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Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Air Force										Date: May 2017		
Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)					R-1 Program Element (Number/Name) PE 0605230F I Ground Based Strategic Deterrent							
COST (\$ in Millions)	Prior Years	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	FY 2019	FY 2020	FY 2021	FY 2022	Cost To Complete	Total Cost
Total Program Element	0.000	64.966	113.919	215.721	0.000	215.721	347.638	574.661	1,539.050	2,557.439	12,656.015	18,069.409
641025: GROUND BASED STRATEGIC DETERRENT (GBSD)	0.000	64.966	113.919	215.721	0.000	215.721	347.638	574.661	1,539.050	2,557.439	12,656.015	18,069.409
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
Program MDAP/MAIS Code: 493												
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. The GBSD program is scoped to deliver a fully integrated weapon system beginning in FY29 timeframe to close key capability gaps and vulnerabilities identified in the GBSD Capabilities Based Assessment, GBSD Initial Capabilities Document, and the GBSD Analysis of Alternatives; and to mitigate ground-based deterrent degradation due to MM III component age-out and attrition.												
The major activities in the GBSD program include 1)Government system engineering (SE), analytics, and test capability development; 2) Flight System (FS) Risk Reduction; 3) Weapon System Command and Control (WSC2) Risk Reduction; 4) Launch Systems (LS) Risk Reduction; 5) Weapon System Integration (WSI) Risk Reduction. FS is an integrated missile stack which includes the propulsion, post-boost, guidance, and re-entry systems (RS) sub-components. WSC2 encompasses all command and control components and interfaces, associated ground hardware, ground control equipment and associated software directly related to the survivability, monitoring and launch of the replacement flight system. LS include Launch Control Center (LCC) and Launch Facility (LF) restoration and modernization of real property and structures and associated ground mechanical systems. The GBSD program will include Prime contractor development of applicable support equipment, data, flight test hardware and infrastructure, and training material while examining and mitigating risk during the MM III to GBSD transition. Government SE investments include development of an organic, computer-aided, model based systems engineering (MBSE), integration, and test software, product life-cycle management (PLM) framework, and modernization of existing SE labs and infrastructure. Efforts are focused on current and future requirements and technologies and reduced life cycle costs. This program also includes any needed nuclear surety and certification and system vulnerability assessments.												
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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3600: Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)		PE 0605230F I Ground Based Strategic Deterrent				
B. Program Change Summary (\$ in Millions)	FY 2016	FY 2017	FY 2018 Base	FY 2018 OCO	FY 2018 Total	
Previous President's Budget	75.166	113.919	293.959	0.000	293.959	
Current President's Budget	64.966	113.919	215.721	0.000	215.721	
Total Adjustments	-10.200	0.000	-78.238	0.000	-78.238	
• Congressional General Reductions	0.000	0.000				
• Congressional Directed Reductions	0.000	0.000				
• Congressional Rescissions	0.000	0.000				
• Congressional Adds	0.000	0.000				
• Congressional Directed Transfers	0.000	0.000				
• Reprogrammings	-0.200	0.000				
• SBIR/STTR Transfer	-10.000	0.000				
• Other Adjustments	0.000	0.000	-78.238	0.000	-78.238	
Change Summary Explanation						
FY 2018 funding reflects a decrease of \$78.238M to align with the Independent Cost Estimate (ICE).						
C. Accomplishments/Planned Programs (\$ in Millions)				FY 2016	FY 2017	FY 2018
Title: Technology Maturation Risk Reduction				64.966	113.919	215.721
Description: The objectives of TMRR for GBSD are as follows: 1) advance GBSD major activities, systems engineering activities, trade-studies, information technology, data management, analytical capabilities and deliver a modular, integrated weapon system preliminary design and 2) mature technologies related to the major activities and demonstrate performance of sub-system capabilities through prototyping, modeling, and simulation.						
FY 2016 Accomplishments:						
- Initiated studies and analysis of Flight System subcomponents						
- Developed GBSD WSC2 systems architecture and components						
- Supported the Enterprise Capability Collaboration Team (ECCT) to identify and examine the GBSD WSC2 and LS concepts and technologies						
- Advanced GBSD data management, systems modeling and simulation, and analytical capabilities						
- Identified and assessed an integrated GBSD weapon system that included areas where component consolidation may have provided maintenance, security and performance advantages						
- Assessed areas where FS, communications, and infrastructure may support fielding and transitioning the MM III to GBSD to meet capabilities requirements						
- Milestone A completed (Aug 2016)						
FY 2017 Plans:						

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2016	FY 2017	FY 2018
<ul style="list-style-type: none"> - Examine and mature FS, WSC2, cybersecurity, and associated ground system technologies, define requirements and modular architectures through trade studies, prototyping, demonstration and analysis - Mature and refine software integration and modular system architecture requirements - Mature the assessment of the current MM III LS to determine, through onsite assessments and analysis, the extent of degradation and evaluate for future upgrade, replacement, preparation, and modernization of operational and test facilities - Mature the weapon system preliminary design and reduce integration risk by conducting trade studies, system engineering, test activities, and systems modeling and simulation - Further develop analytical, information technology, test, and data management capabilities to ensure access to weapon system design information is properly controlled and information is securely transmitted between the government and each contractor. - Continue to assess fielding requirements for FS, WSC2 and LS and appropriate timelines to transition from MM III to GBSD solution <p>FY 2018 Plans:</p> <ul style="list-style-type: none"> - Continue to examine and mature FS, WSC2, cybersecurity, and associated ground system technologies, define requirements and modular architectures through trade studies, prototyping, demonstration and analysis - Continue to mature and refine software integration and modular system architecture requirements - Continue to mature the assessment of the current MM III LS to determine, through onsite assessments and analysis, the extent of degradation and evaluate for future upgrade, replacement, preparation, and modernization of operational and test facilities - Continue to mature the weapon system preliminary design and reduce integration risk by conducting trade studies, system engineering, test activities, and systems modeling and simulation - Continue to further develop analytical, information technology, and data management capabilities to ensure weapon system design information is properly secured and information dissemination between contractors - Continue to assess fielding requirements for FS, WSC2 and LS and appropriate timelines to transition from MM III to GBSD solution - Complete System Requirements Review, cost-capability trade studies, and validate draft Capability Development Document. - Expand and develop analytical, information technology, test, and data management capabilities to ensure access to weapon system design information is properly controlled and information is securely transmitted between the government and each contractor 				
Accomplishments/Planned Programs Subtotals		64.966	113.919	215.721

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D. Other Program Funding Summary (\$ in Millions)											
			<u>FY 2018</u>	<u>FY 2018</u>	<u>FY 2018</u>					<u>Cost To</u>	
<u>Line Item</u>	<u>FY 2016</u>	<u>FY 2017</u>	<u>Base</u>	<u>OCO</u>	<u>Total</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>Complete</u>	<u>Total Cost</u>
• RDTE:BA04:PE 0603851F: <i>Intercontinental Ballistic Missile - Dem/Val</i>	34.765	108.663	10.736	0.000	10.736	42.173	44.442	66.077	67.431	Continuing	Continuing
• MILCON: PE 0605230F: <i>Ground Based Strategic Deterrent (GBSD)</i>	0.000	0.000	0.000	0.000	0.000	0.000	108.000	151.037	135.700	319.220	713.957
Remarks											
E. Acquisition Strategy											
<p>The objective of the GBSD program strategy is to deliver a full, integrated weapon system capability that meets Air Force Global Strike Command's CDD requirements beginning in FY29. For the TMRR phase of this strategy, the Program Office will competitively award two contracts in FY17. The objectives of TMRR for GBSD are as follows: 1) to deliver low-risk, technologically mature, integrated weapon system preliminary design; 2) incorporate a modular open systems architecture; 3) perform cost-capability analysis to aid with validation of user requirements; 4) demonstrate performance of sub-system capabilities through prototyping, modeling, and simulation. The TMRR phase will include a System Requirements Review (SRR), System Functional Review (SFR), System Software Review (SSR), and will culminate in a system Preliminary Design Review (PDR). The contractor may elect to perform additional risk reduction testing on select components to further evolve the PDR design during TMRR in order to lower component integration risk during Engineering and Manufacturing Development (EMD). The anticipated period of performance for the TMRR contracts will be from 4QFY17 to 4QFY20. After MS B approval, EMD contract will be competitively awarded as early as FY20.</p>											
F. Performance Metrics											
<p>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.</p>											

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Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Air Force												Date: May 2017			
Appropriation/Budget Activity 3600 / 4						R-1 Program Element (Number/Name) PE 0605230F / <i>Ground Based Strategic Deterrent</i>						Project (Number/Name) 641025 / <i>GROUND BASED STRATEGIC DETERRENT (GBSD)</i>			
Product Development (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
GBSD Technology Maturation and Risk Reduction (TMRR) Contractor #1	C/CPFF	TBD : TBD	0.000	0.000		5.707	Sep 2017	58.346	Nov 2017	0.000		58.346	294.997	359.050	359.050
GBSD TMRR Contractor #2	C/CPFF	TBD : TBD	0.000	0.000		5.707	Sep 2017	58.346	Nov 2017	0.000		58.346	294.997	359.050	359.050
GBSD EMD Contracts	C/Various	TBD : TBD	0.000	0.000		0.000		0.000		0.000		0.000	13,944.160	13,944.160	-
Subtotal			0.000	0.000		11.414		116.692		0.000		116.692	14,534.154	14,662.260	-
Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
GBSD Integration Support Contract (TMRR)	C/FFP	BAE : Hill AFB, UT	0.000	28.933	Oct 2015	36.720	Oct 2016	41.205	Oct 2017	0.000		41.205	152.999	259.857	-
GBSD Electronic Parts Strategy and Commonality (TMRR)	MIPR	Naval Surface Warfare Center (NSWC) Crane : Crane, IN	0.000	3.779	Mar 2016	6.359	Dec 2016	4.802	Dec 2017	0.000		4.802	5.000	19.940	-
GBSD Federally Funded Research and Development Center (FFRDC) (TMRR)	MIPR	Aerospace Corporation : El Segundo, CA	0.000	2.630	Dec 2015	5.404	Nov 2016	5.610	Oct 2017	0.000		5.610	18.360	32.004	-
GBSD MITRE (TMRR)	MIPR	MITRE : Bedford, MA	0.000	2.144	Feb 2016	2.358	Dec 2016	3.492	Oct 2017	0.000		3.492	10.476	18.470	-
GBSD Technical Area Task Support (TMRR)	MIPR	Air Force Global Strike Command : Barksdale AFB, LA	0.000	1.742	Jan 2016	1.218	Feb 2017	0.000		0.000		0.000	0.000	2.960	-
GBSD Software Engineering Institute (TMRR)	MIPR	Carnegie Mellon : Pittsburgh, PA	0.000	0.360	Jan 2016	1.979	Feb 2017	2.569	Oct 2017	0.000		2.569	8.406	13.314	-
GBSD Reentry Systems (RS) FFRDC Support and Analysis (TMRR)	MIPR	Sandia National Laboratories : Various	0.000	0.000		7.796	Mar 2017	6.510	Nov 2017	0.000		6.510	7.500	21.806	-

UNCLASSIFIED

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Support (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
GBSD RS FFRDC Analysis and Acquisition Intelligence Support (TMRR)	Various	Various : Various	0.000	0.000		2.344	Mar 2017	6.426	Oct 2017	0.000		6.426	23.084	31.854	-
GBSD Software Support (TMRR)	TBD	TBD : TBD	0.000	0.000		0.583	Jun 2017	1.416	Jan 2018	0.000		1.416	4.668	6.667	-
GBSD EMD Support	C/Various	TBD : TBD	0.000	0.000		0.000		0.000		0.000		0.000	1,702.011	1,702.011	-
Subtotal			0.000	39.588		64.761		72.030		0.000		72.030	1,932.504	2,108.883	-
Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
GBSD Test and Assessments (TMRR)	Various	Various : Various	0.000	18.103	Sep 2016	25.002	Jan 2017	4.715	Nov 2017	0.000		4.715	1.311	49.131	-
GBSD Cybersecurity, Test and Evaluation Framework, Codes/Crypto (TMRR)	MIPR	Johns Hopkins University-Applied Physics Lab : Laurel, MD	0.000	4.027	Feb 2016	3.308	Jan 2017	2.179	Jan 2018	0.000		2.179	7.466	16.980	-
GBSD Integrated Test Team (TMRR)	PO	Arnold engineering Development Complex : Arnold AFB, TN	0.000	0.549	Jun 2016	1.332	Nov 2016	3.269	Oct 2017	0.000		3.269	19.239	24.389	-
GBSD Independent Operational Test Agency (TMRR)	PO	Air Force Operational and Evaluation Center : Hill AFB, UT	0.000	0.000		1.025	Mar 2017	1.518	Jan 2018	0.000		1.518	216.797	219.340	-
GBSD Integrated Threat Analysis and Simulation Environment (ITASE) I (TMRR)	MIPR	DIA-Missile and Space Intelligence Center : Redstone Arsenal, AL	0.000	0.000		2.402	Jan 2017	2.283	Jan 2018	0.000		2.283	9.975	14.660	-
GBSD ITASE II (TMRR)	MIPR	DIA-National Air and Space Intelligence	0.000	0.000		0.450	May 2017	2.313	Nov 2017	0.000		2.313	3.287	6.050	-

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Test and Evaluation (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
		Center : Fairborn, OH													
GBSD Nuclear Dust and Debris Environments Study (TMRR)	TBD	TBD : TBD	0.000	0.000		1.160	Jun 2017	0.809	Jun 2017	0.000		0.809	1.821	3.790	-
GBSD RS Test and Assesments (TMRR)	MIPR	Various : Various	0.000	0.000		1.095	Jan 2017	6.077	Jan 2017	0.000		6.077	15.275	22.447	-
GBSD EMD Test Support	C/Various	TBD : TBD	0.000	0.000		0.000		0.000		0.000		0.000	844.954	844.954	-
Subtotal			0.000	22.679		35.774		23.163		0.000		23.163	1,120.125	1,201.741	-
Management Services (\$ in Millions)				FY 2016		FY 2017		FY 2018 Base		FY 2018 OCO		FY 2018 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
GBSD PMA	Various	Various : Various	0.000	2.699	Oct 2015	1.970	Oct 2016	3.836	Oct 2017	0.000		3.836	88.020	96.525	-
Subtotal			0.000	2.699		1.970		3.836		0.000		3.836	88.020	96.525	-
Project Cost Totals			0.000	64.966		113.919		215.721		0.000		215.721	17,674.803	18,069.409	-
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: FY 2018 Air Force			Date: May 2017		
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	FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022			
	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
Materiel Solution Analysis Phase																												
Milestone A (Aug 2016)																												
TMRR Phase																												
PDR (Jun 2020)																												
Milestone B (Sep 2020)																												
EMD Phase																												

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Exhibit R-4A, RDT&E Schedule Details: FY 2018 Air Force			Date: May 2017
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0605230F / <i>Ground Based Strategic Deterrent</i>	Project (Number/Name) 641025 / <i>GROUND BASED STRATEGIC DETERRENT (GBSD)</i>	

Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Materiel Solution Analysis Phase	1	2016	3	2016
Milestone A (Aug 2016)	4	2016	4	2016
TMRR Phase	4	2016	4	2020
PDR (Jun 2020)	3	2020	3	2020
Milestone B (Sep 2020)	4	2020	4	2020
EMD Phase	1	2021	4	2022