CDR - A4 Drawer (Apr 2014)	3	2014	3	2014
ICU II TRR - FPGA (Nov 2014)	1	2015	1	2015
ICU II Weapon System Test I - Software (May 2015)	3	2015	3	2015
ICU II TRR - ASIC (Feb 2016)	2	2016	2	2016
ICU II Weapon System Test II (May 2016)	3	2016	3	2016
ICU II Milestone C (Jun 2017)	3	2017	3	2017
ICU II Production and Deployment Phase	3	2017	2	2020
ICU II FCA/PCA (Aug 2017)	4	2017	4	2017
ICU II IOC (May 2018)	3	2018	3	2018
ICU II FOC (Jun 2020)	3	2020	3	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force										Date: February 2015		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons				Project (Number/Name) 672987 / MM Ops Equip			
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
672987: MM Ops Equip	-	-	16.359	-	-	-	-	-	-	-	-	16.359
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2016, Project 672987, MM Ops Equipment, the two ongoing efforts will be transferred into PE 0605230F, Ground Based Strategic Deterrent (GBSD), Project 641025. The efforts being transferred are Solid Rocket Motor Modernization (SRMM) and Guidance Modernization Program (GMP).

A. Mission Description and Budget Item Justification

MM Operational Equipment program efforts will identify viable concepts and material solutions in support of the Air Force's GBSD. Funding supports design, development, test, integration and replacement of weapon system equipment including flight systems, Nuclear Command, Control and Communications (NC3), launch and control facilities, and Security/Ground Equipment upgrades.

Efforts within the MM Operational Equipment program will ensure MM III operation through 2030 as well as support future GBSD requirements. MM Operational Equipment also provides for other unique government costs, studies, cost trades and acquisition planning activities for future GBSD requirements.

In support of the future flight systems, the GMP effort will further define requirements, explore available technologies and architectures, select the most promising technology and architecture for development, and prepare acquisition plans. Efforts under the ICBM Demonstration and Validation Guidance Application Program (GAP), PE 0603851F, ICBM Dem/Val, will be leveraged to inform these efforts.

Also in support of the future flight systems, the SRMM effort will define operational requirements, investigate available technologies and prepare an acquisition strategy for SRMM development. SRMM will design and replace the existing solid rocket motors with a qualified modern design. This effort, coupled with ICBM Demonstration and Validation Propulsion Application Program (PAP), PE 0603851F, ICBM Dem/Val, will support development of requirements and an implementation timeline for the SRMM program.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Title: Guidance Modernization Program (GMP)	-	15.900	-	-	-
Description: GMP effort will provide modifications or replacements for the current MM III guidance subsystem necessary to ensure operations through 2030 and to support future GBSD requirements.					
FY 2014 Accomplishments: N/A					
FY 2015 Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force									Date: February 2015		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons				Project (Number/Name) 672987 / MM Ops Equip		
B. Accomplishments/Planned Programs (\$ in Millions)					FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total		
<div>- Continue technology assessment and development initiated under Dem/Val GAP.</div> <div>- Establish contracts with multiple contractors with promising technology and architectures relevant for a guidance replacement.</div> <div>- Continue efforts to mature technologies, define requirements and modular architectures.</div> <div>- Prepare acquisition strategies and plans for a GBSD Milestone A decision point.</div> <div>- Begin development of enhanced ground test capability and identify flight system integration requirements.</div> <div>FY 2016 Base Plans: Reflected in PE 0605230F, Ground Based Strategic Deterrent, Project 641025.</div> <div>FY 2016 OCO Plans: N/A</div>											
<div>Title: Solid Rocket Motor Modernization (SRMM)</div> <div>Description: SRMM effort will provide modifications or replacements for the current MM III booster subsystem necessary to ensure operations through 2030 and to support future GBSD requirements.</div> <div>FY 2014 Accomplishments: N/A</div> <div>FY 2015 Plans: - Continue technology assessment and development initiated under Dem/Val PAP. - Prepare acquisition strategies and plans for a GBSD Milestone A decision point.</div> <div>FY 2016 Base Plans: Reflected in PE 0605230F, Ground Based Strategic Deterrent, Project 641025.</div> <div>FY 2016 OCO Plans: N/A</div>					-	0.459	-	-	-		
Accomplishments/Planned Programs Subtotals					-	16.359	-	-	-		
C. 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
• RDTE: BA04: PE 0603851F: ICBM - Dem/Val	72.696	30.885	39.765	-	39.765	83.660	73.309	68.310	65.508	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force								Date: February 2015		
Appropriation/Budget Activity 3600 / 7				R-1 Program Element (Number/Name) PE 0101213F / <i>Minuteman Squadrons</i>				Project (Number/Name) 672987 / <i>MM Ops Equip</i>		

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u> <u>Base</u>	<u>FY 2016</u> <u>OCO</u>	<u>FY 2016</u> <u>Total</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• RDTE: BA04: PE 0605230F: <i>GBSD</i>	-	-	75.166	-	75.166	120.735	207.048	218.162	324.778	Continuing	Continuing

Remarks

Project 672987, MM Ops Equip, is related to only a portion of the RDT&E funding in Other Program Funding Summary.

D. Acquisition Strategy

GMP will prepare for Milestone A efforts leveraging FY14 studies and market research performed under Dem/Val GAP that have identified and matured materiel solutions to various stages of technical readiness. Based on current MM III and future GBSD requirements, multiple contracts will be competitively awarded following Milestone A supporting follow-on down-select of the best solution. It is anticipated that multiple contracts will be awarded as Cost Plus Fixed Fee, Cost Plus Incentive Fee, Fixed Price Incentive, and/or Firm Fixed Price.

SRMM will prepare for Milestone A efforts leveraging studies and market research performed under Dem/Val PAP that have identified and matured materiel solutions to various stages of technical readiness. SRMM funding will be disbursed using two contract vehicles. It is anticipated that multiple contracts will be awarded as Cost Plus Fixed Fee, Cost Plus Incentive Fee, Fixed Price Incentive, and/or Firm Fixed Price.

E. 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 2016 Air Force												Date: February 2015			
Appropriation/Budget Activity 3600 / 7						R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons				Project (Number/Name) 672987 / MM Ops Equip					
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
Guidance Modernization Program Instrument Technology Advancement	C/CPFF	Various : Various, UT	-	-		5.319	Feb 2015	-		-		-	Continuing	Continuing	-
Subtotal			-	-		5.319		-		-		-	-	-	-
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
Solid Rocket Motor Modernization Technical Engineering Services	C/FP	BAE : Hill AFB, UT	-	-		0.459	Mar 2015	-		-		-	Continuing	Continuing	-
Guidance Modernization Program Technical Engineering Services	C/FP	BAE : Hill AFB, UT	-	-		8.191	Feb 2015	-		-		-	Continuing	Continuing	-
Subtotal			-	-		8.650		-		-		-	-	-	-
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
Guidance Modernization Program EGT	C/FP	BAE : Clearfield, UT	-	-		2.390	Feb 2015	-		-		-	Continuing	Continuing	-
Subtotal			-	-		2.390		-		-		-	-	-	-
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
Subtotal			-	-		-		-		-		-	-	-	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Air Force											Date: February 2015			
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0101213F / Minuteman Squadrons					Project (Number/Name) 672987 / MM Ops Equip				
	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	-	-		16.359		-		-		-	-	-	-	

Remarks

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

Date: February 2015

Appropriation/Budget Activity

3600 / 7

R-1 Program Element (Number/Name)

PE 0101213F / Minuteman Squadrons

Project (Number/Name)

672987 / MM Ops Equip

	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
GMP Materiel Solution Analysis Phase																												
GMP Milestone A (Feb 2016)																												
GMP Technology Maturation and Risk Reduction Phase																												
GMP PDR (Aug 2019)																												
GMP Milestone B (Feb 2020)																												
GMP Engineering and Manufacturing Development Phase																												
SRMM Materiel Solution Analysis Phase																												
SRMM Milestone A (Mar 2016)																												
SRMM PDR (Dec 2017)																												
SRMM Milestone B (Aug 2018)																												
SRMM Engineering and Manufacturing Development Phase																												
SRMM CDR (Mar 2019)																												
SRMM FCA (Aug 2020)																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Air Force			Date: February 2015
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101213F / <i>Minuteman Squadrons</i>	Project (Number/Name) 672987 / <i>MM Ops Equip</i>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
GMP Materiel Solution Analysis Phase	3	2014	2	2016
GMP Milestone A (Feb 2016)	2	2016	2	2016
GMP Technology Maturation and Risk Reduction Phase	2	2016	2	2020
GMP PDR (Aug 2019)	4	2019	4	2019
GMP Milestone B (Feb 2020)	2	2020	2	2020
GMP Engineering and Manufacturing Development Phase	2	2020	4	2020
SRMM Materiel Solution Analysis Phase	3	2014	2	2016
SRMM Milestone A (Mar 2016)	2	2016	2	2016
SRMM PDR (Dec 2017)	1	2018	1	2018
SRMM Milestone B (Aug 2018)	4	2018	4	2018
SRMM Engineering and Manufacturing Development Phase	4	2018	4	2020
SRMM CDR (Mar 2019)	2	2019	2	2019
SRMM FCA (Aug 2020)	4	2020	4	2020