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Exhibit R-2, RDT&E Budget Item Justification: PB 2022 Air Force **Date:** May 2021

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 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	FY 2023	FY 2024	FY 2025	FY 2026	Cost To Complete	Total Cost
Total Program Element	0.000	22.469	19.321	0.000	0.000	0.000	-	-	-	-	-	-
646002: <i>Three Dimensional Expeditionary Long Range Radar</i>	0.000	22.469	19.321	0.000	0.000	0.000	-	-	-	-	-	-
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) Rapid Prototyping Middle Tier Acquisition (MTA) 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 at this time. 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 new strategy, the Air Force has removed program funding from fiscal years FY22-FY26 and will use the FY20 prototype capability demonstration results to inform the FY22 budget request.

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 FY20 \$0M and in FY21 \$0.M 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)	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total
Previous President's Budget	23.190	19.356	0.000	0.000	0.000
Current President's Budget	22.469	19.321	0.000	0.000	0.000
Total Adjustments	-0.721	-0.035	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-0.721	-0.035			
• 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	0.000	0.000	0.000

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<p>Title: Demonstration & Integration of Production-Ready System to meet 3DELRR capabilities</p> <p>Description: Collaborative acquisition effort to conduct operational assessment - demonstration of viable, production ready prototypes.</p> <p>FY 2021 Plans: Activities will include but are not limited to the following: - 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 - 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 - 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</p> <p>FY 2022 Plans: Activities will include but are not limited to the following: -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</p>	4.418	12.693	0.000

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2020	FY 2021	FY 2022
<ul style="list-style-type: none"> -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 <p>FY 2021 to FY 2022 Increase/Decrease Statement: FY22 funding increased to pursue Middle Tier Acquisition rapid prototyping with operational assessment demonstrations and system integration of viable production-ready alternatives. The Air Force will select a capability that meets 3DELRR requirements for a production decision in FY21.</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 2021 Plans: Activities will include but are not limited to the following:</p> <ul style="list-style-type: none"> - Will continue to receive and evaluate contractor test data: tailor lessons for Government operational & integration testing - Will continue 3DELRR Mobility Testing - Will continue efforts for interoperability with external agencies as required - Will continue development and refinement of TEMP and other test planning documentation - Will continue to integrate Modeling and Simulation (M&S) into test plans - Will continue cybersecurity planning - Will witness formal contractor test integration events - Will conduct Test Readiness Review (TRR) to support Government Developmental Test & Evaluation (DT&E) - Will conduct training and travel in preparation for Government operational & integration testing - Will conduct system integration and interoperability with operational C2 systems architecture and software <p>FY 2022 Plans: Activities will include but are not limited to the following:</p> <ul style="list-style-type: none"> -Will conduct cybersecurity testing -Will conduct Integrated contractor/government DT&E to characterize performance and cyber posture 		18.051	6.628	0.000

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2020	FY 2021	FY 2022
<ul style="list-style-type: none"> -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 -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 -Will conduct Test Readiness Reviews (TRRs) to support Government Developmental Test & Evaluation (DT&E) <p><i>FY 2021 to FY 2022 Increase/Decrease Statement:</i> FY22 funding increased to pursue Middle Tier Acquisition rapid prototyping with operational assessment demonstrations and system integration of viable production-ready alternatives. The Air Force will select a capability that meets 3DELRR requirements for a production decision in FY21.</p>			
Accomplishments/Planned Programs Subtotals	22.469	19.321	0.000

D. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

E. Acquisition Strategy
The previous 3DELRR strategy was a single-step acquisition approach for full capability to develop, produce and field a highly capable and sustainable, expeditionary long-range radar. A limited competition was conducted for the Engineering and Manufacturing Development (EMD) contract among the multiple contractors that participated in two Technology Maturation and Risk Reduction (TMRR) phases. The EMD contract was awarded 11 May 2017 to a single developer to complete the final design, build, integration and test of the 3DELRR system.

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 in January 2020. The Milestone Decision Authority (MDA) directed a Middle-Tier Acquisition rapid-prototyping approach to accelerate capability delivery, pursuant to FY16 NDAA Section 804 guidance.

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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 in FY21. Intend to award production options to a single vendor in FY22. This strategy has the potential to deliver capability to the field no later than FY24.

Test activities planned for FY22 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 2022 Air Force **Date:** May 2021

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>
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Product Development (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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	2.029	Apr 2020	7.874	Nov 2020	-		-		-	-	-	-
EMD Phase (Prime Contract)	C/FPIF	Raytheon : Woburn, MA	0.000	-		-		-		-		-	-	-	56.640
Subtotal			0.000	2.029		7.874		-		-		-	-	-	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 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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	-		-		-		-		-	-	-	-
System Engineering - A	SS/CPFF	MIT/Lincoln Laboratory : Lexington, MA	0.000	1.139	Nov 2019	0.922	Nov 2020	-		-		-	-	-	-
System Engineering - C	SS/CPFF	GTRI : Atlanta, GA	0.000	0.527	Feb 2020	0.555	Feb 2021	-		-		-	-	-	-
System Engineering - D	SS/CPFF	MITRE : Bedford, MA	0.000	3.081	Oct 2019	3.560	Oct 2020	-		-		-	-	-	-
Subtotal			0.000	4.747		5.037		-		-		-	-	-	N/A

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Test and Evaluation (\$ in Millions)				FY 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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	-		-		-		-		-	-	-	-
Government Developmental Test and Evaluation Planning and Preparation	PO	46 TS : Eglin AFB, FL	0.000	11.051	Jan 2020	1.843	Jan 2021	-		-		-	-	-	-
Subtotal			0.000	11.051		1.843		-		-		-	-	-	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 2020		FY 2021		FY 2022 Base		FY 2022 OCO		FY 2022 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	-		-		-		-		-	-	-	-
Program Management Administration	Various	AFLCMC/HBDD : Hanscom AFB, MA	0.000	4.642	Oct 2019	4.567	Oct 2020	-		-		-	-	-	-
Subtotal			0.000	4.642		4.567		-		-		-	-	-	N/A

	Prior Years	FY 2020	FY 2021	FY 2022 Base	FY 2022 OCO	FY 2022 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	22.469	19.321	-	-	-	-	-	N/A

Remarks

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Exhibit R-4A, RDT&E Schedule Details: PB 2022 Air Force		Date: May 2021
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>				
Operational Assessment Demonstration Planning	2	2020	3	2020
Prototype Other Transaction Authority Contract Award	2	2020	3	2020
Operational Assessment Demonstration	3	2020	4	2020
Command & Control Integration	2	2021	4	2021
Operational Test Planning	1	2021	2	2021
Operational / Integration Test	4	2021	1	2022

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. Planned events provide necessary data to inform FY22 budget request.