

# UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force										Date: February 2019		
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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
Total Program Element	252.633	221.536	414.441	570.373	0.000	570.373	1,527.545	2,540.300	3,039.900	3,078.800	10,328.079	21,973.607
641025: GROUND BASED STRATEGIC DETERRENT (GBSD)	252.633	221.536	414.441	570.373	0.000	570.373	1,527.545	2,540.300	3,039.900	3,078.800	10,328.079	21,973.607
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 Minuteman III (MM III) Intercontinental Ballistic Missile (ICBM) weapon system. The GBSD program will deliver a fully integrated weapon system beginning in FY29 to close key capability gaps and vulnerabilities identified in the GBSD Capabilities Based Assessment, GBSD Capabilities Development Document, and the GBSD Analysis of Alternatives. GBSD will also mitigate ground-based deterrent degradation due to MM III component age-out and attrition.												
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. This program includes any needed nuclear surety and certification and system vulnerability assessments. The major activities in the GBSD program include 1) government system engineering, analytics, and test capability development; 2) air vehicle equipment risk reduction; 3) command & launch risk reduction; 4) launch systems risk reduction; and 5) weapon system integration risk reduction. Government systems engineering investments include development of a model based systems engineering (MBSE), integration, test software, product life-cycle management framework, and modernization of existing system engineering labs and infrastructure. Air vehicle equipment is an integrated missile stack which includes the propulsion, post-boost, guidance, and re-entry systems sub-components. Command & launch 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. Launch systems include launch control center, launch facility restoration, modernization of real property, and structures and associated ground mechanical systems. Weapon system integration risk reduction includes non-proprietary open systems architecture with well-defined interfaces and a modular design at the weapon system level to allow future modification and technology insertion. Major sub-system support systems include operator and maintenance trainer hardware and software, security system architecture, and transport support equipment.												
This program element includes necessary civilian pay expenses required to manage, execute, and deliver GBSD weapon system capability. The use of such program funds is in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605833F, and 0605898F.												

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As directed in the FY 2018 NDAA, Sec 825, amendment to PL 114-92 FY 2016 NDAA, Sec 828 Penalty for Cost Overruns, the FY 2018 Air Force penalty total is \$14.373M. The calculated percentage reduction to each research, development, test and evaluation and procurement account will be allocated proportionally from all programs, projects, or activities under such account.

This effort 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.

<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>
Previous President's Budget	215.721	345.041	570.373	0.000	570.373
Current President's Budget	221.536	414.441	570.373	0.000	570.373
Total Adjustments	5.815	69.400	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	69.400			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	10.000	0.000			
• SBIR/STTR Transfer	-4.185	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** 641025: *GROUND BASED STRATEGIC DETERRENT (GBSD)*

Congressional Add: *GBSD*

Congressional Add Subtotals for Project: 641025

Congressional Add Totals for all Projects

<b>FY 2018</b>	<b>FY 2019</b>
0.000	69.400
0.000	69.400
0.000	69.400

**Change Summary Explanation**

FY 2018 funding reflects a below threshold reprogramming of \$10.000 million from PE 0101125F and PE 0604933F and an Federally Funded Research and Development Center (FFRDC) adjustment of \$4.185 million.

FY 2019 funding reflects a Congressional add of \$69.400 million for "program increase- unfunded requirement."

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020 Base</b>	<b>FY 2020 OCO</b>	<b>FY 2020 Total</b>
<b>Title:</b> Technology Maturation Risk Reduction	221.536	345.041	461.705	-	461.705

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
<p><b>Description:</b> The objectives of TMRR for GBSD are 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.</p> <p><b>FY 2019 Plans:</b></p> <ul style="list-style-type: none"><li>• Complete System Functional Review, cost capability trade studies, and validate Capability Development Document.</li><li>• Use MBSE approach to document and mature design decisions, and develop a strategy to own the technical baseline including data, personnel, analytical tools and information systems infrastructure, and technical processes.</li><li>• Expand the TMRR analytic environment and labs to enable full execution of the program's capability to own the technical baseline throughout the program life cycle.</li><li>• Modify and expand GBSD workspace infrastructure to accommodate a growing workforce.</li><li>• Continue to examine and mature air vehicle equipment, command &amp; launch, cybersecurity, and associated ground technologies, define requirements and modular architectures through trade studies, prototyping, demonstration, and analysis.</li><li>• Continue to mature and refine software integration and modular system architecture requirements.</li><li>• Continue to mature the assessment of the current MM III launch systems 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.</li><li>• Continue to mature the weapon system preliminary design and reduce integration risk by conducting trade studies, system engineering, test activities, and system modeling and simulation.</li><li>• Continue to develop analytical, information technology, and data management capabilities to ensure weapon system design information dissemination between contractors.</li><li>• Continue to assess fielding requirements for air vehicle equipment, command &amp; launch, launch systems, operator and maintenance trainer hardware and software, security system architecture, and transport sub-systems and appropriate timelines to transition from MM III to GBSD solution.</li><li>• 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, TMRR prime contractors, support contractors, and FFRDC/UARCs.</li></ul>						

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
<ul style="list-style-type: none"><li>• Prepare for Request for Proposal Decision Point by further planning for EMD and refining the acquisition strategy based on TMRR assessments.</li><li>• Increase FFRDC support in order to maintain ownership of the technical baseline in EMD.</li><li>• Continue to refine Security Classification Guide, update impacts, and implement updates and changes through all Government and contractor programmatic activities.</li></ul> <p><b>FY 2020 Base Plans:</b></p> <ul style="list-style-type: none"><li>• Modify, modernize, and expand the analytic environment and labs to support the conclusion of TMRR and the transition to EMD activities to enable full execution of the program's capability to own the technical baseline throughout the program life cycle.</li><li>• Continue to examine and mature air vehicle equipment, command &amp; launch, cybersecurity, operator and maintenance trainer hardware and software, security system architecture, transport sub-systems, and associated ground technologies, define requirements and modular architectures through trade studies, prototyping, demonstration, and analysis.</li><li>• Continue to mature and refine test software, software development integration and modular system architecture requirements, and product life-cycle management.</li><li>• Continue to mature the assessment of the current MM III launch systems to determine, through on-site assessments and analysis, the extent of degradation and evaluate for future upgrade, replacement, preparation, and modernization of operational and test facilities.</li><li>• Continue to mature the weapon system preliminary design and reduce integration risk by conducting trade studies, system engineering, test activities, and system modeling and simulation.</li><li>• Continue to further develop analytical, information technology, and data management capabilities to ensure weapon system design information dissemination between contractors.</li><li>• Implement information systems and information technology design to support TMRR closure.</li><li>• Modify and expand GBSD workspace infrastructure to accommodate a growing workforce.</li><li>• Continue to assess fielding requirements for air vehicle equipment, command &amp; launch, and launch systems and appropriate timelines to transition from MM III to GBSD solution.</li><li>• Conduct planning for the use of MBSE tools during Operations and Sustainment phase in order to transform ICBM sustainment and supply chain management.</li><li>• Complete Software Specification Review, 9th Quarter Technical Interchange Meeting, and the Preliminary Design Review.</li><li>• Continue to develop system safety and nuclear surety.</li></ul>						

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
<ul style="list-style-type: none"><li>• Expand and develop analytical, information technology, test, and data management capabilities to ensure access to weapon system design information is properly controlled and securely transmitted between government and contractors.</li><li>• Increase FFRDC support to maintain the ability to own the technical baseline.</li><li>• Prepare to execute based on TMRR assessments by conducting mock source selection activities and exercising the computer and analytic environment for source selection evaluation activities.</li><li>• Conduct source selection to competitively award and execute EMD contract.</li><li>• Continue to refine Security Classification Guide, update impacts, and implement updates and changes through all Government and contractor programmatic activities.</li></ul> <p><b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Funding increase due to ramp-up and completion of Preliminary Design Review and preparation for EMD phase in FY 2020.</p>						
<p><b>Title:</b> Engineering &amp; Manufacturing Development</p> <p><b>Description:</b> The objectives of EMD for GBSD are as follows: 1) advance GBSD major activities, systems engineering activities, information technology, data management, analytical capabilities and deliver a flexible, integrated weapon system critical design, 2) prototype and test mature technologies related to the major activities and demonstrate performance of sub-system and system capabilities through prototyping and testing and 3) engage in rapid prototyping events to mature future design increments.</p> <p><b>FY 2019 Plans:</b> N/A</p> <p><b>FY 2020 Base Plans:</b></p> <ul style="list-style-type: none"><li>• Modify, modernize, and expand the analytic environment and labs to support EMD activities to enable full execution of the program's capability to own the technical baseline throughout the program life cycle.</li><li>• Continue to examine and mature air vehicle equipment, command &amp; launch, cybersecurity, operator and maintenance trainer hardware and software, security system architecture, transport sub-systems, and associated ground technologies, define requirements and modular architectures through trade studies, prototyping, demonstration, and analysis.</li><li>• Continue to mature and refine test software, software development integration and modular system architecture requirements, and product life-cycle management.</li></ul>		0.000	0.000	108.668	0.000	108.668

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
<ul style="list-style-type: none"><li>• Continue to mature the assessment of the current MM III launch systems 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.</li><li>• Continue to mature the weapon system by conducting trade studies, system engineering, test activities, and system modeling and simulation.</li><li>• Continue to further develop analytical, information technology, and data management capabilities.</li><li>• Implement information systems and information technology design to support EMD execution.</li><li>• Modify and expand GBSD workspace infrastructure to accommodate a growing workforce.</li><li>• Continue to assess fielding requirements for air vehicle equipment, command &amp; launch, and launch systems and appropriate timelines to transition from MM III to GBSD solution.</li><li>• Conduct planning for the use of MBSE tools during Operations and Sustainment phase in order to transform ICBM sustainment and supply chain management.</li><li>• Continue to develop system safety and nuclear surety.</li><li>• Expand and develop analytical, information technology, test, and data management capabilities to ensure access to weapon system design information is properly controlled and securely transmitted between government and contractors.</li><li>• Increase FFRDC support to maintain the ability to own the technical baseline in EMD.</li><li>• Conduct source selection to competitively award and execute EMD contract.</li><li>• Continue to refine Security Classification Guide, update impacts, and implement updates and changes through all Government and contractor programmatic activities.</li></ul> <p><b>FY 2020 OCO Plans:</b> No OCO requirements</p> <p><b>FY 2019 to FY 2020 Increase/Decrease Statement:</b> Funding increase due to ramp-up and completion of Preliminary Design Review and preparation for EMD phase in FY 2020.</p>						
Accomplishments/Planned Programs Subtotals		221.536	345.041	570.373	0.000	570.373
		FY 2018	FY 2019			
Congressional Add: GBSD		0.000	69.400			

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	<b>FY 2018</b>	<b>FY 2019</b>
<b><i>FY 2018 Accomplishments:</i></b> N/A		
<b><i>FY 2019 Plans:</i></b> • Further modify and expand GBSD workspace infrastructure to accommodate a growing workforce. • Continue to mature the assessment of the current MM III test launch facilities and begin modifications to prepare for EMD. • Continue to mature the reentry vehicle preliminary design and reduce integration risk. • Continue to refine Security Classification Guide, update impacts, and implement updates and changes through all Government and contractor programmatic activities.		
<b>Congressional Adds Subtotals</b>	0.000	69.400

**D. Other Program Funding Summary (\$ in Millions)**

<u>Line Item</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u> <u>Base</u>	<u>FY 2020</u> <u>OCO</u>	<u>FY 2020</u> <u>Total</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• RDTE 04 PE 0603851F: <i>Intercontinental Ballistic Missile - Dem/Val</i>	27.424	32.356	44.109	-	44.109	65.582	66.944	68.165	9.896	Continuing	Continuing
• MILCON PE 0101233F: <i>GBSD SQUADRONS</i>	0.000	0.000	108.000	-	108.000	0.000	0.000	0.000	0.000	0.000	108.000
• MILCON PE 0605230F: <i>Ground Based Strategic Deterrent (GBSD)</i>	-	-	0.000	-	0.000	151.000	140.000	117.500	74.309	127.401	610.210

**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 Capability Development Document requirements beginning in FY29. For the TMRR phase of this strategy, the Program Office competitively awarded 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, System Functional Review, Software Specification Review, and will culminate in a system Preliminary Design Review. The contractor may elect to perform additional risk reduction testing on select components to further evolve the Preliminary Design Review design during TMRR to lower component integration risk during EMD. The period of performance for the TMRR contracts is 4QFY17 to 4QFY20. After Milestone B approval, EMD contract will be competitively awarded in FY20 and EMD execution will begin.

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<b>F. Performance Metrics</b> 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 2020 Air Force												Date: February 2019			
Appropriation/Budget Activity 3600 / 4						R-1 Program Element (Number/Name) PE 0605230F / Ground Based Strategic Deterrent				Project (Number/Name) 641025 / GROUND BASED STRATEGIC DETERRENT (GBSD)					
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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 TMRR Contractor #1	C/CPFF	Boeing Def, Space, & Sec : Huntsville, AL	54.206	55.611	Nov 2017	116.168	Oct 2018	123.175	Oct 2019	-		123.175	0.000	349.160	349.160
GBSD TMRR Contractor #2	C/CPFF	Northrup Grumman Sys Corp : El Segundo, CA	61.917	67.965	Nov 2017	110.315	Oct 2018	88.388	Oct 2019	-		88.388	0.000	328.585	328.585
GBSD EMD Contract	C/Various	TBD : TBD	0.000	-		-		108.668	Jul 2020	-		108.668	15,829.150	15,937.818	-
GBSD Security Classification Guide Compliance	Various	Various : Various	0.000	-		43.979	Oct 2018	42.414	Oct 2019	-		42.414	0.000	86.393	86.393
Subtotal			116.123	123.576		270.462		362.645		-		362.645	15,829.150	16,701.956	N/A
Remarks															
The GBSD Security Classification Guide (SCG) was implemented in February 2018. Product Development "Prior Years" total increase due to receipt of FY17 reprogrammed funds.															
Support (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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	C/FFP	BAE : Hill AFB, UT	49.013	27.462	Oct 2017	24.570	Oct 2018	31.980	Oct 2019	-		31.980	88.862	221.887	-
GBSD Electronic Parts Strategy and Commonality	MIPR	Naval Surface Warfare Center Crane : Crane, IN	7.074	1.669	Dec 2017	3.500	Nov 2018	4.000	Nov 2019	-		4.000	16.800	33.043	-
GBSD System Engineering and Acquisition Support	MIPR	Aerospace Corporation : El Segundo, CA	3.812	4.424	Oct 2017	5.688	Nov 2018	6.318	Nov 2019	-		6.318	27.225	47.467	-
GBSD Acquisition Support and System Engineering	MIPR	MITRE : Bedford, MA	4.604	5.298	Oct 2017	6.722	Nov 2018	6.922	Nov 2019	-		6.922	23.172	46.718	-
GBSD Technical Area Task Support (TMRR)	MIPR	Air Force Global Strike Command : Barksdale AFB, LA	2.950	-		-		-		-		-	0.000	2.950	-

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<b>Support (\$ in Millions)</b>				<b>FY 2018</b>		<b>FY 2019</b>		<b>FY 2020 Base</b>		<b>FY 2020 OCO</b>		<b>FY 2020 Total</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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
GBSD Software Engineering Institute	MIPR	Carnegie Mellon : Pittsburgh, PA	1.601	-		1.400	Nov 2018	1.402	Nov 2019	-		1.402	8.911	13.314	-
GBSD Reentry Systems (RS) FFRDC Support and Analysis	MIPR	Sandia National Laboratories : Various	8.443	3.870	Nov 2017	9.054	Oct 2018	7.750	Oct 2019	-		7.750	41.000	70.117	-
GBSD RS FFRDC Analysis and Acquisition Intelligence Support	MIPR	MIT Lincoln Labs : Lexington, MA	0.580	0.848	Oct 2017	1.775	Oct 2018	1.026	Oct 2019	-		1.026	28.125	32.354	-
GBSD Operations Research Analyst Support	C/FFP	Tecolote Research : Hill AFB, UT	0.000	0.239	Jun 2018	1.904	Oct 2018	2.230	Oct 2019	-		2.230	6.679	11.052	-
GBSD Surety and Certification Engineering Services	C/CPFF	Booz Allen Hamilton : Kirtland AFB, NM	2.610	1.641	Apr 2018	3.930	Nov 2018	1.246	Nov 2019	-		1.246	0.794	10.221	-
GBSD OASIS A&AS Support	C/FPIF	Peerless : Hill AFB, UT	0.000	0.025	Oct 2018	0.943	Nov 2018	1.144	Nov 2019	-		1.144	2.179	4.291	-
GBSD Temporary Facility	C/FFP	BOXX Modular : Hill AFB, UT	0.000	3.696	Jul 2018	1.585	Oct 2018	-		-		-	0.000	5.281	-
GBSD Technical Design Agent for NC2 Codes/ Crypto	MIPR	Sandia National Labs : Various	0.000	-		-		8.000	Nov 2019	-		8.000	18.000	26.000	-
GBSD Joint Test Assembly Encryption	MIPR	Sandia National Labs : Various	0.000	-		-		3.000	Nov 2019	-		3.000	6.000	9.000	-
GBSD Joint Environment Test Unit / Joint Test Assembly National Nuclear Security Agency Cost Share	MIPR	Sandia National Labs : Various	0.000	-		-		2.000	Nov 2019	-		2.000	5.000	7.000	-
GBSD Enterprise Support	C/Various	Various : Various	0.952	0.203	Oct 2017	0.048	Oct 2018	0.050	Oct 2019	-		0.050	897.153	898.406	-
<b>Subtotal</b>			81.639	49.375		61.119		77.068		-		77.068	1,169.900	1,439.101	N/A
<b>Remarks</b> GBSD is spearheading the Owning The Technical Baseline (OTTB) approach for system acquisition. This approach utilizes additional support efforts that would typically be performed by a Prime Contractor. GBSD Enterprise Support was labelled GBSD EMD Support in FY19 PB.															

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<b>Support (\$ in Millions)</b>				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
<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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
GBSD Electronic Parts Strategy and Commonality, GBSD System Engineering and Acquisition Support, and GBSD Acquisition Support and System Engineering have increased STE since the FY19 PB. GBSD Reentry Systems (RS) FFRDC Support and Analysis will continue into EMD. GBSD Codes and Crypto designs and develops a certified Nuclear Command and Control cryptographic device using a Technical Design Agent (TDA).															
<b>Test and Evaluation (\$ in Millions)</b>				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total			
<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>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
GBSD Cybersecurity, Test and Evaluation Framework, Codes/Crypto	MIPR	Johns Hopkins University-Applied Physics Lab : Laurel, MD	6.776	5.373	Jan 2018	7.436	Oct 2018	11.352	Oct 2019	-		11.352	10.610	41.547	-
GBSD Integrated Test Team	PO	Arnold Engineering Development Complex : Arnold AFB, TN	2.340	2.789	Oct 2017	5.661	Oct 2018	7.462	Oct 2019	-		7.462	6.137	24.389	-
GBSD Independent Operational Test Agency	PO	Air Force Operational Test and Evaluation Center : Hill AFB, UT	0.773	0.502	Jan 2018	1.188	Oct 2018	1.990	Oct 2019	-		1.990	214.887	219.340	-
GBSD Integrated Threat Analysis and Simulation Environment (ITASE) 1	MIPR	DIA-Missile and Space Intelligence Center : Redstone Arsenal, AL	2.400	2.282	Jan 2018	4.779	Oct 2018	5.144	Nov 2019	-		5.144	0.055	14.660	-
GBSD ITASE 2	MIPR	DIA-National Air and Space Intelligence Center : Fairborn, OH	0.241	0.701	Nov 2017	0.948	Nov 2018	0.765	Nov 2019	-		0.765	0.265	2.920	-
GBSD Nuclear Dust and Debris Environments Study	MIPR	Air Force Research Lab : Wright Patterson AFB, OH	0.629	0.455	Dec 2017	1.200	Oct 2018	0.400	Nov 2019	-		0.400	1.106	3.790	-
GBSD RS Test and Advanced Technology Interface (TMRR)	MIPR	Sandia National Labs : Various	1.095	0.855	Jan 2017	0.275	Oct 2018	-		-		-	0.000	2.225	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force												Date: February 2019			
Appropriation/Budget Activity 3600 / 4						R-1 Program Element (Number/Name) PE 0605230F / Ground Based Strategic Deterrent				Project (Number/Name) 641025 / GROUND BASED STRATEGIC DETERRENT (GBSD)					
Test and Evaluation (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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 Defense Accelerator (TMRR)	MIPR	Army Research Lab : Adelphi, MD	1.283	-		-		-		-		-	0.000	1.283	-
GBSD Launch Systems LF-26 (TMRR)	TBD	Various : Various	0.000	0.010	Jul 2018	3.990	Jan 2019	3.010	Oct 2019	-		3.010	0.000	7.010	-
GBSD Software Support	PO	309th SMXG : Hill AFB, UT	0.444	0.935	Jan 2018	1.260	Oct 2018	1.320	Oct 2019	-		1.320	2.708	6.667	-
GBSD Test Vehicles	Various	Various : Various	0.000	-		-		4.000	Jan 2020	-		4.000	134.000	138.000	-
GBSD Instrument Testing	MIPR	Aerospace Corporation : El Segundo, CA	0.000	-		-		7.600	Nov 2019	-		7.600	5.500	13.100	-
GBSD Booster Ground Test	MIPR	Air Force Research Labs : Edwards AFB, CA	0.000	-		-		4.300	Nov 2019	-		4.300	3.100	7.400	-
GBSD Guidance, Navigation, and Control Instruments for Developmental Testing	TBD	TBD : Various	0.000	-		-		21.600	Nov 2019	-		21.600	30.800	52.400	-
GBSD / Missile Defense Agency Silo Fly-out Modelling / Simulation Development	MIPR	Various : Various	0.000	-		-		5.500	Nov 2019	-		5.500	14.000	19.500	-
GBSD Reentry System / Reentry Vehicle Modelling / Simulation Environment Development	MIPR	DIA Air & Space Intel : Fairborn, OH	0.000	-		-		2.000	Nov 2019	-		2.000	4.000	6.000	-
GBSD Enterprise Test and Assessments	C/Various	Various : Various	3.407	0.909	Nov 2017	-		-		-		-	2,580.232	2,584.548	-
Subtotal			19.388	14.811		26.737		76.443		-		76.443	3,007.400	3,144.779	N/A
Remarks GBSD Independent Operational Test Agency includes planning and design costs for TMRR and EMD. Operational Test costs have been included in the GBSD Enterprise Test and Assessment line item. GBSD Enterprise Test and Assessments was labelled GBSD EMD Test Support in FY19 PB. GBSD Cybersecurity, Test and Evaluation Framework, Codes/Crypto will continue into EMD.															

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force												Date: February 2019			
Appropriation/Budget Activity 3600 / 4						R-1 Program Element (Number/Name) PE 0605230F / Ground Based Strategic Deterrent				Project (Number/Name) 641025 / GROUND BASED STRATEGIC DETERRENT (GBSD)					
Management Services (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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	1.024	1.363	Oct 2017	1.066	Oct 2018	1.055	Oct 2019	-		1.055	93.339	97.847	-
GBSD Integration Support Contract	C/FFP	BAE : Hill AFB, UT	26.391	14.787	Oct 2017	13.230	Oct 2018	17.220	Oct 2019	-		17.220	0.000	71.628	-
GBSD Electronics Parts Strategy and Commonality	C/Various	Naval Surface Warfare Center : Crane, IN	3.032	0.715	Dec 2017	1.500	Nov 2018	1.000	Nov 2019	-		1.000	4.200	10.447	-
GBSD System Engineering and Acquisition Support	C/Various	Aerospace Corporation : El Segundo, CA	4.660	5.407	Oct 2017	6.952	Nov 2018	7.722	Nov 2019	-		7.722	33.276	58.017	-
GBSD IS/IT Support	C/Various	Various : Various	0.376	11.502	Dec 2017	27.100	Dec 2018	9.000	Oct 2019	-		9.000	0.000	47.978	-
GBSD Civilian Manpower	Various	US Gov Civilians : Hill AFB, UT	0.000	-		4.640	Dec 2018	13.597	Oct 2019	-		13.597	41.914	60.151	-
GBSD Environment Assessments	MIPR	Various : Various	0.000	-		1.635	Dec 2018	4.623	Dec 2019	-		4.623	5.742	12.000	-
GBSD Enterprise Infrastructure	C/Various	Various : Various	0.000	-		-		-		-		-	329.703	329.703	-
Subtotal			35.483	33.774		56.123		54.217		-		54.217	508.174	687.771	N/A
Remarks															
GBSD is spearheading the Owning The Technical Baseline (OTTB) approach for system acquisition. This approach utilizes additional support and management services that would typically be performed by a Prime Contractor. Additional line items were created in FY20 to capture the breakout of management services in line with the OTTB strategy. GBSD Integration Support Contract, GBSD Electronic Parts Strategy and Commonality, and GBSD System Engineering and Acquisition Support have increased STE since the FY19 PB.															
GBSD IS/IT Support spiked in FY19 due to computer equipment and IT infrastructure purchases that were exclusive to FY19.															
GBSD Civilian Manpower includes the hiring of 128 new civilian personnel in FY19 and FY20.															
GBSD Environment Assessments funding spikes in FY20 to address reporting requirements related to National Environmental Policy Act. Reporting for test facilities begins in FY19 and operational facilities begins in FY20.															
			Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			252.633	221.536		414.441		570.373		-		570.373	20,514.624	21,973.607	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force												Date: February 2019			
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 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	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
Ground Based Strategic Deterrent (GBSD)																												
TMRR Phase																												
Preliminary Design Review (Jun 2020)																												
Milestone B (Jul 2020)																												
EMD Phase																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Air Force			Date: February 2019
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0605230F / Ground Based Strategic Deterrent	Project (Number/Name) 641025 / GROUND BASED STRATEGIC DETERRENT (GBSD)	

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Ground Based Strategic Deterrent (GBSD)				
TMRR Phase	1	2018	4	2020
Preliminary Design Review (Jun 2020)	3	2020	3	2020
Milestone B (Jul 2020)	4	2020	4	2020
EMD Phase	4	2020	4	2024