Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force	Date: April 2022
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203873SF / *Ballistic Missile Defense Radars*

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	-	21.817	12.292	18.615	0.000	18.615	13.781	9.077	1.470	0.000	0.000	77.052
674820: *Sensor Development*	-	21.817	12.292	18.615	0.000	18.615	13.781	9.077	1.470	0.000	0.000	77.052
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

COBRA DANE (CD) is a 40+ year old radar located on Eareckson AS, AK (Shemya Island, AK). CD is the most powerful, sensitive, and accurate Ground-based Midcourse Defense (GMD) radar and the premier Ballistic Missile Defense (BMD) radar. At the same time, it is the most accurate and capable phased array available to the Space Surveillance Network (SSN) for cataloging hazardous and difficult-to-track satellites and space debris objects that clutter the near-earth orbital regime that cannot be detected by most other SSN tracking assets. CD has two primary missions. One is to support US Strategic Command's (USSTRATCOM) BMD mission by providing midcourse coverage for the Ballistic Missile Defense System (BMDS). CD detects Intercontinental Ballistic Missiles (ICBMs) and Sea-Launched Ballistic Missiles (SLBMs), classifies reentry vehicles (RVs) and other missile objects, provides real-time information to the GMD Fire Control (GFC), and provides tracking of threat ballistic missiles with sufficient accuracy to commit the launch of interceptors and to update the target tracks to the interceptor while the interceptor is in flight. CD's other primary mission is to support US Space Command's (USSPACECOM) Space Domain Awareness (SDA) mission by detecting, tracking, correlating, and characterizing man-made resident space objects, primarily in the Low-Earth Orbit (LEO) regime, including space debris and early observation of New Foreign Launches (NFLs). It operates as part of the larger SSN and provides metric observation data to its command and control nodes: the Combined Space Operations Center (CSpOC) and the Distributed Space Command and Control - Dahlgren (DSC2-D). CD also supports USSPACECOM's Space Object Identification (SOI) mission by providing narrowband radar data of man-made resident space objects in the LEO regime. SOI information is used to ascertain the mission and operational status of various payloads and aids in forecasting maneuvers or deorbits.

CD will acquire a modern architecture through design, development, integration, and test. This architecture enhances mission capability, providing warfighter and stakeholder customers direct operational benefit. CD utilizes Federally Funded Research and Development Centers (FFRDC), Systems Engineering and Integration (SE&I), University Affiliated Research Center (UARC), and Assistance and Advisory Services (A&AS) contractors to support programmatic and technical activities. Activities include studies and analysis to support both current program planning and execution and future program planning. Specifically, the Automated Data Processing Equipment (ADPE) Rehost program upgrades the CD system's radar back-end mission data processing, radar management and control, and signal processing capabilities to a modern architecture that facilitates long-term mission resiliency, cyber security, system viability, high operational availability, and rapid hardware and software development and deployment capability. RDT&E funds were provided to the Missile Defense Agency (MDA) to accelerate the joint Department of the Air Force and MDA modernization program of the CD radar. In addition to funds being used to modernize this back-end of the radar, these funds will also be used for out-year planning of front-end component modernization including enhancement of communication elements.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) is transforming the organization and implementation of space acquisition to an enterprise approach, to increase innovation and resiliency, leveraging international, commercial, and mission partnerships, and managing program/project priorities according to an integrated unclassified/ classified enterprise space architecture. Expanding the appropriate acquisition

authorities and contract mechanisms to deliver capability sooner, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Cobra Dane for weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF. In FY 2021 $0.00 was expended for civilian pay expenses in this program element, and in FY 2022 $0.00 is forecasted for civilian pay expenses in this program element.

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 the current or subsequent fiscal year.

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	28.179	12.292	0.000	0.000	0.000
Current President's Budget	21.817	12.292	18.615	0.000	18.615
Total Adjustments	-6.362	0.000	18.615	0.000	18.615
• 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	-5.454	0.000			
• SBIR/STTR Transfer	-0.908	0.000			
• Other Adjustments	0.000	0.000	18.615	0.000	18.615

Change Summary Explanation

FY 2021: -5.454M reprogramming reduction to support higher SF priorities and -0.908M decrease for SBIR.
FY 2023: The FY 2022 President's Budget submittal did not reflect FY 2023 through FY 2026 funding. Therefore, an explanation of the change between the two budget positions for FY 2023 cannot be made in a relevant manner.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: ADPE Rehost Upgrade, Phase II	21.817	12.292	18.615
Description: The Automated Data Processing Equipment (ADPE) Rehost (ADPE-R) Phase II Signal Processor, Radar Controller and Receiver modernization. Mission Computer replacement will also be accomplished as soon as resources allow. The approach will modernize these systems with an innovative hardware and software-based open architecture solution supported by switching solutions and modernized development environments.			

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
FY 2022 Plans: Planned projects include completion of demonstration activities, execution of the Mission Computer replacement hardware and software development, system integration, developmental testing, and initial deployment to site. In addition, completion of the Signal Processor, Radar Controller, and Receiver requirements definition activities, and start of design, system hardware and software development. This program element may include necessary civilian pay expenses required to manage, execute, and deliver CD's weapon system capability. Continue program office and other related support and integration activities such as, but not limited to, studies, technical analysis, experimentation, prototyping, architectural development, systems engineering, demonstrations, testing, command and control integration, mission partner integration, and space test/combat range events. ***FY 2023 Plans:*** Continue effort to upgrade the Signal Processor, Radar Controller, Receiver-Exciter (SPARC/REX) Replacement system hardware and software development. Continue Mission Computer replacement hardware and software development as resources are available. Replaces the transmitter system and associated systems, and the automated data processing equipment. This program element may include necessary civilian pay expenses required to manage, execute, and deliver CD's weapon system capability. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 increased due to additional effort to modernize the back-end of the radar and plan front-end system modernization including enhancement of communication elements.			
Accomplishments/Planned Programs Subtotals	21.817	12.292	18.615

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

The ADPE Rehost acquisition strategy has transitioned to traditional acquisition delivery orders under a University Affiliated Research Center (UARC), sole-source, cost-plus fixed fee contract. This approach will provide a phased extension of system service life to ensure warfighter capability through at least 2030. This evolutionary migration to a modernized open system approach provides the foundation for adaptable system sustainment and addition of future capabilities.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force			Date: April 2022
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203873SF / *Ballistic Missile Defense Radars*	**Project (Number/Name)** 674820 / *Sensor Development*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ADPE Phase II, Mission Computer Replacement	SS/CPAF	Various : Colorado Springs, CO	-	8.834	Dec 2021	3.146	Feb 2022	7.053	Feb 2023	-		7.053	Continuing	Continuing	-
Signal Processor, Radar Controller, Receiver-Exciter Replacement	SS/CPAF	Various : Colorado Springs, CO	-	8.292	Aug 2021	6.584	Feb 2022	8.809	Feb 2023	-		8.809	Continuing	Continuing	-
		Subtotal	-	17.126		9.730		15.862		-		15.862	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ADPE Integration	Various	Riverside Res Institute : Colorado Springs, CO	-	0.406	Jul 2021	0.700	Dec 2021	0.700	Dec 2022	-		0.700	Continuing	Continuing	-
		Subtotal	-	0.406		0.700		0.700		-		0.700	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation	Various	Space Readiness Delta : Colorado Springs, CO	-	2.000	Aug 2021	0.411	Feb 2022	0.410	Feb 2023	-		0.410	Continuing	Continuing	-
		Subtotal	-	2.000		0.411		0.410		-		0.410	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	Various : Colorado Springs, CO	-	2.285	Jun 2021	1.205	Jun 2022	0.650	Jun 2023	-		0.650	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force			Date: April 2022
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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Other Support	Various	Various : Colorado Springs, CO	-	-		0.246	Jun 2022	0.993	Jun 2023	-		0.993	Continuing	Continuing	-
		Subtotal	-	2.285		1.451		1.643		-		1.643	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	-	21.817		12.292		18.615		-		18.615	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203873SF / *Ballistic Missile Defense Radars*	**Project (Number/Name)** 674820 / *Sensor Development*

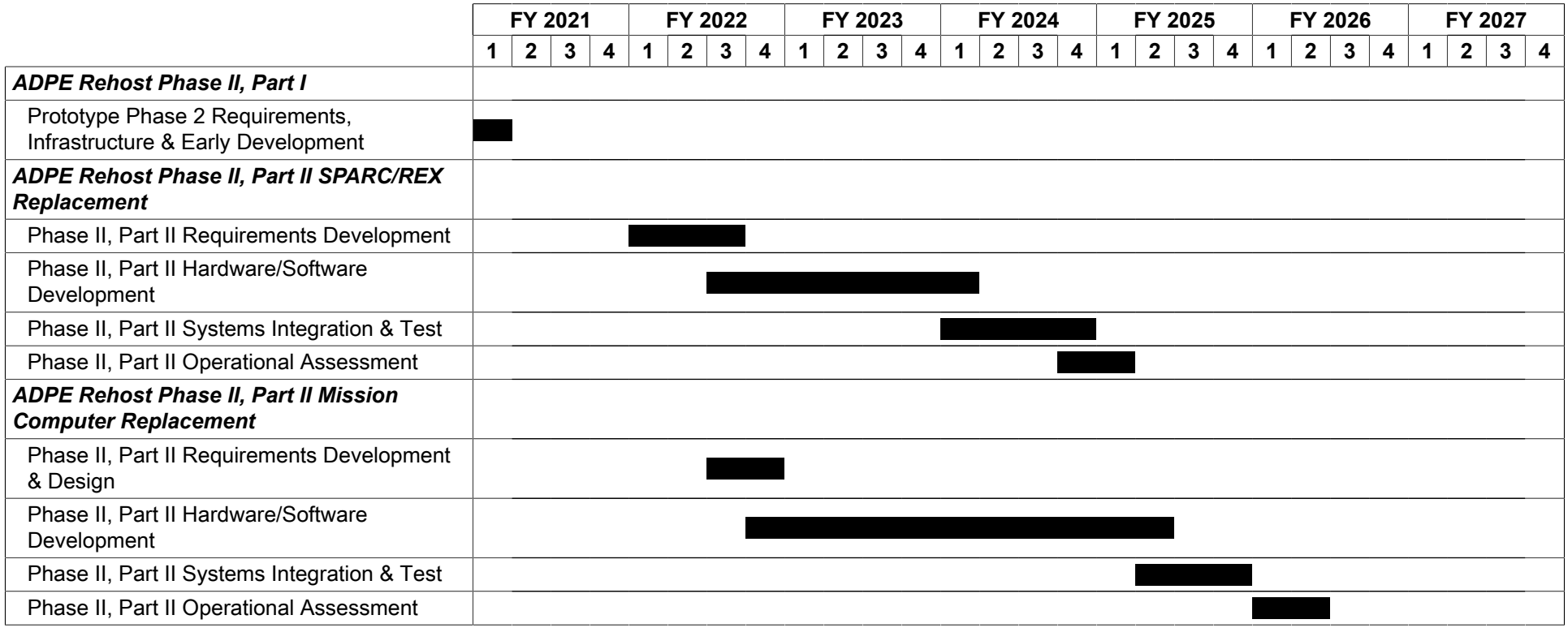

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203873SF / *Ballistic Missile Defense Radars*	**Project (Number/Name)** 674820 / *Sensor Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
ADPE Rehost Phase II, Part I				
Prototype Phase 2 Requirements, Infrastructure & Early Development	1	2021	1	2021
ADPE Rehost Phase II, Part II SPARC/REX Replacement				
Phase II, Part II Requirements Development	1	2022	3	2022
Phase II, Part II Hardware/Software Development	3	2022	1	2024
Phase II, Part II Systems Integration & Test	1	2024	4	2024
Phase II, Part II Operational Assessment	4	2024	1	2025
ADPE Rehost Phase II, Part II Mission Computer Replacement				
Phase II, Part II Requirements Development & Design	3	2022	4	2022
Phase II, Part II Hardware/Software Development	4	2022	2	2025
Phase II, Part II Systems Integration & Test	2	2025	4	2025
Phase II, Part II Operational Assessment	1	2026	2	2026