

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Air Force **Date:** February 2016

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0605230F / <i>Ground Based Strategic Deterrent</i>
--	---

COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	-	0.000	75.166	113.919	0.000	113.919	293.959	321.054	1,034.249	1,576.429	Continuing	Continuing
641025: <i>GROUND BASED STRATEGIC DETERRENT (GBSD)</i>	-	0.000	75.166	113.919	0.000	113.919	293.959	321.054	1,034.249	1,576.429	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 493

Note

In FY 2016, PE 0101213F, (Minuteman Squadrons), Project 672987, (MM Ops Equipment) efforts were transferred to PE 0605230F, (Ground Based Strategic Deterrent), Project 641025, (Ground Based Strategic Deterrent), in order to provide budget transparency for this ACAT ID effort.

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 FY28 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 attrition and age-out.

The major activities in the GBSD program include 1) Flight System (FS); 2) Weapon System Command and Control (WSC2); 3) Launch Systems (LS); 4) Weapon System Integration. 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 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.

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.

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Air Force **Date:** February 2016

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
---	--

B. Program Change Summary (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	0.000	75.166	120.735	0.000	120.735
Current President's Budget	0.000	75.166	113.919	0.000	113.919
Total Adjustments	0.000	0.000	-6.816	0.000	-6.816
• 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	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-6.816	0.000	-6.816

Change Summary Explanation

FY 2017 funding reflects an increase of \$10.000M to address refurbishment of Launch Facility 26 at Vandenberg Air Force Base, CA for future testing and a decrease of \$16.816M to reflect revised program planning.

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

	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Title: Flight System	0.000	37.644	42.115	0.000	42.115
Description: Matures and supports ICBM reentry system, guidance, and propulsion technologies; refines requirements; develops modular subsystem architectures to support development of the weapon system preliminary design.					
FY 2015 Accomplishments: N/A					
FY 2016 Plans:					
- Combined previous year's Propulsion and Guidance Major Thrusts					
- Mature guidance technologies, define requirements and modular architectures					
- Further develop enhanced ground test capability and flight system integration requirements					
- Evaluate ICBM propulsion propellants, advanced flight controls and case material for medium class stage motors					
- Develop motor and integrated post boost vehicle concept designs through prototyping, demonstration and analysis					

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Air Force				Date: February 2016	
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>		R-1 Program Element (Number/Name) PE 0605230F <i>I Ground Based Strategic Deterrent</i>			
C. Accomplishments/Planned Programs (\$ in Millions)					
	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
- Initiate studies and analysis of Flight System subcomponents					
FY 2017 Base Plans:					
- Continue efforts to mature guidance technologies, define requirements and modular architectures					
- Continue development of enhanced ground test capability and develop flight system integration requirements					
- Continue to evaluate and refine ICBM propulsion propellants, advanced flight controls and case material for medium class stage motors					
- Continue to develop motor and integrated post boost vehicle concept designs through prototyping, demonstration and analysis					
- Examine and mature Reentry System concept designs through prototyping, demonstration and analysis					
FY 2017 OCO Plans:					
N/A					
Title: Weapon System Command and Control					
Description: Identify and assess integration of GBSD's WSC2 systems and associated ground systems to execute, operate, sustain, and secure the GBSD weapon system; refine requirements, develop modular subsystem architectures, and support development of the weapon system preliminary design.					
FY 2015 Accomplishments:					
N/A					
FY 2016 Plans:					
- Effort previously encompassed in Weapon System Integration Major Thrust					
- Develop GBSD WSC2 systems architecture and components					
- Support the Enterprise Capability Collaboration Team (ECCT) to identify and examine the GBSD WSC2 concepts and technologies					
FY 2017 Base Plans:					
- Continue efforts to mature WSC2 system concepts and identified technologies					
- Continue to refine software integration requirements					
- Continue to mature modular systems architectures					
- Evaluate command and control systems, associated ground system technologies, and cybersecurity technologies through prototyping, demonstration and analysis					
FY 2017 OCO Plans:					
	0.000	1.245	2.075	0.000	2.075

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Air Force				Date: February 2016	
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>		R-1 Program Element (Number/Name) PE 0605230F / <i>Ground Based Strategic Deterrent</i>			
C. Accomplishments/Planned Programs (\$ in Millions)					
	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
N/A					
<p>Title: Launch Systems</p> <p>Description: Identify, assess and evaluate GBSD LS and associated systems to support development of the weapon system preliminary design.</p> <p>FY 2015 Accomplishments: N/A</p> <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Effort previously encompassed in Weapon System Integration Major Thrust - Perform assessment of current MM III LCCs and LFs - Support the ECCT to assess potential GBSD LS concepts <p>FY 2017 Base Plans:</p> <ul style="list-style-type: none"> - Continue to assess the current MM III LS to determine the extent of degradation and evaluate for future upgrade or replacement - Continue efforts to mature LS refurbishment and modernization concepts and define requirements through on-site assessments and analyses for operational and test facilities - Begin refurbishment of Vandenberg Air Force Base Launch Facility 26 for future GBSD testing <p>FY 2017 OCO Plans: N/A</p>					
	0.000	1.255	6.184	0.000	6.184
<p>Title: Weapon System Integration</p> <p>Description: Advance GBSD test activities, systems engineering activities, trade-studies, information technology, data management, systems modeling and simulation, analytical capabilities, and support development of the weapon system preliminary design.</p> <p>FY 2015 Accomplishments: N/A</p> <p>FY 2016 Plans:</p> <ul style="list-style-type: none"> - Advance GBSD data management, systems modeling and simulation, and analytical capabilities - Identify and assess an integrated GBSD weapon system to include areas where component consolidation may provide maintenance, security and performance advantages 					
	0.000	35.022	63.545	0.000	63.545

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Air Force **Date:** February 2016

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0605230F / <i>Ground Based Strategic Deterrent</i>
--	---

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
- Assess areas where flight systems, communications, and infrastructure may support fielding and transitioning the MM III to GBSD to meet capabilities requirements <i>FY 2017 Base Plans:</i> - 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, and data management capabilities to ensure weapon system design information is properly secured and information dissemination between contractors is protected - Continue to assess fielding requirements for FS, WSC2 and LS and appropriate timelines to transition from MM III to GBSD solution <i>FY 2017 OCO Plans:</i> N/A					
Accomplishments/Planned Programs Subtotals	0.000	75.166	113.919	0.000	113.919

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2015</u>	<u>FY 2016</u>	<u>FY 2017 Base</u>	<u>FY 2017 OCO</u>	<u>FY 2017 Total</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• RDTE:BA04:PE 0603851F: <i>Intercontinental Ballistic Missile - Dem/Val</i>	30.388	39.765	108.663	0.000	108.663	72.604	67.655	64.922	66.071	Continuing	Continuing
• RDTE:BA07:PE 0101213F: <i>Minuteman III Ops Equipment</i>	18.205	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Remarks

E. Acquisition Strategy

The objective of the GBSD program strategy is to deliver a full, integrated weapon system capability that meets Air Force Global Strike Command's requirements beginning in FY28. For the TMRR phase of this strategy, the Program Office will competitively award contracts in FY17. The objectives of TMRR for GBSD are: 1) to deliver a modular, integrated weapon system preliminary design and 2) mature technology and demonstrate performance of subsystem capabilities through prototyping, modeling, and simulation. The TMRR phase will include a System Requirements Review (SRR), a System Functional Review (SFR) and will culminate in a system Preliminary Design Review (PDR). The contract may also 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. The anticipated period of performance for the TMRR contracts will be from 2QFY17 to 2QFY20. After MS B approval, an Engineering and Manufacturing Development (EMD) contract will be competitively awarded in FY20.

UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Air Force **Date:** February 2016

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 / *Ground Based Strategic Deterrent*

F. Performance Metrics

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

UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Air Force **Date:** February 2016

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 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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			
Technology Maturation and Risk Reduction (TMRR) Contractor #1	C/TBD	TBD : TBD	-	0.000		0.000		27.523	May 2017	0.000		27.523	Continuing	Continuing	TBD
TMRR Contractor #2	C/TBD	TBD : TBD	-	0.000		0.000		27.523	May 2017	0.000		27.523	Continuing	Continuing	TBD
GBSD System Engineering and Integration	C/TBD	TBD : TBD	-	0.000		16.004	Jan 2016	27.715	Jan 2017	0.000		27.715	Continuing	Continuing	-
Subtotal			-	0.000		16.004		82.761		0.000		82.761	-	-	-

Support (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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			
Integration Support Contract	C/FFP	BAE : Hill AFB, UT	-	0.000		47.832	Oct 2015	17.863	Mar 2017	0.000		17.863	Continuing	Continuing	-
Federally Funded Research and Development Center/ University Affiliated Research Center Support	MIPR	Various* : Various*	-	0.000		6.494	Dec 2015	4.006	Jan 2017	0.000		4.006	Continuing	Continuing	-
Subtotal			-	0.000		54.326		21.869		0.000		21.869	-	-	-

Remarks
* Aerospace Corp, El Segundo, CA; Carnegie Mellon, Pittsburgh, PA; MITRE, Bedford, MA; Johns Hopkins Applied Physics Laboratory, Laurel, MD

Test and Evaluation (\$ in Millions)				FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 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			
GBSD Test and Assessments	Various	TBD : TBD	-	0.000		3.293	Feb 2016	5.493	Jan 2017	0.000		5.493	Continuing	Continuing	TBD
Subtotal			-	0.000		3.293		5.493		0.000		5.493	-	-	-

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Air Force		Date: February 2016
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>

	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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 (Mar 2016)					████																							
TMRR Phase													██															
PDR (May 2019)																	████											
Milestone B (June 2020)																					████							
EMD Phase																					██							

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Air Force		Date: February 2016
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
Material Solution Analysis Phase	1	2015	2	2016
Milestone A (Mar 2016)	2	2016	2	2016
TMRR Phase	3	2016	2	2020
PDR (May 2019)	3	2019	3	2019
Milestone B (June 2020)	3	2020	3	2020
EMD Phase	3	2020	4	2021