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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 0207455F / <i>Three Dimensional Long-Range Radar (3DELRR)</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	0.000	18.862	0.000	14.490	0.000	14.490	6.228	0.000	0.000	0.000	0.000	39.580
646002: <i>Three Dimensional Expeditionary Long Range Radar</i>	0.000	18.862	0.000	14.490	0.000	14.490	6.228	0.000	0.000	0.000	0.000	39.580
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

Program MDAP/MAIS Code: 393

A. Mission Description and Budget Item Justification

The Three-Dimensional Expeditionary Long-Range Radar (3DELRR) is a program will be the principal USAF long-range, ground-based sensor for detecting, identifying, tracking and reporting aerial tracks for the Joint Force Air Component Commander (JFACC) through the Theater Air Control System. The 3DELRR system will provide multiple benefits and increased capabilities to the USAF and to the Joint Services: 1) Replace the aging USAF AN/TPS-75 radar system, which is at the end of its service life and costly to maintain; 2) Detect and track highly maneuverable, small radar cross section air-breathing targets; 3) Mitigate reliability, operational availability, maintainability, transportability and sustainability issues, which plague the AN/TPS-75 radar system; 4) Enable greater battlefield and battlespace awareness through its precise, real-time air picture of sufficient quality to control individual aircraft under a wide range of environmental and operational conditions and 5) Provide exchange of information to the United States Marine Corps, Navy, and Army via appropriate interfaces.

The Air Force conducted a radar market survey in 2019 and identified multiple production-ready alternatives capable of meeting or exceeding 3DELRR requirements. In FY20, the Air Force re-designated 3DELRR as a Middle-Tier Acquisition rapid prototyping effort to demonstrate in FY20 the performance of production-ready systems for meeting 3DELRR requirements.

Based upon the current strategy, the Air Force will use the FY20 prototype capability demonstration results to inform the FY22 Production decision

The total cost of the 3DELRR Rapid Prototyping Middle Tier of Acquisition effort is \$298.986 million, including RDT&E and procurement of prototype units. The 3DELRR is fully funded across the Future Years Defense Program.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver 0207455F weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0207455F. In FY21 0.00M and in FY22 0.00M was expended 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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B. Program Change Summary (\$ in Millions)	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023 Base</u>	<u>FY 2023 OCO</u>	<u>FY 2023 Total</u>
Previous President's Budget	19.321	0.000	0.000	0.000	0.000
Current President's Budget	18.862	0.000	14.490	0.000	14.490
Total Adjustments	-0.459	0.000	14.490	0.000	14.490
• Congressional General Reductions	-0.459	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	14.490	0.000	14.490

C. Accomplishments/Planned Programs (\$ in Millions)	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>
Title: Demonstration & Integration of Production-Ready System to meet 3DELRR capabilities	12.693	0.000	6.837
Description: Collaborative acquisition effort to conduct operational assessment - demonstration of viable, production ready prototypes.			
FY 2022 Plans: Activities supported with FY21 funding will continue into FY22, to include but not limited to: -Will continue to lead and manage program through daily interaction with contractor and key stakeholders -Will continue efforts for interoperability with external agencies as required -Will develop, test, and implement select Contractor Proposed Enhancements based on mission needs -Will continue to identify, monitor, mitigate and report program and known risks associated with hardware, software and testing -Will continue required system and sub-system certification work -Will continue the development of technical manuals and training material -Will continue and complete demonstrations of viable radars and conduct technical reviews -Will continue preparation of follow on production decision and associated documentation -Will begin system integration & interoperability with operational Command and Control (C2) systems -Will initiate contractor integration testing of components & subsystems -Will conduct Test Readiness Reviews (TRRs) prior to specific operational & integration test events			
FY 2023 Plans: Activities will include but are not limited to the following: -Will continue verifying, validating and accrediting modelling & simulation tools for use in test			

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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 0207455F / <i>Three Dimensional Long-Range Radar (3DELRR)</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2021	FY 2022	FY 2023
<ul style="list-style-type: none"> -Will continue integrated contractor/gov't DT&E to characterize performance and cyber posture -Will continue preparation for IOT&E and ensure entrance criteria are met -Continue identifying spares through Provisioning Conference -Finalize support equipment requirements -Will continue efforts for interoperability with external agencies as required through FY23 as part of the integration contract -Will develop, test, and implement select Contractor Proposed Enhancements based on mission needs through FY23 and beyond -Will continue required system and sub-system certification work through FY23 -Will continue, finalize and complete the development of technical manuals and training material through FY23 -Will continue preparation of follow on production decision and associated documentation Through FY23 -Will begin system integration & interoperability with operational Command and Control (C2) systems through FY23 -Will initiate contractor integration testing of components & subsystems through FY23 <p>FY 2022 to FY 2023 Increase/Decrease Statement: FY 2023 funds increase to support RDT&E follow on work, including system enhancements. FY2022 production units provide operational utility to the warfighter and these performance enhancements bring the system more in line with the full 3DELRR requirements. Demonstration and integration of production ready systems. Implement full complement of EP Techniques. Implement Unique Classification Techniques and Additional Clutter Algorithms Design Radar Templates for other Natural and EA Environments.</p>				
<p>Title: Government Development, Operational & Integration Test and Evaluation Planning and Execution</p> <p>Description: Planning and execution of Government development, operational, integration test and evaluation.</p> <p>FY 2022 Plans: Activities supported with FY21 funding will continue into FY22, to include but not limited to:</p> <ul style="list-style-type: none"> -Will conduct cybersecurity testing -Will conduct Integrated contractor/government DT&E to characterize performance and cyber posture -Will verify, validate, and accredit modeling and simulation tools for use in test -Will continue to lead and manage program through daily interaction with contractor and key stakeholders -Will Continue efforts for interoperability with external agencies as required -Will continue to identify, monitor, mitigate and report program and known risks associated with hardware, software and testing -Will continue required system and sub-system certification work (eg transportation IFF, etc.) -Will continue the development of technical manuals and training material -Will continue and complete demonstrations of viable radars and conduct technical reviews -Will continue preparation of production decision and associated documentation 		6.169	0.000	7.653

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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 0207455F I Three Dimensional Long-Range Radar (3DELRR)
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2021	FY 2022	FY 2023
<p>-Will begin system integration & interoperability with operational Command and Control (C2) systems</p> <p>-Will initiate contractor integration testing of components & subsystems</p> <p>-Will conduct Test Readiness Reviews (TRRs) prior to specific operational & integration test events</p> <p>-Will conduct Test Readiness Reviews (TRRs) to support Government Developmental Test & Evaluation (DT&E)</p> <p>FY 2023 Plans: Activities will include but are not limited to the following:</p> <p>-Will continue verifying, validating and accrediting modelling & simulation tools for use in test</p> <p>-Will continue integrated contractor/gov't DT&E to characterize performance and cyber posture</p> <p>-Will continue preparation for IOT&E and ensure entrance criteria are met</p> <p>-Continue identifying spares through Provisioning Conference</p> <p>-Finalize support equipment requirements</p> <p>-Will continue efforts for interoperability with external agencies as required through FY23 as part of the integration contract</p> <p>-Will develop, test, and implement select Contractor Proposed Enhancements based on mission needs through FY23 and beyond</p> <p>-Will continue required system and sub-system certification work through FY23</p> <p>-Will continue, finalize and complete the development of technical manuals and training material through FY23</p> <p>-Will continue preparation of follow on production decision and associated documentation Through FY23</p> <p>-Will begin system integration & interoperability with operational Command and Control (C2) systems through FY23</p> <p>-Will initiate contractor integration testing of components & subsystems through FY23</p> <p>FY 2022 to FY 2023 Increase/Decrease Statement: FY 2023 funds increase to support RDT&E follow on work including: Plan, execute and report on Developmental Test & Evaluation. Test efforts will focus on the Performance, Cyber and RMA KPPs and KSAs. Integrated test events/data collection will be maximized to ensure early Operational, Test & Evaluation Involvement.</p> <p>Testing supports follow-on production decision to increase radar fleet beyond initial six systems.</p>			
Accomplishments/Planned Programs Subtotals	18.862	0.000	14.490

D. 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>
• OPAF 03 0207455F: THREE DIMEN LONG RANGE RADAR (3DELRR)	0.000	96.186	184.531	-	184.531	34.001	93.900	104.553	130.462	0.000	643.633

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D. 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>
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Remarks

E. Acquisition Strategy

The previous 3DELRR strategy was a single-step acquisition approach. A limited competition was conducted for the Engineering and Manufacturing Development (EMD) contract. The EMD contract was awarded 11 May 2017 to a single developer. Due to chronic technical challenges rooted in previous EMD contractor's proposed design and subsequent schedule delays, the USAF concluded the EMD contract in January 2020.

The Milestone Decision Authority (MDA) approved use of a Middle-Tier Acquisition rapid-prototyping strategy in December 2019 to accelerate capability delivery, pursuant to FY16 NDAA Section 804 guidance.

The current 3DELRR strategy is to implement rapid-prototyping, conduct operational assessment demonstrations of viable production-ready alternatives in FY20, and select the best solution that meets 3DELRR requirements in order to make the initial production decision to a single vendor in FY22. This strategy has the potential to deliver capability to the field no later than FY25.

Test activities planned for FY22 and FY23 include but are not limited to rapid-prototyping, demonstration and tailored Developmental Integration Test.

The MDA for the 3DELRR program is the Assistant Secretary of the Air Force (Acquisition). The Air Force Program Executive Officer (PEO) for Digital Directorate (AFPEO) located at Hanscom AFB, MA is the PEO for 3DELRR. The Air Force Life Cycle Management Center (AFLCMC) located at Wright-Patterson AFB, OH is the contracting authority for the 3DELRR program. AFLCMC provides contracting, legal, comptroller, programmatic, engineering, test and logistics support.

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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 0207455F / Three Dimensional Long-Range Radar (3DELRR)	Project (Number/Name) 646002 / Three Dimensional Expeditionary Long Range Radar
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Product Development (\$ 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			
Demonstration & Integration (Rapid-Prototyping)	C/TBD	Not specified. : TBD	0.000	7.874	Nov 2020	-		6.347	Nov 2022	-		6.347	104.800	119.021	-
EMD Phase (Prime Contract)	C/FPIF	Raytheon : Woburn, MA	0.000	-		-		-		-		-	0.000	0.000	0.000
Subtotal			0.000	7.874		-		6.347		-		6.347	104.800	119.021	N/A

Remarks
 FINANCIAL PERFORMANCE: 3DELRR is evaluated against traditional Research and Development (R&D) program expenditure benchmarks. Unlike many traditional R&D programs, however, the 3DELLR EMD contract is a FPIF contract with progress payments. Twenty percent of incurred costs were withheld until the end of the contract, when they were liquidated. Mandatory funding obligations and progress payment withholds will cause the program to lag traditional expenditure benchmarks, painting an inaccurate portrait of overall program health.

Due to chronic technical challenges rooted in current EMD contractor's proposed TPS-81 design and subsequent schedule delays, the USAF began conclusion of the current EMD contract after final FPIF contract progress payment in FY19.

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			
Support	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-
System Engineering - A	SS/CPFF	MIT/Lincoln Laboratory : Lexington, MA	0.000	0.922	Nov 2020	-		-		-		-	0.000	0.922	-
System Engineering - C	SS/CPFF	GTRI : Atlanta, GA	0.000	0.555	Feb 2021	-		-		-		-	0.000	0.555	-
System Engineering - D	SS/CPFF	MITRE : Bedford, MA	0.000	3.560	Oct 2020	-		-		-		-	0.000	3.560	-
Subtotal			0.000	5.037		-		-		-		-	0.000	5.037	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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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			
Test and Evaluation	C/CPAF	Not specified. : TBD	0.000	-		-		7.293	Nov 2022	-		7.293	0.000	7.293	-
Government Developmental Test and Evaluation Planning and Preparation	PO	46 TS : Eglin AFB, FL	0.000	1.843	Jan 2021	-		-		-		-	0.000	1.843	-
Subtotal			0.000	1.843		-		7.293		-		7.293	0.000	9.136	N/A

Remarks
FY21 decreased funding in Test and Evaluation reflects change in the acquisition strategy to a Middle-Tier Acquisition rapid-prototyping program with acceleration of demonstration and analysis into FY20 with follow-on operational system integration and testing in FY21.

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			
Management Services	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-
Program Management Administration	Various	AFLCMC/HBDD : Hanscom AFB, MA	0.000	4.108	Oct 2020	-		0.850	Nov 2022	-		0.850	0.000	4.958	-
Subtotal			0.000	4.108		-		0.850		-		0.850	0.000	4.958	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			0.000	18.862	-		14.490	-	14.490	104.800	138.152	N/A

Remarks

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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 0207455F / <i>Three Dimensional Long-Range Radar (3DELRR)</i>	Project (Number/Name) 646002 / <i>Three Dimensional Expeditionary Long Range Radar</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
<i>Three Dimensional Expeditionary Long Range Radar</i>																												
Government Test																												
Implement full complement of EP Techniques																												
Implement Unique Classification Techniques and Additional Clutter Algorithms																												
Design Radar Templates for other Natural and EA Environments																												

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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 0207455F / <i>Three Dimensional Long-Range Radar (3DELRR)</i>	Project (Number/Name) 646002 / <i>Three Dimensional Expeditionary Long Range Radar</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Three Dimensional Expeditionary Long Range Radar</i>				
Government Test	4	2022	2	2023
Implement full complement of EP Techniques	1	2023	1	2025
Implement Unique Classification Techniques and Additional Clutter Algorithms	1	2023	1	2025
Design Radar Templates for other Natural and EA Environments	1	2023	1	2025

Note

Schedule is restricted to the current, approved funding profile and allows for completion of rapid prototyping, test and integration efforts that will lead to a production contract decision.