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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force										Date: February 2018		
Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development					R-1 Program Element (Number/Name) PE 0101328F I ICBM Reentry Vehicles							
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	18.412	0.000	18.412	75.571	112.959	74.868	81.905	Continuing	Continuing
674920: IW1/Mk21A	-	0.000	0.000	18.412	0.000	18.412	75.571	112.959	74.868	81.905	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 7, PE 0101328F, project 674920, Mk21A Technology Maturation Risk Reduction, is a new start.

A. Mission Description and Budget Item Justification

The Mk21A Reentry Vehicle (RV) program will design, develop, produce and deploy an integrated RV capable of delivering the Interoperable Warhead 1 (IW-1) nuclear warhead when released from the Ground Based Strategic Deterrent (GBSD) Intercontinental Ballistic Missile (ICBM). The major activities in the Technology Maturation and Risk Reduction (TMRR) phase of the Mk21A RV program include 1) Government system engineering, analytics, and test capability development, 2) RV Risk Reduction, and 3) Weapon System Integration Risk Reduction. Reentry vehicle components include a high velocity nosetip, high impulse transducer, fuze, aeroshell forward section, body section and rear cover, radio frequency subsystem with antennas, RV spin-up system, inflight disconnect cable and other electrical cables. The MK21A program will include prime contractor development of applicable support equipment, data, flight test hardware, infrastructure, training materials while examining and mitigating weapon system integration risks, and any needed nuclear surety and certification and system vulnerability assessments.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Mk21A RV weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605833F, and 0605898F.

BA7 - 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 current or subsequent fiscal year.

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Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development		R-1 Program Element (Number/Name) PE 0101328F I ICBM Reentry Vehicles				
B. Program Change Summary (\$ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
Previous President's Budget	0.000	0.000	0.000	0.000	0.000	
Current President's Budget	0.000	0.000	18.412	0.000	18.412	
Total Adjustments	0.000	0.000	18.412	0.000	18.412	
• 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	18.412	0.000	18.412	
Change Summary Explanation FY 2019 funding increased to support Mk21A Reentry Vehicle risk reduction activities.						
C. Accomplishments/Planned Programs (\$ in Millions)				FY 2017	FY 2018	FY 2019
Title: Mk21A Technology Maturation Risk Reduction				-	0.000	18.412
Description: The objectives of TMRR for the Mk21A RV program are as follows: 1) to deliver preliminary designs to address evolving threats; 2) incorporate a modular open systems architecture; 3) perform cost capability analysis to aid with validation of user requirements; 4) demonstrate performance of weapon system capabilities through prototyping, modeling, simulation, and testing.						
FY 2018 Plans: None						
FY 2019 Plans: • Complete Milestone A • Award TMRR contract(s) • Mature reentry vehicle preliminary design • Develop ground and flight test plans for prototypes • Begin development of prototype test vehicles						
FY 2018 to FY 2019 Increase/Decrease Statement:						

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C. Accomplishments/Planned Programs (\$ in Millions)										FY 2017	FY 2018	FY 2019
Mk21A RV is a new start in 2019.												
Accomplishments/Planned Programs Subtotals										-	0.000	18.412

D. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
• RDTE 04 0605230F/641025: <i>Ground Based Strategic Deterrent</i>	109.260	215.721	345.041	-	345.041	570.373	1,527.545	2,539.060	3,018.653	Continuing	Continuing	
• RDTE 05 0604933F/655082: <i>Fuze Modernization</i>	172.946	178.991	172.902	-	172.902	161.199	132.926	60.016	2.035	Continuing	Continuing	
• RDTE 04 060351F/641022: <i>Dem/Val - RVAP</i>	64.740	7.085	17.920	-	17.920	19.439	19.776	20.186	20.554	Continuing	Continuing	

Remarks

E. Acquisition Strategy

The Mk21A RV program strategy is to deliver an integrated RV capable of delivering the IW1 to target beginning in FY30. For the Technology Maturation and Risk Reduction (TMRR) phase, the Program Office will competitively award two contracts in FY19. The objectives of TMRR for Mk21A are as follows: 1) to deliver preliminary designs to address evolving threats; 2) incorporate a modular open systems architecture; 3) perform cost capability analysis to aid with validation of user requirements; 4) demonstrate performance of weapon system capabilities through prototyping, modeling, simulation, and testing.

The TMRR phase will include a System Requirements Review, System Functional Review, Preliminary Design Review, and Prototype RV Demonstration. The contractors may elect to perform additional risk reduction testing on select components to further evolve the 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 4QFY19 to 4QFY22. After MS B approval, EMD contract will be competitively awarded as early as FY22.

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 2019 Air Force												Date: February 2018			
Appropriation/Budget Activity 3600 / 7						R-1 Program Element (Number/Name) PE 0101328F / ICBM Reentry Vehicles				Project (Number/Name) 674920 / IW1/Mk21A					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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
Mk21A TMRR Contractor	TBD	TBD : TBD	-	-		-		13.596	Aug 2019	-		13.596	Continuing	Continuing	-
Subtotal			-	-		-		13.596		-		13.596	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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
Mk21A/GBSD Integration Support	TBD	TBD : TBD	-	-		-		0.817	Oct 2018	-		0.817	Continuing	Continuing	-
Mk21A/Fuze Integration Support	TBD	TBD : TBD	-	-		-		0.336	Oct 2018	-		0.336	Continuing	Continuing	-
Subtotal			-	-		-		1.153		-		1.153	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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 Guidance System T&E	C/CPAF	TBD : TBD	-	-		-		0.077	Oct 2018	-		0.077	Continuing	Continuing	-
Subtotal			-	-		-		0.077		-		0.077	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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
Mk21A PMA	TBD	TBD : TBD	-	-		-		3.586	Oct 2018	-		3.586	Continuing	Continuing	-
Subtotal			-	-		-		3.586		-		3.586	Continuing	Continuing	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	-		0.000		18.412		-		18.412	Continuing	Continuing	N/A

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	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract	
Remarks										

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Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force	Date: February 2018
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0101328F / ICBM Reentry Vehicles	Project (Number/Name) 674920 / IW1/Mk21A
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	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	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
Mk21A Reentry Vehicle (RV)																												
Materiel Development Decision (Sep 2017)																												
Milestone A (Oct 2018)																												
TMRR Phase																												
PDR (Jan 2021)																												
Milestone B (Jul 2022)																												
EMD Phase																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force			Date: February 2018
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Mk21A Reentry Vehicle (RV)</i>				
Materiel Development Decision (Sep 2017)	4	2017	4	2017
Milestone A (Oct 2018)	1	2019	1	2019
TMRR Phase	1	2019	3	2022
PDR (Jan 2021)	2	2021	2	2021
Milestone B (Jul 2022)	4	2022	4	2022
EMD Phase	4	2022	3	2023

Note

EMD Phase continues beyond FY2023 to FY2027