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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>
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COST (\$ in Millions)	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	0.000	90.595	89.306	113.622	0.000	113.622	-	-	-	-	-	-
672983: <i>MM Ground and Comm Equipment</i>	0.000	55.627	15.879	19.811	0.000	19.811	-	-	-	-	-	-
672984: <i>MM III Baseline Support</i>	0.000	14.816	68.983	90.123	0.000	90.123	-	-	-	-	-	-
672985: <i>MM Support Equip</i>	0.000	6.859	0.000	0.000	0.000	0.000	-	-	-	-	-	-
672986: <i>MM Crypto Mods</i>	0.000	13.293	4.444	3.688	0.000	3.688	-	-	-	-	-	-

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

The MM 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 Minuteman III (MM III) operations until replaced by Ground Based Strategic Deterrent (GBSD). Current efforts include development, qualification, integration, and testing of replacement equipment such as the LGM-30G Fast Rising B-Plug Service Life Extension Program (FRBP SLEP).

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 MM III capabilities, and 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 LGM-30G Arm/Disarm Switch Replacement (ADSR) and LGM-30G Flight Test Telemetry and Termination System (FT3). These programs will also implement processes, procedures and data systems to mitigate the transition risk from MM III to GBSD. 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. Efforts also include any minor needs required to prepare for full acquisition purposes.

MM Support Equipment program designs, develops, and tests replacement of obsolete/non-serviceable weapon system support equipment. These programs will also implement processes, procedures and data systems to mitigate the transition risk from MM III to Ground Based Strategic Deterrent (GBSD). Efforts include design, development, and testing of support equipment such as LGM-30G Pendulous Integrating Gyroscopic Accelerometer/G6B4 Build Equipment Replacement (PIGA/G6B4 BER) and LGM-30G Control Monitor Procedure Trainer Upgrade (CMPT). Programs may execute Diminishing Manufacturing Sources and Material Shortages/Program Management Administration support through the ISC 2.0 contract established to support the ICBM enterprise through the life of MM III.

MM Crypto Mods executes United States Strategic Command, Air Force Global Strike Command, and Air Force Safety Center requirements by implementing the KS-60 capabilities in LGM-30G ICBM Cryptography Upgrade II (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

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by reducing the frequency of open sites by 75 days annually and will reduce associated resource costs for 450 Launch Facilities (LFs) and 45 Launch Control Centers (LCCs).

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. In FY 2020 \$1.100M and in FY2021 \$1.100M was expended for civilian pay expenses in this program element.

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

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
Previous President's Budget	104.219	116.569	116.618	0.000	116.618
Current President's Budget	90.595	89.306	113.622	0.000	113.622
Total Adjustments	-13.624	-27.263	-2.996	0.000	-2.996
• Congressional General Reductions	0.000	-0.163			
• Congressional Directed Reductions	0.000	-27.100			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-10.000	0.000			
• SBIR/STTR Transfer	-3.624	0.000			
• Other Adjustments	0.000	0.000	-2.996	0.000	-2.996

**Change Summary Explanation**

Fiscal Year 2020 funding reflects a Small Business Innovation Research (SBIR) adjustment of \$3.624 million and a below threshold reprogramming of \$10.0 million for higher Air Force priorities.

Fiscal Year 2021 funding reflects Congressionally Directed Reductions of \$25.6 million for "Restoring acquisition accountability: Concurrency of FT3 development" and \$1.5 million for "Restoring acquisition accountability: Schedule slip of APT-R." Fiscal Year 2021 funding also reflects a Congressional General Reduction of \$0.163 million for an undistributed mark.

Fiscal Year 2022 funding reflects a \$2.996 million reduction for higher Air Force priorities.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0101213F / Minuteman Squadrons				<b>Project (Number/Name)</b> 672983 / MM Ground and Comm Equipment			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
672983: MM Ground and Comm Equipment	0.000	55.627	15.879	19.811	0.000	19.811	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

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

The MM 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 Minuteman III operations until replaced by Ground Based Strategic Deterrent (GBSD). Current efforts include development, qualification, integration, and testing of replacement equipment such as the LGM-30G Fast Rising B-Plug Service Life Extension Program (FRBP SLEP).

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver Minuteman Squadron for emergent or unanticipated weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605833F or 0605831F. In FY 2020 1.100M and in FY2021 1.100M was expended for civilian pay expenses in this program element.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> LGM-30G Air Launch Control System Replacement (ALCS-R)	51.133	0.000	0.000	-	0.000
<b>Description:</b> In FY 2019, Project 672983, MM Ground and Comm Equipment - Air Launch Control System Replacement (ALCS-R) was terminated. The requirement for air-based, survivable launch capability will be fulfilled through an alternative path: a dual-capable Secondary Launch Platform - Airborne, under the Ground Based Strategic Deterrent (GBSD) program. The GBSD program is budgeted in PE 0605230F, Ground Based Strategic Deterrent.					
The purpose of the ALCS-R program was to design, develop, produce and deploy a replacement for the legacy nuclear command and control system that provides the capability to launch Intercontinental Ballistic Missiles from an airborne platform, currently the Navy E-6B, as well as consider future alternate launch requirements. The legacy system consists of a nuclear hardened radio and MM III interface at each Launch Facility, and a suite of launch and cryptographic equipment that generates and transmits commands from the E-6B. ALCS dependent on the Strategic Air Command Code Processing System for codes data supplied to airborne equipment, and the Navy E-6B radio Command, Control, and Communication data path to transmit signals to the Launch Facilities.					
<b>FY 2021 Plans:</b>					

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672983 / <i>MM Ground and Comm Equipment</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
N/A					
<b>FY 2022 Base Plans:</b> N/A					
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A					
<p><b>Title:</b> LGM-30G Fast Rising B-Plug Service Life Extension Program (FRBP SLEP)</p> <p><b>Description:</b> The Fast Rising B-Plug (FRBP) provides security functions for the Personnel Access System (PAS) of the Launch Facilities (LFs). It is a 14,000 pound cylinder with 12 locking pins used to deny/delay access to intruders during LF maintenance activities.</p> <p>This effort includes critical hardware and software modifications to address high obsolescence risk and reliability issues affecting the operational wings.</p> <p>Note: Due to a database issue, FRBP SLEP does not reflect \$1.5 million realignment of funds from FRBP SLEP to FT3. Correct Fiscal Year 2021 amount is \$14.379 million.</p> <p><b>FY 2021 Plans:</b></p> <ul style="list-style-type: none"> <li>• Complete system functional and requirements reviews</li> <li>• Preliminary Design Review</li> <li>• Test and Evaluations Planning</li> </ul> <p><b>FY 2022 Base Plans:</b></p> <ul style="list-style-type: none"> <li>• Critical Design Review</li> <li>• Test &amp; Evaluation execution</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increase due to program completing CDR and entering Testing and Evaluation phase.</p>	4.494	15.879	19.811	-	19.811
<b>Accomplishments/Planned Programs Subtotals</b>	55.627	15.879	19.811	-	19.811

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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672983 / <i>MM Ground and Comm Equipment</i>
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• MPAF 03 M30MLG: <i>MM III Modifications</i>	22.617	47.640	65.690	-	65.690	-	-	-	-	-	-
• MPAF 01 00099L: <i>Missile Replacement Eq-Ballistic</i>	3.817	0.000	0.000	-	0.000	-	-	-	-	-	-
• APAF 06 000999: <i>Replen Spares/Repair Parts</i>	45.123	60.276	38.645	-	38.645	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

Ground and Communication 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 for Ground and Communication equipment 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. Nuclear Surety and Vulnerability analysis requirements are covered in the Acquisition Strategy.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / Minuteman Squadrons	<b>Project (Number/Name)</b> 672983 / MM Ground and Comm Equipment
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<b>Product Development (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
LGM-30G Airborne Launch Control Center Replacement (ALCS-R) TMRR Contractor A	C/FPIF	Lockheed Martin : Littleton, CO	0.000	19.166	Dec 2019	-		-		-		-	-	-	-
LGM-30G Airborne Launch Control Center Replacement (ALCS-R) TMRR Contractor B	C/FPIF	Rockwell Collins : Cedar Rapids, IA	0.000	21.188	Dec 2019	-		-		-		-	-	-	-
LGM-30G Airborne Launch Control Center Replacement (ALCS-R) SIL	MIPR	Aerospace : El Segundo, CA	0.000	0.079	May 2020	-		-		-		-	-	-	-
LGM-30G Fast Rising B-Plug Service Life Extension Program (FRBP SLEP) EMD	C/CPFF	Northrop Grumman : Salt Lake City, UT	0.000	3.357	Aug 2020	12.561	Oct 2020	16.396	Oct 2021	-		16.396	-	-	21.949
<b>Subtotal</b>			0.000	43.790		12.561		16.396		-		16.396	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2020</b>		<b>FY 2021</b>		<b>FY 2022 Base</b>		<b>FY 2022 OCO</b>		<b>FY 2022 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>			
LGM-30G Airborne Launch Control Center Replacement (ALCS-R) Testing	Various	Various : Various	0.000	1.224	Dec 2019	-		-		-		-	-	-	-
LGM-30G Fast Rising B-Plug Service Life Extension Program (FRBP SLEP) Test & Evaluation	Various	Various : Various	0.000	0.132	Jan 2020	0.761	Oct 2020	0.838	Oct 2021	-		0.838	-	-	0.000
<b>Subtotal</b>			0.000	1.356		0.761		0.838		-		0.838	-	-	N/A

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / Minuteman Squadrons	<b>Project (Number/Name)</b> 672983 / MM Ground and Comm Equipment
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<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G Airborne Launch Control Center Replacement (ALCS-R) Integration Support Contract	C/FP	BAE : Layton, UT	0.000	3.494	Oct 2019	-		-		-		-	-	-	-
LGM-30G Airborne Launch Control Center Replacement (ALCS-R) A&AS	C/FPIF	BAE : Layton, UT	0.000	1.753	Oct 2019	-		-		-		-	-	-	-
LGM-30G Airborne Launch Control Center Replacement (ALCS-R) PMA	Various	Various : Various	0.000	4.229	Oct 2019	-		-		-		-	-	-	-
LGM-30G Fast Rising B-Plug Service Life Extension Program (FRBP SLEP) A&AS	C/FP	BAE : Layton, UT	0.000	0.721	Dec 2019	0.903	Nov 2020	0.753	Oct 2021	-		0.753	-	-	3.692
LGM-30G Fast Rising B-Plug Service Life Extension Program (FRBP SLEP) PMA	Various	Various : Various	0.000	0.284	Apr 2020	1.654	Jan 2021	1.824	Jan 2022	-		1.824	-	-	0.000
<b>Subtotal</b>			0.000	10.481		2.557		2.577		-		2.577	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	0.000	55.627	15.879	19.811	-	19.811	-	-	N/A

**Remarks**



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672983 / <i>MM Ground and Comm Equipment</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>MM Ground and Comm Equipment</i></b>				
FRBP SLEP Milestone B (Aug 2020)	4	2020	4	2020
FRBP SLEP Engineering & Manufacturing Development Phase	4	2020	2	2023
FRBP SLEP Milestone C (Jan 2023)	2	2023	2	2023
FRBP SLEP Production & Deployment Phase	2	2023	2	2026
FRBP SLEP FOC (Mar 2026)	2	2026	2	2026

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0101213F / Minuteman Squadrons				<b>Project (Number/Name)</b> 672984 / MM III Baseline Support			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
672984: MM III Baseline Support	0.000	14.816	68.983	90.123	0.000	90.123	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

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

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 MM III capabilities, and 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 LGM-30G Arm Disarm Switch Replacement (ADSR) and LGM-30G Flight Test Telemetry and Termination System (FT3). 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.

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver Minuteman Squadron for emergent or unanticipated weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605833F or 0605831F. In FY 2020 1.100M and in FY2021 1.100M was expended for civilian pay expenses in this program element.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> LGM-30G Arm Disarm Switch Replacement (ADSR)	6.404	4.274	0.161	-	0.161
<p><b>Description:</b> The ADSR program designs, develops, fabricates and tests replacements for the aging Arm/Disarm (A/D) switches currently on the MM III Missile fleet. The A/D switch is responsible for completing or interrupting ordnance electrical circuits. A/D switches are placed at five key locations in the system: Interstage I-II, Stage II Liquid Injection Thrust Vector Control (LITVC) and Roll Control, Interstage II-III, PSRE Staging, and PSRE Isolation Valves. Aging and surveillance is an ongoing study to generate a trade-off curve between reliability/availability and cost.</p> <p>Reliability/availability are monitored by periodic testing to discover unforeseen issues. Because not all existing A/D switches can be repaired/refurbished, the number in inventory will eventually be inadequate to meet the need of the PDM cycle. Supply is estimated to deplete by approximately FY24 with repair/refurbish mitigation. Repair/refurbish is a reliable mitigation plan to meet the ongoing needs of the fleet while a manufacturer is selected and the manufacturing system is selected to develop a replacement A/D switch that meets requirements and production quantities through 2036.</p> <p><b>FY 2021 Plans:</b></p>					

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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672984 / <i>MM III Baseline Support</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<ul style="list-style-type: none"> <li>• Conduct qualification testing on A/D designs</li> <li>• Conduct Critical Design Review activities</li> </ul> <p><b>FY 2022 Base Plans:</b></p> <ul style="list-style-type: none"> <li>• Conclude qualification testing</li> <li>• Conduct Milestone C</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding decreased due to conclusion of EMD activities and commencement of Production and Deployment effort.</p>					
<p><b>Title:</b> LGM-30G Flight Test Telemetry and Termination System (FT3)</p> <p><b>Description:</b> The FT3 Program replaces the Mod 7 Instrumentation Wafer (Mod 7) and associated Signal Conditioner Monitor Group, and All Ordnance Destruct System (AODS) with a flight test kit. In addition, a replacement of the Launch Support System (LSS) is required to deploy the flight test kit. The flight test kit which consists of the Flight Destruct System (FDS) and a wafer-less Integrated Instrumentation System (IIS), along with an upgraded LSS, will meet 30th Space Wing Range Safety and Air Force Global Strike Command (AFGSC) requirements and resolve obsolescence concerns/issues.</p> <p>The AODS, Mod 7 Instrumentation Wafer, and LSS include many components that are not economically available, are no longer compliant with applicable Range Safety requirements, or are in need of technical modernization. Replacement of the Vandenberg Air Force Base flight test unique equipment is necessary to sustain future AFGSC Operational Test Launches (OTL), supporting USSTRATCOM requirements starting in FY22.</p> <p>The OTLs are critical to validating the continued accuracy and reliability of the MM III ICBM Weapon System until Ground Based Strategic Deterrent (GBSD) is fielded by providing valuable data to ensure a safe, secure, and effective nuclear deterrent. The FT3 System of Systems (SoS) will perform the same function as the existing systems with upgraded design features in order to comply with Air Force Space Command Manual (AFSPCMAN) 91-710, Range Safety User Requirements, Range Commander's Council 319, Flight Termination Systems Commonality Standard, and RCC-324, Global Positioning and Inertial Measurements Range Safety Tracking Systems' Commonality Standard.</p> <p>As of Feb 2020, the FT3 Program is executing to a Rapid Fielding replan to meet a requirement to be first launch ready, Oct 2022. Rapid Fielding requires concurrent activities in order to meet required first launch ready</p>	7.797	64.578	89.506	-	89.506

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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672984 / <i>MM III Baseline Support</i>			
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>					
<p>date; failure to be first flight ready in Oct 2022 jeopardizes MMIII OTL schedule. Rapid Fielding execution has increased concurrency of technical milestones, delaying some noncritical activities to post first flight (Oct 2022).</p> <p>Note: Due to a database issue, FT3 does not reflect 1.5 million realignment of funds from FRBP SLEP to FT3. Correct Fiscal Year 2021 amount is 66.078 million.</p> <p><b>FY 2021 Plans:</b></p> <ul style="list-style-type: none"> <li>• Conclude component qualification testing</li> <li>• Conclude LSS system-level qualification testing</li> <li>• Conclude flight system-level qualification testing</li> <li>• Request and receive Limited Deployment Decision for LSS</li> <li>• Begin LSS install activities in one launch facility</li> <li>• Install new Integrated Launch Support Center</li> <li>• Conduct System of Systems Level TRR</li> </ul> <p><b>FY 2022 Base Plans:</b></p> <ul style="list-style-type: none"> <li>• Conduct System of Systems Level qualification testing at Utah Lab</li> <li>• Conduct System of Systems Level qualification testing at Vandenberg AFB CA</li> <li>• Complete Flight Systems Production Readiness Review</li> <li>• Complete Milestone C</li> <li>• Conduct Systems Verification Review (SVR) #1</li> <li>• Deliver first flight test kit</li> <li>• Prepare for first launch</li> </ul> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> Funding increased due to system of systems qualification test activities.</p>					
<b>Title:</b> LGM-30G Baseline Support					
<b>Description:</b> 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.					
<b>FY 2021 Plans:</b>					
<ul style="list-style-type: none"> <li>• Conduct studies of system performance.</li> </ul>					
	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
	0.615	0.131	0.456	-	0.456

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672984 / <i>MM III Baseline Support</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<ul style="list-style-type: none"> <li>• Conduct cost trades and acquisition planning activities, up to and including proposal preparation, for future capabilities.</li> </ul> <p><b><i>FY 2022 Base Plans:</i></b></p> <ul style="list-style-type: none"> <li>• Conduct studies of system performance.</li> <li>• Conduct cost trades and acquisition planning activities, up to and including proposal preparation, for future capabilities.</li> </ul> <p><b><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i></b> Funding increased due to increase in number of studies.</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	14.816	68.983	90.123	-	90.123

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022 Base</u>	<u>FY 2022 OCO</u>	<u>FY 2022 Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• MPAF 03 M30MLG: <i>Minuteman III Modifications BP21</i>	0.000	0.000	4.534	-	4.534	-	-	-	-	-	-
• MPAF 01 00099L: <i>Missile Replacement Eq-Ballistic</i>	0.000	0.000	0.000	-	0.000	-	-	-	-	-	-
• 000999: <i>Replen Spares/Repair Parts</i>	45.123	60.276	38.645	-	38.645	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**  
Baseline Support 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 for Baseline Support equipment efforts will be executed through contracts available under competitive source selections. Nuclear Surety Cross Check Analysis (NSCCA) and Independent Verification and Validation (IV&V) efforts are contracted separately. Nuclear Surety and Vulnerability analysis requirements are covered in the Acquisition Strategy.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / Minuteman Squadrons	<b>Project (Number/Name)</b> 672984 / MM III Baseline Support
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G Arm Disarm Switch Replacement (ADSR)	C/CPFF	MOOG/ BIONETICS/ EBAD : Moorpark, CA. Blacksburg VA. Heath OH, CA	0.000	6.063	Jun 2020	3.602	Oct 2020	-		-		-	-	-	8.587
LGM-30G Flight Test Telemetry and Termination System (FT3) TMRR/EMD	C/CPIF	Boeing : Clearfield, UT	0.000	6.720	Feb 2020	52.917	Dec 2020	75.376	Dec 2021	-		75.376	-	-	177.789
LGM-30G Flight Test Telemetry and Termination System (FT3) MOTP	C/CPIF	Northrop Grumman : Clearfield, UT	0.000	0.000	Jul 2020	0.000		-		-		-	-	-	-
<b>Subtotal</b>			0.000	12.783		56.519		75.376		-		75.376	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G Arm Disarm Switch Replacement (ADSR) Support	C/Variou	Hill AFB : Clearfield, UT	0.000	0.139	Jan 2020	0.139	Jan 2021	0.161	Jan 2022	-		0.161	-	-	-
LGM-30G Flight Test Telemetry and Termination System (FT3) Support	C/Variou	Various : Clearfield, UT	0.000	0.000	Sep 2020	4.549	Oct 2020	5.599	Nov 2021	-		5.599	-	-	-
LGM-30G Baseline Support	C/Variou	Various : Various	0.000	0.615	Mar 2020	0.131	Mar 2021	0.456	Mar 2022	-		0.456	-	-	-
<b>Subtotal</b>			0.000	0.754		4.819		6.216		-		6.216	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G Flight Test Telemetry and Termination System (FT3) NSCCA-PATE	C/Variou	Northrop Grumman : Clearfield, UT	0.000	0.000	Jun 2020	-		-		-		-	-	-	-

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / Minuteman Squadrons	<b>Project (Number/Name)</b> 672984 / MM III Baseline Support
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<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G Flight Test Telemetry and Termination System (FT3) Lead Developmental Test Organization	MIPR	AEDC/TST : AAFB, TN	0.000	0.000	Oct 2020	0.659	Dec 2020	0.344	Nov 2021	-		0.344	-	-	-
<b>Subtotal</b>			0.000	0.000		0.659		0.344		-		0.344	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G Arm Disarm Switch Replacement (ADSR) PMA	Various	Various : Various	0.000	0.202	Jan 2020	0.533	Jan 2021	-		-		-	-	-	-
LGM-30G Flight Test Telemetry and Termination System (FT3) PMA	Various	Various : Various	0.000	0.000	Jan 2020	5.392	Oct 2020	6.436	Nov 2021	-		6.436	-	-	-
LGM-30G Flight Test Telemetry and Termination System (FT3) A&AS	C/FFP	Various : Clearfield, UT	0.000	1.077	Feb 2020	1.061	Oct 2020	1.751	Nov 2021	-		1.751	-	-	-
<b>Subtotal</b>			0.000	1.279		6.986		8.187		-		8.187	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>	0.000	14.816	68.983	90.123	-	90.123	-	-	N/A

**Remarks**



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2022 Air Force		<b>Date:</b> May 2021
<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672984 / <i>MM III Baseline Support</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>MM III Baseline Support</i></b>				
ADSR Milestone B (Mar 2020)	2	2020	2	2020
ADSR Engineering and Manufacturing Development Phase	2	2020	1	2022
ADSR PDR (July 2020)	4	2020	4	2020
ADSR CDR (Jan 2021)	2	2021	2	2021
ADSR Milestone C (Jan 2022)	2	2022	2	2022
ADSR Production and Deployment Phase	2	2022	4	2023
FT3 Engineering and Manufacturing Development Phase	1	2020	3	2024
FT3 PRR (Feb 2022)	2	2022	2	2022
FT3 Milestone C (Mar 2022)	2	2022	2	2022
FT3 Production and Deployment Phase	2	2021	3	2024
FT3 RAA (Jun 2022)	3	2022	3	2022
FT3 Operations and Support Phase	2	2022	4	2026

**Note**

FT3 Program:

- EMD and the P&D Phases overlap due to Rapid Fielding concurrent activities required during the EMD effort to meet need date for first flight
- P&D Phase begins earlier than MS C due to a Limited Deployment Decision for LSS; LSS must be installed prior to FT3 System of Systems qualification testing
- Only one LSS will be produced and installed. The LSS is the ground system that integrates with the flight test kit
- P&D Phase ends when the last of the eight LRIPs fly, 4QFY24
- O&S Phase begins when the FT3 Program awards contract to start production of replenishment spares, 2QFY22 (3020 BP25)
- Plan is to purchase up to 36 FRP units (up to 4 per year) which will support the MMIII OTL mission
- O&S phase will include sustainment of the LSS and associated FT3 support equipment (3400) through the life of MMIII OTL

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**Exhibit R-2A, RDT&E Project Justification:** PB 2022 Air Force **Date:** May 2021

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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
672985: MM Support Equip	0.000	6.859	0.000	0.000	0.000	0.000	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

MM Support Equipment program designs, develops, and tests replacement of obsolete/non-serviceable weapon system support equipment. These programs will also implement processes, procedures and data systems to mitigate the transition risk from MM III to Ground Based Strategic Deterrent (GBSD). Efforts include design, development, and testing of support equipment such as LGM-30G Pendulous Integrating Gyroscopic Accelerometer/G6B4 Build Equipment Replacement (PIGA/G6B4 BER) and LGM-30G Control Monitor Procedure Trainer Upgrade (CMPT).

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver Minuteman Squadron for emergent or unanticipated weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605833F or 0605831F. In FY 2020 1.100M and in FY2021 1.100M was expended for civilian pay expenses in this program element.

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

	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p><b>Title:</b> LGM-30G Pendulous Integrated Gyroscopic Accelerometer/G6B4 Build Equipment Replacement (PIGA/G6B4 BER)</p> <p><b>Description:</b> The Minuteman III PIGA and G6B4 gyros are repaired at the Boeing Guidance Repair Center (BGRC) in Heath, OH. PIGAs and G6B4s are repaired and tested for operational readiness using the government furnished PIGA &amp; G6B4 Build Equipment which is 30 years old and in need of replacement. The PIGA and G6B4 BER Program uses the current configuration as a baseline and replaces obsolete components with COTS components where possible.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Base Plans:</b> N/A</p> <p><b>FY 2022 OCO Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A</p>	4.972	0.000	0.000	0.000	0.000
<p><b>Title:</b> LGM-30G Control Monitor Procedure Trainer Upgrade (CMPT)</p>	1.887	0.000	0.000	-	0.000

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672985 / <i>MM Support Equip</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
<p><b>Description:</b> CMPT replaces the classroom trainer supporting start-up and shut-down of the MM III LF and missile, computer memory loading operations, and maintenance procedures. The program updated software, outdated operating systems, and obsolete/unsupportable hardware (desktop computers, motherboards, simulated programmer group, drivers, simulated cable sets, tape sets, and other miscellaneous parts) located at each Missile Wing and Vandenberg AFB necessary to continue support training capability of the CMPTs through 2030.</p> <p><b>FY 2021 Plans:</b> N/A</p> <p><b>FY 2022 Base Plans:</b> N/A</p> <p><b>FY 2021 to FY 2022 Increase/Decrease Statement:</b> N/A</p>					
<b>Accomplishments/Planned Programs Subtotals</b>	6.859	0.000	0.000	0.000	0.000

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
Line Item	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
• MPAF 03 M30MLG: <i>MM III Modifications</i>	0.258	0.000	0.000	-	0.000	-	-	-	-	-	-
• MPAF 01 00099L: <i>Missile Replacement Eq-Ballistic</i>	57.493	69.868	54.316	-	54.316	-	-	-	-	-	-
• 000999: <i>Replen Spares/Repair Parts</i>	45.123	60.276	38.645	-	38.645	-	-	-	-	-	-

**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 for support equipment 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. Nuclear Surety and Vulnerability analysis requirements are covered in the Acquisition Strategy.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / Minuteman Squadrons	<b>Project (Number/Name)</b> 672985 / MM Support Equip
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G Pendulous Integrating Gyroscopic Accelerometer/G6B4 Build Equipment Replacement (PIGA/G6B4 BER)	SS/FPIF	Boeing : Layton, UT	0.000	4.709	Oct 2020	-		-		-		-	-	-	-
LGM-30G Control Monitor Procedure Trainer Upgrade (CMPT) EMD	PO	309th SMXG : Hill AFB, UT	0.000	1.281	Jun 2020	-		-		-		-	-	-	-
<b>Subtotal</b>			0.000	5.990		-		-		-		-	-	-	N/A

<b>Management Services (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G Pendulous Integrating Gyroscopic Accelerometer/G6B4 Build Equipment Replacement (PIGA/G6B4 BER) PMA	Various	Various : Various	0.000	0.263	Nov 2020	-		-		-		-	-	-	-
LGM-30G Control Monitor Procedure Trainer Upgrade (CMPT) PMA	Various	Various : Various	0.000	0.188	Jan 2020	-		-		-		-	-	-	-
LGM-30G Control Monitor Procedure Trainer Upgrade (CMPT) A&AS	C/FFP	BAE : Clearfield, UT	0.000	0.418	Mar 2020	-		-		-		-	-	-	-
<b>Subtotal</b>			0.000	0.869		-		-		-		-	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
	<b>Project Cost Totals</b>		0.000	6.859	0.000	-	-	-	-

**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date: May 2021**

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / Minuteman Squadrons	<b>Project (Number/Name)</b> 672985 / MM Support Equip
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FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b>MM Support Equipment</b>	
PIGA/G6B4 BER TMRR Phase	
PIGA/G6B4 BER Milestone B (Jan 2021)	
PIGA/G6B4 BER Engineering and Manufacturing Development Phase	
PIGA/G6B4 BER CDR (Sept 2021)	
PIGA/G6B4 BER TRR (Jun 2022)	
PIGA/G6B4 BER RAA (Jan 2023)	
CMPT Engineering and Manufacturing Development Phase	
CMPT Milestone C (Jun 2020)	
CMPT Production and Deployment Phase	
CMPT RAA (Sept 2020)	

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672985 / <i>MM Support Equip</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>MM Support Equipment</i></b>				
PIGA/G6B4 BER TMRR Phase	1	2020	4	2020
PIGA/G6B4 BER Milestone B (Jan 2021)	2	2021	2	2021
PIGA/G6B4 BER Engineering and Manufacturing Development Phase	2	2021	2	2023
PIGA/G6B4 BER CDR (Sept 2021)	4	2021	4	2021
PIGA/G6B4 BER TRR (Jun 2022)	3	2022	3	2022
PIGA/G6B4 BER RAA (Jan 2023)	2	2023	2	2023
CMPT Engineering and Manufacturing Development Phase	1	2020	3	2020
CMPT Milestone C (Jun 2020)	3	2020	3	2020
CMPT Production and Deployment Phase	4	2020	4	2020
CMPT RAA (Sept 2020)	4	2020	4	2020

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force										<b>Date:</b> May 2021		
<b>Appropriation/Budget Activity</b> 3600 / 7					<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>				<b>Project (Number/Name)</b> 672986 / <i>MM Crypto Mods</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>	<b>FY 2023</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
672986: <i>MM Crypto Mods</i>	0.000	13.293	4.444	3.688	0.000	3.688	-	-	-	-	-	-
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

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

MM Crypto Mods executes United States Strategic Command, Air Force Global Strike Command, and Air Force Safety Center requirements by implementing the KS-60 capabilities in LGM-30G ICBM Cryptography Upgrade II (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 by 75 days annually and will reduce associated resource costs for 450 Launch Facilities (LFs) and 45 Launch Control Centers (LCCs).

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver Minuteman Squadron for emergent or unanticipated weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605833F or 0605831F. In FY 2020 1.100M and in FY2021 1.100M was expended for civilian pay expenses in this program element.

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

	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022 Base</b>	<b>FY 2022 OCO</b>	<b>FY 2022 Total</b>
<b>Title:</b> LGM-30G ICBM Cryptography Upgrade II (ICU II)	13.293	4.444	3.688	-	3.688
<b>Description:</b> ICU II completes design and development, implements KS-60 remote key/code change, irreversible transformation capabilities, and prevents continuous signal lockout.					
<b>FY 2021 Plans:</b>					
• Continue Guided Missile Launcher Electronic Circuit (GMLEC) interface modification					
• Conclude Depot Support Equipment (DSE) development					
<b>FY 2022 Base Plans:</b>					
• Continue Guided Missile Launcher Electronic Circuit (GMLEC) interface modification					
<b>FY 2021 to FY 2022 Increase/Decrease Statement:</b>					
Funding decreased due to completion of Depot Support Equipment contract.					
<b>Accomplishments/Planned Programs Subtotals</b>	13.293	4.444	3.688	-	3.688

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2022 Air Force	<b>Date:</b> May 2021
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<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672986 / <i>MM Crypto Mods</i>
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**C. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u> <u>Base</u>	<u>FY 2022</u> <u>OCO</u>	<u>FY 2022</u> <u>Total</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• MPAF 03 M30MLG: <i>MM III Modifications</i>	26.288	33.337	10.782	-	10.782	-	-	-	-	-	-
• MPAF 04 Line Item 000999: <i>Replen Spares/ Repair Parts BP25/26</i>	45.123	60.276	38.645	-	38.645	-	-	-	-	-	-

**Remarks**

**D. Acquisition Strategy**

LGM-30G ICBM Cryptography Upgrade II (ICU II) program utilizes the ICBM Prime Integration Contract (IPIC) services of Northrop Grumman (NG), which were competitively awarded for the design and development of the ICU II capability. 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 Safety Cross Check Analysis/Performance Analysis and Technical Evaluation (NSCCA/PATE) Independent Validation & Verification (IV&V). This contract is driven by critical nuclear safety requirements to perform an independent assessment of all modifications to nuclear-certified software. The Support Equipment effort includes EMD development of Depot Support Equipment, Guided Missile Launch Electronic Circuit (GMLEC) interface modification, and Acoustic Microscope System. Nuclear Safety and Vulnerability analysis requirements are covered in the Acquisition Strategy.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2022 Air Force** **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / Minuteman Squadrons	<b>Project (Number/Name)</b> 672986 / MM Crypto Mods
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<b>Product Development (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G ICBM Cryptography Upgrade II EMD	C/CPIF	Northrop Grumman : Clearfield, UT	0.000	0.070	Oct 2019	-		-		-		-	-	-	160.400
LGM-30G ICBM Cryptography Upgrade II Support Equipment development	C/CPFF	Northrop Grumman : Clearfield, UT	0.000	8.244	Oct 2019	-		-		-		-	-	-	29.300
LGM-30G ICBM Cryptography Upgrade II Support GMLEC	C/CPFF	Northrop Grumman : Clearfield, UT	0.000	2.170	Jun 2020	3.392	Jan 2021	2.805	Jan 2022	-		2.805	-	-	8.367
<b>Subtotal</b>			0.000	10.484		3.392		2.805		-		2.805	-	-	N/A

<b>Support (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G ICBM Cryptography Upgrade II Nuclear Safety Support (NSCCA/IV&V)	C/CPFF	Northrop Grumman : Clearfield, UT	0.000	1.962	Oct 2019	-		-		-		-	-	-	7.400
LGM-30G ICBM Cryptography SIBR & FFRDC Support	Various	Various : Various	0.000	-		0.264	Jan 2021	0.223	Jan 2022	-		0.223	-	-	-
<b>Subtotal</b>			0.000	1.962		0.264		0.223		-		0.223	-	-	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LGM-30G ICBM Cryptography Upgrade II LDTO	PO	AEDC/TSTS : Arnold AFB, TN	0.000	-		0.075	Nov 2020	0.051	Nov 2021	-		0.051	-	-	-
<b>Subtotal</b>			0.000	-		0.075		0.051		-		0.051	-	-	N/A



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**Exhibit R-4, RDT&E Schedule Profile: PB 2022 Air Force** **Date: May 2021**

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672986 / <i>MM Crypto Mods</i>
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	FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

<b><i>MM Crypto Mods</i></b>	
ICU II Engineering and Manufacturing Development Phase	
ICU II Support Equipment Engineering and Manufacturing Development Phase	
ICU II Engineering and Manufacturing Development Phase (GMLEC)	
ICU II Production and Deployment Phase	
ICU II Required Assets Available (RAA) for Initial Operational Capability (IOC)(Jun 2022)	
ICU II Required Assets Available (RAA) for Full Operational Capability (FOC) (Jan 2024)	

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2022 Air Force **Date:** May 2021

<b>Appropriation/Budget Activity</b> 3600 / 7	<b>R-1 Program Element (Number/Name)</b> PE 0101213F / <i>Minuteman Squadrons</i>	<b>Project (Number/Name)</b> 672986 / <i>MM Crypto Mods</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>MM Crypto Mods</i></b>				
ICU II Engineering and Manufacturing Development Phase	1	2020	2	2020
ICU II Support Equipment Engineering and Manufacturing Development Phase	1	2020	1	2021
ICU II Engineering and Manufacturing Development Phase (GMLEC)	3	2020	1	2023
ICU II Production and Deployment Phase	1	2020	2	2024
ICU II Required Assets Available (RAA) for Initial Operational Capability (IOC)(Jun 2022)	3	2022	3	2022
ICU II Required Assets Available (RAA) for Full Operational Capability (FOC) (Jan 2024)	2	2024	2	2024