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Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force **Date:** April 2022

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 0603851F / <i>Intercontinental Ballistic Missile - Dem/Val</i>
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COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
Total Program Element	-	34.755	76.621	46.432	0.000	46.432	16.717	28.424	7.821	7.995	Continuing	Continuing
641020: <i>ICBM Guidance Applications</i>	-	18.875	8.022	4.137	0.000	4.137	0.000	0.000	0.000	0.000	Continuing	Continuing
641021: <i>ICBM Propulsion Applications</i>	-	5.262	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
641022: <i>ICBM Reentry Vehicle Applications</i>	-	10.456	45.166	13.042	0.000	13.042	0.000	0.000	0.000	0.000	Continuing	Continuing
644209: <i>Long Range Planning (LRP)</i>	-	0.162	23.433	29.253	0.000	29.253	16.717	28.424	7.821	7.995	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Intercontinental Ballistic Missile (ICBM) Demonstration/Validation (Dem/Val) program ensures a responsive design and development engineering infrastructure to address emerging issues and technology insertion/technology application on legacy and future ICBM, and other common strategic deterrent mission areas to develop enhanced multi-use capabilities. The ICBM Dem/Val program will provide technology maturation and risk reduction activities to support Minuteman (MM) III sustainment, MM III to Ground Based Strategic Deterrent (GBSD) transition, and future ICBM systems development. ICBM Dem/Val conducts advanced component development and prototyping to validate emerging strategic missile technologies and future upgrades to the ICBM. Efforts will identify methods to improve system performance, develop potential future Reentry Vehicle (RV) designs, mitigate evolving threats, reduce life cycle costs, develop/expand modeling/simulation and experimental platforms for weapon qualification activities, improve nuclear safety and surety, and ensure both viability and durability of strategic missile systems.

The ICBM Dem/Val program will develop key enabling engineering tools for the ICBM mission to include Models Based Systems Engineering (MBSE), test software, and modernization of existing analytical tools. This program will leverage modular system, open architecture and agile software development to build key enabling engineering tools and future upgrades to ICBMs.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F or 0605833F. In FY 2021 0.000M was expended for civilian pay expenses in this program element, and in FY 2022 0.000M is forecasted for civilian pay expenses in this program element.

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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force	Date: April 2022
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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 0603851F / <i>Intercontinental Ballistic Missile - Dem/Val</i>
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B. Program Change Summary (\$ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	32.899	49.621	0.000	0.000	0.000
Current President's Budget	34.755	76.621	46.432	0.000	46.432
Total Adjustments	1.856	27.000	46.432	0.000	46.432
• 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	3.000	0.000			
• SBIR/STTR Transfer	-1.144	0.000			
• Other Adjustments	0.000	27.000	46.432	0.000	46.432

Change Summary Explanation

FY2021 funding reflects a Small Business Innovation Research (SBIR) adjustment of \$1.144M and a incoming below-threshold reprogramming of \$3M.
 FY2022 funding reflects Congressional increase of \$27M for ICBM mission enhancements developed under AFGSC's Innovation Hub to meet national strategic and operational needs.
 The FY2022 President's Budget did not reflect the FY2023 through FY2026 funding. Therefore, an explanation of the change between the two budget positions for FY2023 cannot be made in a relevant manner.

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Air Force										Date: April 2022		
Appropriation/Budget Activity 3600 / 4					R-1 Program Element (Number/Name) PE 0603851F / <i>Intercontinental Ballistic Missile - Dem/Val</i>				Project (Number/Name) 641020 / <i>ICBM Guidance Applications</i>			
COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
641020: <i>ICBM Guidance Applications</i>	-	18.875	8.022	4.137	0.000	4.137	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Guidance Applications Program (GAP) ensures the development of strategic capability in response to the Nuclear Posture Review, recommendations of the United States Strategic Command (USSTRATCOM) Strategic Advisory Group, USSTRATCOM Commander Guidance, and the Defense Science Board Task Force on Nuclear Deterrence. The program conducts any necessary studies and assesses both legacy and future ICBM Guidance System technology applications. Efforts are focused on current and future requirements and technologies, reduced life cycle costs, and increased nuclear surety and safety. Activities leverage the efforts of the Science and Technology community and are coordinated with the Navy strategic applications program to enhance synergy and avoid duplication. Key elements include developing responsive technologies with common applications for future strategic guidance capabilities. This program also includes 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 weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F or 0605833F. In FY 2021 0.000M was expended for civilian pay expenses in this program element, and in FY 2022 0.000M is forecasted for civilian pay expenses in this program element.

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

	FY 2021	FY 2022	FY 2023
Title: Guidance Applications Program	18.875	8.022	4.137
Description: Develop and mature advanced technologies and concepts to support future requirements.			
FY 2022 Plans:			
<ul style="list-style-type: none"> • Continue development of a Micro-Electro Mechanical System for potential insertion into the Path Length Module. • Continue evaluating emerging strategic instrument technologies for future strategic grade gyros and accelerometers to ensure appropriate test capability development, to include gyrometer and nested Inertial Measuring Unit (IMU) development. • Rapidly respond to evolving warfighter priorities and emerging requirements. 			
FY 2023 Plans:			
<ul style="list-style-type: none"> • Continue development of a Micro-Electro Mechanical System for potential insertion into the Path Length Module. • Continue evaluating emerging strategic instrument technologies for future strategic grade gyros and accelerometers to ensure appropriate test capability development, to include gyrometer and nested IMU development. • Continue to assess and rapidly respond to evolving warfighter priorities and emerging requirements. 			
FY 2022 to FY 2023 Increase/Decrease Statement:			

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603851F / <i>Intercontinental Ballistic Mis sile - Dem/Val</i>	Project (Number/Name) 641020 / <i>ICBM Guidance Applications</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023
Funding decreased due to ramp down in Dem/Val funding required to continue emerging strategic instrument technology development.			
Accomplishments/Planned Programs Subtotals	18.875	8.022	4.137

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• RDTE 04 PE 0605230F: <i>GBSD</i>	1,397.485	2,553.541	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3,951.026
• RDTE 05 PE 0605238F: <i>Ground Based Strategic Deterrent EMD</i>	0.000	0.000	3,614.290	-	3,614.290	3,614.629	3,255.759	3,190.113	2,628.739	4,439.300	20,742.830

Remarks

D. Acquisition Strategy

Accomplish studies, analyses, concept development and engineering; efforts will be conducted using contracting strategies deemed most appropriate, generally using competitive contracts and/or other obligating documentation considered most appropriate by obligating and performing agencies involved. Current effort deliverables to include strategic grade guidance prototypes to support multiple ongoing Air Force initiatives.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force **Date:** April 2022

Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603851F / <i>Intercontinental Ballistic Missile - Dem/Val</i>	Project (Number/Name) 641020 / <i>ICBM Guidance Applications</i>
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Test and Evaluation (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
GAP Micro-Electronic Module System, Advanced Fuzing	Various	Various : Various	-	2.008	Jan 2021	1.000	Feb 2022	1.000	Dec 2022	-		1.000	Continuing	Continuing	-
GAP Emerging Strategic Instrument Technology (Sparrow)	Various	Various : Various	-	6.472	Jan 2021	6.560	Mar 2022	2.662	Dec 2022	-		2.662	Continuing	Continuing	-
GAP Rad Hard Non-Volatile Memory	Various	Various : Various	-	1.500	Jan 2021	-		-		-		-	Continuing	Continuing	-
GAP Rad Hard Advanced Microelectronics	Various	Various : Various	-	8.690	Jan 2021	-		-		-		-	Continuing	Continuing	-
Subtotal			-	18.670		7.560		3.662		-		3.662	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
GAP, Program Management Administrative Support Services	C/Various	Various : Various	-	0.205	Jan 2021	0.462	Apr 2022	0.475	Dec 2022	-		0.475	Continuing	Continuing	-
Subtotal			-	0.205		0.462		0.475		-		0.475	Continuing	Continuing	N/A

	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	18.875	8.022	4.137	-	4.137	Continuing	Continuing	N/A

Remarks
 Rad Hard Non-Volatile Memory transitioned to RVAP in FY22 to more accurately reflect potential future applicability of technology.
 Rad Hard Advanced Microelectronics transitioned to RVAP in FY21 to more accurately reflect potential future applicability of technology.

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603851F / <i>Intercontinental Ballistic Mis sile - Dem/Val</i>	Project (Number/Name) 641020 / <i>ICBM Guidance Applications</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
GAP				
GAP Micro-Electronic Module System, Advanced Fuzing	1	2021	4	2023
GAP Emerging Strategic Instrument Technology (Sparrow)	1	2021	2	2023
GAP Rad Hard Non-Volatile Memory	1	2021	4	2021
GAP Rad Hard Advanced Microelectronics	1	2021	3	2021

Note

Rad Hard Non-Volatile Memory transitioned to RVAP in FY22 to more accurately reflect potential future applicability of technology.
 Rad Hard Advanced Microelectronics transitioned to RVAP in FY21 to more accurately reflect potential future applicability of technology.

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Air Force										Date: April 2022		
Appropriation/Budget Activity 3600 / 4					R-1 Program Element (Number/Name) PE 0603851F / <i>Intercontinental Ballistic Missile - Dem/Val</i>				Project (Number/Name) 641021 / <i>ICBM Propulsion Applications</i>			
COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
641021: <i>ICBM Propulsion Applications</i>	-	5.262	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Propulsion Applications Program (PAP) develops and assesses strategic propulsion system technology applications for both legacy and future ICBM propulsion systems through projects exploring improvements and/or alternatives to current propulsion systems, conducting studies assessing application of new technologies to meet future common propulsion systems requirements, and assessing opportunities for applying common materials and technology between the ICBM, submarine-launched ballistic missile (SLBM) propulsion systems, and other rocket motor propulsion capabilities. Efforts are focused on current and future requirements and technologies, reduced life cycle costs, and increased nuclear surety, safety, certification and system vulnerability assessments.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F or 0605833F. In FY 2021 0.000M was expended for civilian pay expenses in this program element, and in FY 2022 0.000M is forecasted for civilian pay expenses in this program element.

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

	FY 2021	FY 2022	FY 2023
Title: Propulsion Applications Program	5.262	0.000	0.000
Description: Assess, develop, evaluate, and demonstrate common solid and liquid propulsion technology and manufacturing leading up to a static fire and test of strategic propulsion systems; develop capability and explore improvements to current and future propulsion systems; and support the research and development industrial base and critical infrastructure.			
FY 2022 Plans: N/A			
FY 2023 Plans: N/A			
FY 2022 to FY 2023 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	5.262	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603851F / <i>Intercontinental Ballistic Mis sile - Dem/Val</i>	Project (Number/Name) 641021 / <i>ICBM Propulsion Applications</i>

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u> <u>Base</u>	<u>FY 2023</u> <u>OCO</u>	<u>FY 2023</u> <u>Total</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• RDTE 04 PE 0605230F: <i>GBSD</i>	1,397.485	2,553.541	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3,951.026
• RDTE 05 PE 0605238F: <i>Ground Based Strategic Deterrent EMD</i>	0.000	0.000	3,614.290	-	3,614.290	3,614.629	3,255.759	3,190.113	2,628.739	4,439.300	20,742.830

Remarks

D. Acquisition Strategy

Studies, analyses, limited engineering, hardware development and/or testing will be accomplished; efforts will be conducted using contracting strategies deemed most appropriate, generally using competitive contracts and/or other obligating documentation considered most appropriate by obligating and performing agencies involved. Current effort deliverables include flight test demonstrations to support multiple studies.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force **Date:** April 2022

Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603851F / <i>Intercontinental Ballistic Mis sile - Dem/Val</i>	Project (Number/Name) 641021 / <i>ICBM Propulsion Applications</i>
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Test and Evaluation (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
Developmental Flight Test	Various	Various : Various	-	4.983	Jun 2021	-		-		-		-	0.000	4.983	-
Subtotal			-	4.983		-		-		-		-	0.000	4.983	N/A

Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
PAP Program Management Administration	Various	Various : Various	-	0.279	Jan 2021	-		-		-		-	0.000	0.279	-
Subtotal			-	0.279		-		-		-		-	0.000	0.279	N/A

			Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	5.262	-	-	-	-	0.000	5.262	N/A

Remarks
Developmental Flight Test efforts transitioned to LRP in FY22. Flight tests enable demonstration of technologies in relevant ICBM environments.

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603851F / <i>Intercontinental Ballistic Mis sile - Dem/Val</i>	Project (Number/Name) 641021 / <i>ICBM Propulsion Applications</i>

FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
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

PAP	
Developmental Flight Test	██████████

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603851F / <i>Intercontinental Ballistic Mis sile - Dem/Val</i>	Project (Number/Name) 641021 / <i>ICBM Propulsion Applications</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
PAP				
Developmental Flight Test	2	2021	4	2021

Note
Developmental Flight Test efforts transitioned to LRP in FY22. Flight tests enable demonstration of technologies in relevant ICBM environments.

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Air Force										Date: April 2022		
Appropriation/Budget Activity 3600 / 4					R-1 Program Element (Number/Name) PE 0603851F / <i>Intercontinental Ballistic Missile - Dem/Val</i>				Project (Number/Name) 641022 / <i>ICBM Reentry Vehicle Applications</i>			
COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
641022: <i>ICBM Reentry Vehicle Applications</i>	-	10.456	45.166	13.042	0.000	13.042	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Reentry Vehicle Applications Program (RVAP) ensures the ICBM force is equipped with the safest, most reliable, most survivable Reentry Systems, and explores options for common, multi-mission capabilities. The program enables a responsive engineering infrastructure by developing modeling/simulation, ground and flight test platforms to support Reentry System qualifications. The program ensures the availability of long-lead components and materials while identifying life cycle cost reduction methods. In addition, the program matures and tests advanced Reentry System technologies and designs to meet future requirements. This includes conducting any necessary studies and assessing technology applications relevant to Mk12A, Mk21, Mk21A and future ICBM Reentry Systems. The program leverages investments by the Science & Technology community and Navy reentry systems applications program. Testing may occur on a space available basis on Air Force and Navy Force Development Evaluation (FDE) flights.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F or 0605833F. In FY 2021 0.000M was expended for civilian pay expenses in this program element, and in FY 2022 0.000M is forecasted for civilian pay expenses in this program element.

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

	FY 2021	FY 2022	FY 2023
Title: Reentry Vehicle Applications Program	10.456	45.166	13.042
Description: Mature, evaluate, and test reentry system materials, technologies, and vehicles including modeling/simulation, and ground and flight test platforms for use in current and future strategic applications.			
FY 2022 Plans:			
<ul style="list-style-type: none"> • Continue new modeling/simulation and flight test platforms for future weapon qualification activities. • Continue study for future RV concepts. • Develop designs and production concepts for trusted radiation-hardened advanced microelectronics. • Design predictive health management tool based on engineering predictive analysis. • Conclude design of Virtual Environment Trainer for ICBM Platforms. • Initiate thermal protection systems (TPS) materials research. • Initiate digital engineering research. • Initiate Rad Hard Non-Volatile Memory research. • Initiate Rad Hard Radar research. 			

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603851F / <i>Intercontinental Ballistic Missile - Dem/Val</i>	Project (Number/Name) 641022 / <i>ICBM Reentry Vehicle Applications</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023
<ul style="list-style-type: none"> Continue the Joint Technology Demonstrator effort. Rapidly respond to evolving warfighter priorities and emerging requirements. <p>FY 2023 Plans:</p> <ul style="list-style-type: none"> Continue new modeling/simulation and flight test platforms for future weapon qualification activities. Continue study for future RV concepts. Design predictive health management tool based on engineering predictive analysis. Continue thermal protection systems (TPS) materials research. Continue digital engineering research. Continue the future system demonstrator effort (formerly Joint Technology Demonstrator). Continue Rad Hard Non-Volatile Memory research Continue Rad Hard Radar research Initiate navigation aids/instrumentation & sensor research Initiate ground testing & capabilities research Rapidly respond to evolving warfighter priorities and emerging requirements. <p>FY 2022 to FY 2023 Increase/Decrease Statement: Funding decreased due to completion in FY23 of Advanced Concept Studies, initial Radiation Hardened Advanced Microelectronics Studies, and Virtual Environment Trainer development.</p>			
Accomplishments/Planned Programs Subtotals	10.456	45.166	13.042

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u> <u>Base</u>	<u>FY 2023</u> <u>OCO</u>	<u>FY 2023</u> <u>Total</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• RDTE 04 PE 0605230F: <i>Ground Based Strategic Deterrent</i>	1,397.485	2,553.541	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3,951.026
• RDTE 05 PE 0605238F: <i>Ground Based Strategic Deterrent EMD</i>	0.000	0.000	3,614.290	-	3,614.290	3,614.629	3,255.759	3,190.113	2,628.739	4,439.300	20,742.830
• RDTE 07 PE 0101328F: <i>ICBM Reentry Vehicles</i>	108.625	96.313	118.616	-	118.616	368.449	640.795	835.562	854.140	Continuing	Continuing

Remarks

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Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603851F / <i>Intercontinental Ballistic Mis sile - Dem/Val</i>	Project (Number/Name) 641022 / <i>ICBM Reentry Vehicle Applications</i>

D. Acquisition Strategy

Studies, analyses, limited engineering, and pre-prototype hardware development will be accomplished; efforts will be conducted using contracting strategies deemed most appropriate, generally using competitive contracts and/or other obligating documentation considered most appropriate by obligating and performing agencies involved. Current effort deliverables include various technologies for ICBM re-entry vehicles including modeling and simulation software, alternate high temperature materials, advanced concepts, and radiation-hardened microelectronics.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force **Date:** April 2022

Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603851F / <i>Intercontinental Ballistic Missile - Dem/Val</i>	Project (Number/Name) 641022 / <i>ICBM Reentry Vehicle Applications</i>
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Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
RVAP Support 1.0	C/FFP	BAE Systems : Clearfield, UT	-	3.100	Mar 2021	2.800	Jan 2022	-		-		-	Continuing	Continuing	-
RVAP Support 2.0	C/FFP	TBD : TBD	-	-		-		1.400	Nov 2022	-		1.400	Continuing	Continuing	-
RVAP Study Support	C/FFP	Aerospace : Various	-	-		0.900	Apr 2022	-		-		-	0.000	0.900	-
RVAP Engineering Support	C/FP	JHU/APL : Various	-	-		0.500	May 2022	0.500	Dec 2022	-		0.500	Continuing	Continuing	-
Subtotal			-	3.100		4.200		1.900		-		1.900	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
RVAP Future System Demonstrator	MIPR	Various : Various	-	0.500	Feb 2021	1.000	Apr 2022	3.000	Nov 2022	-		3.000	Continuing	Continuing	-
RVAP Modeling and Simulation Programs	Various	Various : Various	-	1.300	Feb 2021	0.500	Aug 2022	0.500	Nov 2022	-		0.500	Continuing	Continuing	-
RVAP Advanced Concept Studies	Various	Various : Various	-	3.100	Jan 2021	4.000	Apr 2022	1.500	Nov 2022	-		1.500	0.000	8.600	-
RVAP Virtual Environment Trainer Launch Facility Prototype	C/CPAF	By Light Professional IT : Orlando, FL	-	-		0.500	May 2022	-		-		-	0.000	0.500	-
RVAP Radiation-Hardened Advanced Microelectronics	Various	Various : Various	-	0.954	Jan 2021	6.566	Jan 2022	2.841	Nov 2022	-		2.841	Continuing	Continuing	-
RVAP Flight Test	Various	Various : Various	-	0.800	Jun 2021	-		-		-		-	0.000	0.800	-
RVAP Rad Hard Non-Volatile Memory	Various	Various : Various	-	-		0.500	Apr 2022	1.500	Nov 2022	-		1.500	Continuing	Continuing	-
RVAP Navigation Aids/ Instrumentation	TBD	Not specified. : TBD	-	-		0.250	Jul 2022	1.301	Nov 2022	-		1.301	Continuing	Continuing	-
AFGSC Innovation Hub Apps	Various	Various : Various	-	-		27.000	Jul 2022	-		-		-	Continuing	Continuing	-
Subtotal			-	6.654		40.316		10.642		-		10.642	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force **Date:** April 2022

Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603851F / <i>Intercontinental Ballistic Missile - Dem/Val</i>	Project (Number/Name) 641022 / <i>ICBM Reentry Vehicle Applications</i>
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Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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			
RVAP Program Management Administration	Various	Various : Various	-	0.702	Jan 2021	0.650	Apr 2022	0.500	Nov 2022	-		0.500	Continuing	Continuing	-
Subtotal			-	0.702		0.650		0.500		-		0.500	Continuing	Continuing	N/A
Project Cost Totals			-	10.456		45.166		13.042		-		13.042	Continuing	Continuing	N/A

Remarks

Joint Technology Demonstrator has been renamed Future System Demonstrator.

Developmental Flight Test efforts transitioned to LRP in FY22.

Rad Hard Non-Volatile Memory transitioned from GAP to RVAP in FY22 to more accurately reflect potential future applicability of technology.

Rad Hard Advanced Microelectronics transitioned from GAP to RVAP in FY21 to more accurately reflect potential future applicability of technology.

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603851F / <i>Intercontinental Ballistic Mis sile - Dem/Val</i>	Project (Number/Name) 641022 / <i>ICBM Reentry Vehicle Applications</i>

	FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
	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
RVAP																												
RVAP Future System Demonstrator																												
RVAP Modeling and Simulation Programs																												
RVAP Advanced Concept Studies																												
RVAP Virtual Environment Trainer Launch Facility Prototype Development																												
RVAP Rad Hard Advanced Microelectronics																												
RVAP PISON																												
RVAP Rad Hard Non-Volatile Memory																												
RVAP Navigation Aids/Instrumentation																												
AFGSC Innovation Hub Apps																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603851F / <i>Intercontinental Ballistic Mis sile - Dem/Val</i>	Project (Number/Name) 641022 / <i>ICBM Reentry Vehicle Applications</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
RVAP				
RVAP Future System Demonstrator	1	2022	2	2023
RVAP Modeling and Simulation Programs	2	2021	4	2023
RVAP Advanced Concept Studies	1	2021	3	2023
RVAP Virtual Environment Trainer Launch Facility Prototype Development	1	2022	4	2022
RVAP Rad Hard Advanced Microelectronics	4	2021	2	2023
RVAP PISON	2	2021	4	2021
RVAP Rad Hard Non-Volatile Memory	1	2022	3	2023
RVAP Navigation Aids/Instrumentation	3	2022	4	2023
AFGSC Innovation Hub Apps	4	2022	4	2024

Note

Joint Technology Demonstrator has been renamed Future System Demonstrator.

Developmental Flight Test efforts transitioned to LRP in FY22.

Rad Hard Non-Volatile Memory transitioned from GAP to RVAP in FY22 to more accurately reflect potential future applicability of technology.

Rad Hard Advanced Microelectronics transitioned from GAP to RVAP in FY21 to more accurately reflect potential future applicability of technology.

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Air Force										Date: April 2022		
Appropriation/Budget Activity 3600 / 4					R-1 Program Element (Number/Name) PE 0603851F / <i>Intercontinental Ballistic Missile - Dem/Val</i>				Project (Number/Name) 644209 / <i>Long Range Planning (LRP)</i>			
COST (\$ in Millions)	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
644209: <i>Long Range Planning (LRP)</i>	-	0.162	23.433	29.253	0.000	29.253	16.717	28.424	7.821	7.995	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Long Range Planning (LRP) effort identifies and analyzes potential modifications to current and future Intercontinental Ballistic Missile (ICBM) Weapon Systems required to meet objectives relative to executing flight tests, long-term sustainment, technology insertion, battle space awareness, employment, force structure and future systems. The studies will focus on system supportability, operability, reliability, innovation and maintainability. Options/concepts generated by these studies are evaluated for feasibility, system impacts, and cost. The LRP supports and conducts testing, and future weapon systems development and deployment. Pre-milestone activities may be conducted for current or future ICBM weapon systems to include entry criteria for milestone activities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F or 0605833F. In FY 2021 0.000M was expended for civilian pay expenses in this program element, and in FY 2022 0.000M is forecasted for civilian pay expenses in this program element.

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

	FY 2021	FY 2022	FY 2023
Title: Long Range Planning	0.162	23.433	29.253
Description: Analyze, study and plan current and future ICBM activities to meet requirements for long-term sustainment, technology insertion, employment force structure and future systems.			
FY 2022 Plans:			
• Continue developmental test flight capabilities that were started in Reentry Vehicle Applications and Propulsion Applications.			
FY 2023 Plans:			
• Continue developmental test flight efforts			
• Initiate terminal tracking and scoring research			
• Rapidly respond to evolving warfighter priorities and emerging requirements.			
• Conduct any necessary roadmap studies			
FY 2022 to FY 2023 Increase/Decrease Statement:			
Funding increased due to continuation of FY23 and FY25 Developmental Flight Test efforts as well as initiating Terminal Tracking and Scoring research.			
Accomplishments/Planned Programs Subtotals	0.162	23.433	29.253

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Exhibit R-2A, RDT&E Project Justification: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603851F / <i>Intercontinental Ballistic Mis sile - Dem/Val</i>	Project (Number/Name) 644209 / <i>Long Range Planning (LRP)</i>

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2023</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To</u>	
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	<u>Total Cost</u>
• RDTE 04 PE 0605230F: <i>GBSD</i>	1,397.485	2,553.541	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3,951.026
• RDTE 05 PE 0605238F: <i>Ground Based Strategic Deterrent EMD</i>	-	-	3,614.290	-	3,614.290	3,614.629	3,255.759	3,190.113	2,628.739	4,439.300	20,742.830

Remarks

D. Acquisition Strategy

Analysis will be accomplished; efforts will be conducted using contracting strategies deemed most appropriate, generally using competitive contracts and/or other obligating documentation considered most appropriate by obligating and performing agencies involved.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force												Date: April 2022			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
3600 / 4				PE 0603851F / Intercontinental Ballistic Missile - Dem/Val				644209 / Long Range Planning (LRP)							
Support (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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
LRP Support	C/CPFF	TBD : TBD	-	-		-		1.893	Nov 2022	-		1.893	Continuing	Continuing	-
LRP Study Support	C/CPFF	Aerospace : Various	-	-		-		0.450	Nov 2022	-		0.450	0.000	0.450	-
LRP Engineering Support	C/CPFF	JHU/APL : Various	-	-		-		1.015	Nov 2022	-		1.015	Continuing	Continuing	-
Subtotal			-	-		-		3.358		-		3.358	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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
LRP FY23 Developmental Flight Test	Various	Various : Various	-	-		23.433	Apr 2022	13.000	Nov 2022	-		13.000	0.000	36.433	-
LRP FY25 Developmental Flight Test	TBD	TBD : TBD	-	-		-		10.000	Feb 2023	-		10.000	Continuing	Continuing	-
LRP Virtual Environment Trainer	Various	Various : Various	-	0.162	Feb 2021	-		-		-		-	Continuing	Continuing	-
LRP Terminal Tracking & Scoring	TBD	TBD : TBD	-	-		-		1.793	Feb 2023	-		1.793	Continuing	Continuing	-
Subtotal			-	0.162		23.433		24.793		-		24.793	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 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
LRP Program Management	Various	Various : Various	-	-		-		1.102	Nov 2022	-		1.102	0.000	1.102	-
Subtotal			-	-		-		1.102		-		1.102	0.000	1.102	N/A
Project Cost Totals			-	0.162		23.433		29.253		-		29.253	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force	Date: April 2022
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Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603851F / <i>Intercontinental Ballistic Missile - Dem/Val</i>	Project (Number/Name) 644209 / <i>Long Range Planning (LRP)</i>
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	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
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Remarks

Developmental flight tests require two years of funding prior to the test to support planning/execution activities. Developmental flight tests enable us to demonstrate developing technologies in relevant ICBM environments.

FY23 Developmental Flight Test funding started in FY21 under RVAP and PAP and will meet combined technology demonstration needs between the Dem/Val and Mk21A programs.

VET-LF moved from LRP to RVAP in FY22.

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Exhibit R-4, RDT&E Schedule Profile: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603851F / <i>Intercontinental Ballistic Mis sile - Dem/Val</i>	Project (Number/Name) 644209 / <i>Long Range Planning (LRP)</i>

	FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
	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

LRP																													
LRP Virtual Environment Trainer	██████████																												
LRP FY23 Developmental Flight Test					████████████████████																								
LRP FY25 Developmental Flight Test									████████████████████																				
LRP Terminal Tracking & Scoring									██████████																				

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Exhibit R-4A, RDT&E Schedule Details: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603851F / <i>Intercontinental Ballistic Mis sile - Dem/Val</i>	Project (Number/Name) 644209 / <i>Long Range Planning (LRP)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
LRP				
LRP Virtual Environment Trainer	1	2021	4	2021
LRP FY23 Developmental Flight Test	1	2022	4	2023
LRP FY25 Developmental Flight Test	1	2023	3	2024
LRP Terminal Tracking & Scoring	2	2023	4	2023

Note

Developmental flight tests require two years of funding prior to the test to support planning/execution activities. Developmental flight tests enable us to demonstrate developing technologies in relevant ICBM environments.

FY23 Developmental Flight Test funding started in FY21 under RVAP and PAP and will meet combined technology demonstration needs between the Dem/Val and Mk21A programs.

VET-LF moved from LRP to RVAP in FY22.