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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2016 Air Force **Date:** February 2015

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0605230F / <i>Ground Based Strategic Deterrent</i>
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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	-	-	-	75.166	-	75.166	120.735	207.048	218.162	324.778	Continuing	Continuing
641025: <i>GROUND BASED STRATEGIC DETERRENT (GBSD)</i>	-	-	-	75.166	-	75.166	120.735	207.048	218.162	324.778	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Program MDAP/MAIS Code:** 493

**Note**

In FY 2016, PE 0605230F, Project 641025, Ground Based Strategic Deterrent (GBSD) efforts were transferred from the Solid Rocket Motor Modernization (SRMM) and Guidance Modernization Program (GMP) efforts in PE 0101213F, Project 672987, MM Ops Equipment.

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

The Ground Based Strategic Deterrent (GBSD) will design, develop, produce and deploy a replacement for the current Intercontinental Ballistic Missile (ICBM) Minuteman III (MM III) weapon system. GBSD is scoped to deliver an integrated flight system beginning in FY27 and continue to advance GBSD data management, systems modeling and simulation, and analytical capabilities to integrate GBSD's Weapon System Command & Control (WSC2) systems and infrastructure required to execute, operate, sustain, and secure a fully integrated GBSD weapon system to address capability requirements identified in the GBSD Capabilities Based Assessment and GBSD Initial Capabilities Document, and examined in the GBSD Analysis of Alternatives to mitigate ground-based deterrent degradations due to MM III component age-out and attrition.

The major activities in the GBSD program include 1) Flight System (FS); 2) Weapon System Command and Control (WSC2); 3) Infrastructure [e.g. Launch Facilities (LF) and Launch Control Centers (LCC)]; 4) Weapon System Integration. Flight System is an integrated missile stack which includes the following major sub-components: propulsion, post-boost, guidance, and re-entry systems (RS). WSC2 encompasses all weapon system C2 components and interfaces, associated ground hardware, ground control equipment and associated software directly related to the sustainment, survivability, monitoring and launch of the replacement flight system. Infrastructure includes restoration and modernization of real property and structures, and associated ground mechanical systems. The GBSD program will include development of applicable support equipment, data, flight test hardware and infrastructure, and training material.

BA4 - This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

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<b>B. Program Change Summary (\$ in Millions)</b>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>
Previous President's Budget	-	-	-	-	-
Current President's Budget	-	-	75.166	-	75.166
Total Adjustments	-	-	75.166	-	75.166
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Other Adjustments	-	-	75.166	-	75.166

**Change Summary Explanation**

FY16 - funding transfered from PE11213F BPAC 672987.

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016</u>
<p><b>Title:</b> Guidance</p> <p><b>Description:</b> The GBSD Guidance effort will provide replacements for the current MM III guidance subsystem necessary to ensure continued operations and to support GBSD requirements.</p> <p><b>FY 2016 Plans:</b> Analyze, select, and assess advanced guidance instruments and electronic components to support GBSD strategic guidance requirements. Conduct technology development and concept analysis and design efforts to identify areas for guidance integration to support GBSD tradespace considerations.</p>	-	-	20.580
<p><b>Title:</b> Propulsion</p> <p><b>Description:</b> The GBSD Propulsion effort will provide replacements for the current MM III solid rocket motor subsystem necessary to ensure continued operations and to support GBSD requirements.</p> <p><b>FY 2016 Plans:</b> Analyze, select, and assess solid rocket motors and associated components to support GBSD strategic propulsion requirements. Conduct technology development and concept analysis and design efforts to identify areas for booster integration to support GBSD trade space considerations.</p>	-	-	22.786
<p><b>Title:</b> GBSD Weapon System Integration</p>	-	-	31.800

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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0605230F / <i>Ground Based Strategic Deterrent</i>
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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2014	FY 2015	FY 2016
<p><b>Description:</b> Identify and assess weapon system integration of GBSD's Command &amp; Control (WSC2) systems, flight systems and infrastructure required to execute, operate, sustain, and secure the GBSD weapon system. Assess the current MMIII launch and control facilities to determine the extent of degradation and evaluate for future upgrade or replacement.</p> <p><b>FY 2016 Plans:</b> Identify and assess an integrated GBSD weapon system to include areas where component consolidation may provide maintenance, security and performance advantages. Assess areas where flight systems, communications and infrastructure may support fielding and transitioning the MM III to GBSD to meet capabilities requirements.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	-	-	75.166

<b>D. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	FY 2014	FY 2015	FY 2016 <u>Base</u>	FY 2016 <u>OCO</u>	FY 2016 <u>Total</u>	FY 2017	FY 2018	FY 2019	FY 2020	<u>Cost To Complete</u>	<u>Total Cost</u>
• RDTE:BA04:PE 0603851F: <i>Intercontinental Ballistic Missile - Dem/Val</i>	72.696	30.885	39.765	-	39.765	83.660	73.309	68.310	65.508	Continuing	Continuing
• RDTE:BA07:PE 0101213F: <i>Minuteman III Ops Equipment</i>	-	16.359	-	-	-	-	-	-	-	-	-

**Remarks**

**E. Acquisition Strategy**  
The GBSD program will deliver a weapon system capability that meets Air Force requirements with initial fielding in FY27. For the pre-Milestone A and Technology Maturation/Risk Reduction (TMRR) phases of this strategy, contracts will be competitively awarded. The TMRR phase will include a System Requirements Review (SRR), a System Design Review (SDR) and will culminate in a system Preliminary Design Review (PDR). As appropriate, the contract will include risk reduction prototyping on key technologies and the requirement to bring forward multiple vendor designs for key government designated components/sub-components to PDR or beyond. After MS B approval, Engineering, Manufacturing and Development (EMD) contract will be competitively awarded.

**F. Performance Metrics**  
Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Air Force												Date: February 2015			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
3600 / 4				PE 0605230F / Ground Based Strategic Deterrent				641025 / GROUND BASED STRATEGIC DETERRENT (GBSD)							
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
Navy Crane Guidance Parts	MIPR	Navy Crane : Crane, IN	-	-		-		1.000	Feb 2016	-		1.000	Continuing	Continuing	TBD
Propulsion Systems Concept Development 1	C/TBD	TBD : TBD,	-	-		-		11.143	Jan 2016	-		11.143	Continuing	Continuing	TBD
Propulsion Systems Concept Development 2	C/TBD	TBD : TBD,	-	-		-		11.143	Jan 2016	-		11.143	Continuing	Continuing	TBD
<b>Subtotal</b>			-	-		-		23.286		-		23.286	-	-	-
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
Integration Support Contract	C/FFP	BAE : Layton, UT	-	-		-		11.500	Dec 2015	-		11.500	Continuing	Continuing	TBD
Tech/Engineering Support - Guidance	C/FFP	BAE : Layton, UT	-	-		-		11.417	Jun 2016	-		11.417	Continuing	Continuing	TBD
Tech/Engineering Support - Propulsion	C/FFP	BAE : Layton, UT	-	-		-		2.573	Jan 2016	-		2.573	Continuing	Continuing	TBD
<b>Subtotal</b>			-	-		-		25.490		-		25.490	-	-	-
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
Enhanced Ground Test	MIPR	Draper Labs : Cambridge, MA	-	-		-		8.280	Jan 2016	-		8.280	Continuing	Continuing	TBD
Guidance Instrument Ground Simulation	C/TBD	Little Mountain : Clearfield, UT	-	-		-		11.300	Mar 2016	-		11.300	Continuing	Continuing	TBD
<b>Subtotal</b>			-	-		-		19.580		-		19.580	-	-	-



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2016 Air Force		<b>Date:</b> February 2015
<b>Appropriation/Budget Activity</b> 3600 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0605230F / <i>Ground Based Strategic Deterrent</i>	<b>Project (Number/Name)</b> 641025 / <i>GROUND BASED STRATEGIC DETERRENT (GBSD)</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
Technology Maturation and Risk Reduction Phase																												
Milestone A (2Q16)																												
TMRR Contract Award (March 2017)																												
PDR (Dec 2019)																												
Milestone B (March 2019)																												
Engineering, Manufacturing and Development (EMD) Phase																												
EMD Contract Award (June 2019)																												
Guidance Concept Development and Architecture																												
Propulsion Solid Rocket Motor Concept Development																												
GBSD Weapon System Integration																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2016 Air Force		<b>Date:</b> February 2015
<b>Appropriation/Budget Activity</b> 3600 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0605230F / <i>Ground Based Strategic Deterrent</i>	<b>Project (Number/Name)</b> 641025 / <i>GROUND BASED STRATEGIC DETERRENT (GBSD)</i>

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Technology Maturation and Risk Reduction Phase	2	2016	2	2019
Milestone A (2Q16)	2	2016	2	2016
TMRR Contract Award (March 2017)	2	2017	2	2017
PDR (Dec 2019)	1	2019	1	2019
Milestone B (March 2019)	2	2019	2	2019
Engineering, Manufacturing and Development (EMD) Phase	2	2019	4	2020
EMD Contract Award (June 2019)	3	2019	3	2019
Guidance Concept Development and Architecture	2	2016	4	2020
Propulsion Solid Rocket Motor Concept Development	2	2016	4	2020
GBSD Weapon System Integration	2	2016	4	2020