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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2024 Air Force **Date:** March 2023

<b>Appropriation/Budget Activity</b> 3620F: <i>Research, Development, Test &amp; Evaluation, Space Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 1203873SF / <i>Ballistic Missile Defense Radars</i>
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	7.432	21.615	20.752	0.000	20.752	9.065	1.468	0.000	0.000	0.000	60.332
674820: <i>Sensor Development</i>	-	7.432	21.615	20.752	0.000	20.752	9.065	1.468	0.000	0.000	0.000	60.332
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 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 (USSPACECOM)'s 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

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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.

The PARCS Radar Digitization Upgrade Study will determine the requirement to modernize the radar through a systematic re-architecture from an analog infrastructure to a digital phased array radar to keep up with modern threats.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Ballistic Missile Defense Radars 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.

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>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
Previous President's Budget	12.292	18.615	13.781	0.000	13.781
Current President's Budget	7.432	21.615	20.752	0.000	20.752
Total Adjustments	-4.860	3.000	6.971	0.000	6.971
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	3.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-4.500	0.000			
• SBIR/STTR Transfer	-0.360	0.000			
• Other	0.000	0.000	6.971	0.000	6.971

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

**Project:** 674820: *Sensor Development*

Congressional Add: *PARCS Radar Digitization Upgrade Study*

Congressional Add Subtotals for Project: 674820

Congressional Add Totals for all Projects

	<b>FY 2022</b>	<b>FY 2023</b>
	-	3.000
	-	3.000
	-	3.000

**Change Summary Explanation**

FY 2022: -4.50M decrease to support higher Space Force priorities.

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FY 2024: -0.091M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<p><b>Title:</b> ADPE Rehost Upgrade, Phase II</p> <p><b>Description:</b> 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.</p> <p><b>FY 2023 Plans:</b> 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.</p> <p><b>FY 2024 Plans:</b> Continue effort to upgrade the Signal Processor, Radar Controller, Receiver-Exciter (SPARC/REX) and Mission Computer. The programs will continue the development of software and hardware for the upgrade of the SPARC/REX and mission computer. 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.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> FY 2024 increased to ramp-up of SPARC/REX replacement efforts as that portion of the program moves towards system integration and test.</p>	7.432	18.615	20.752
<b>Accomplishments/Planned Programs Subtotals</b>	7.432	18.615	20.752

	<b>FY 2022</b>	<b>FY 2023</b>
<b>Congressional Add:</b> PARCS Radar Digitization Upgrade Study	-	3.000
<b>FY 2023 Plans:</b> The PARCS RADAR Digitization Study will determine the requirement to modernize the radar from an analog infrastructure to a digital phased array radar to keep up with modern threats. Activities may		

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	<b>FY 2022</b>	<b>FY 2023</b>
include, but are not limited to program office support, studies, technical analysis, experimentation, prototyping, etc.		
<b>Congressional Adds Subtotals</b>	-	3.000

**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.

PARCS Radar Digitization upgrade study will be accomplished using an existing indefinite delivery/indefinite quantity contract.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force												Date: March 2023			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)						Project (Number/Name)					
3620F / 7				PE 1203873SF / Ballistic Missile Defense Radars						674820 / Sensor Development					
Product Development (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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
ADPE Phase II, Mission Computer Replacement	SS/CPAF	Various : Colorado Springs, CO	-	1.482	Feb 2022	7.053	Feb 2023	7.713	Oct 2023	-		7.713	Continuing	Continuing	-
Signal Processor, Radar Controller, Receiver-Exciter Replacement	SS/CPAF	Various : Colorado Springs, CO	-	3.794	Feb 2022	8.228	Feb 2023	10.419	Oct 2023	-		10.419	Continuing	Continuing	-
PARCS Radar Digitization	SS/CPFF	Georgia Tech : Atlanta, GA	-	-		2.800	Jul 2023	-		-		-	0.000	2.800	-
SBIR/STTR	TBD	TBD : TBD	-	0.360	Oct 2021	0.581	Oct 2022	0.479	Oct 2023	-		0.479	Continuing	Continuing	-
<b>Subtotal</b>			-	5.636		18.662		18.611		-		18.611	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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
ADPE Integration	Various	Riverside Res Institute : Colorado Springs, CO	-	0.000	Dec 2021	0.700	Dec 2022	0.250	Dec 2023	-		0.250	Continuing	Continuing	-
<b>Subtotal</b>			-	0.000		0.700		0.250		-		0.250	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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
Test and Evaluation	Various	Space Readiness Delta : Colorado Springs, CO	-	0.000	Feb 2022	0.410	Mar 2023	0.327	Jan 2024	-		0.327	Continuing	Continuing	-
<b>Subtotal</b>			-	0.000		0.410		0.327		-		0.327	Continuing	Continuing	N/A



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2024 Air Force		<b>Date:</b> March 2023
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	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	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
<b><i>ADPE Rehost Phase II, Part I</i></b>																												
Prototype Phase II Requirements, Infrastructure & Early Development	■																											
<b><i>ADPE Rehost Phase II, Part II SPARC/REX Replacement</i></b>																												
Phase II, Part II Requirements Development	■	■																										
Phase II, Part II Hardware/Software Development			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Phase II, Part II Systems Integration & Test																												
Phase II, Part II Operational Assessment																												
<b><i>ADPE Rehost Phase II, Part II Mission Computer Replacement</i></b>																												
Phase II, Part II Requirements Development & Design			■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Phase II, Part II Hardware/Software Development	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
Phase II, Part II Systems Integration & Test																												
Phase II, Part II Operational Assessment																												
<b><i>PARCS Radar Digitization Upgrade Study</i></b>																												
Digitization Upgrade Study																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2024 Air Force		<b>Date:</b> March 2023
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>ADPE Rehost Phase II, Part I</i></b>				
Prototype Phase II Requirements, Infrastructure & Early Development	1	2022	1	2022
<b><i>ADPE Rehost Phase II, Part II SPARC/REX Replacement</i></b>				
Phase II, Part II Requirements Development	1	2022	3	2022
Phase II, Part II Hardware/Software Development	3	2022	4	2024
Phase II, Part II Systems Integration & Test	4	2024	1	2025
Phase II, Part II Operational Assessment	1	2025	2	2025
<b><i>ADPE Rehost Phase II, Part II Mission Computer Replacement</i></b>				
Phase II, Part II Requirements Development & Design	3	2022	1	2023
Phase II, Part II Hardware/Software Development	1	2022	4	2025
Phase II, Part II Systems Integration & Test	4	2025	2	2026
Phase II, Part II Operational Assessment	2	2026	3	2026
<b><i>PARCS Radar Digitization Upgrade Study</i></b>				
Digitization Upgrade Study	4	2023	2	2024