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<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Air Force											<b>Date:</b> February 2018	
<b>Appropriation/Budget Activity</b> 3600: Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)					<b>R-1 Program Element (Number/Name)</b> PE 0207455F I Three Dimensional Long-Range Radar (3DELRR)							
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>FY 2020</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
Total Program Element	99.588	47.166	10.645	40.326	0.000	40.326	41.416	31.720	16.745	0.468	0.000	288.074
646002: Three Dimensional Expeditionary Long Range Radar	99.588	47.166	10.645	40.326	0.000	40.326	41.416	31.720	16.745	0.468	0.000	288.074
Quantity of RDT&E Articles	-	3	-	-	-	-	-	-	-	-		
<b>Program MDAP/MAIS Code:</b> 393												
<p><b>A. Mission Description and Budget Item Justification</b></p> <p>Mission Description: The Three-Dimensional Expeditionary Long-Range Radar (3DELRR) 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; 5) Serve as a pilot program for Defense Exportability Features (DEF) to maximize export potential early in the design phase while reducing 3DELRR life cycle costs through increased production; and 6) Provide exchange of information to the United States Marine Corps (Navy) and the United States Army via appropriate interfaces.</p> <p>This program element may include necessary civilian pay expenses required to manage, execute, and deliver Three-Dimensional Expeditionary Long-Range Radar weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.</p> <p>Note: This program is in Budget Authority 4, Advanced Component Development and Prototypes (ACD&amp;P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.</p>												

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B. Program Change Summary (\$ in Millions)		FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget		49.491	10.645	13.729	0.000	13.729
Current President's Budget		47.166	10.645	40.326	0.000	40.326
Total Adjustments		-2.325	0.000	26.597	0.000	26.597
• Congressional General Reductions		-0.533	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		-1.792	0.000			
• Other Adjustments		0.000	0.000	26.597	0.000	26.597
Change Summary Explanation						
- FY19 \$26.9M RDT&E increased to fund to the FY17 Service Cost Position (SCP)						
The start of Engineering and Manufacturing Development (EMD) was delayed due to contractor protests and continued source selection activities. The Engineering and Manufacturing Development (EMD) prime contract was awarded 11 May 2017.						
C. Accomplishments/Planned Programs (\$ in Millions)				FY 2017	FY 2018	FY 2019
Title: Contractor Engineering and Manufacturing Development (EMD)				38.042	0.000	29.017
Description: Contractor's portion of EMD efforts contribute to the overall development of 3DELRR capabilities.						
FY 2018 Plans:						
Conduct program management and systems engineering activities to continue execution of EMD Phase of 3DELRR. Activities will include but are not limited to the following:						
- Mature system design through successful Critical Design Review (CDR)						
- Conduct Integrated Baseline Review (IBR)						
- Continue to support the Defense Exportability Features (DEF) effort						
- Continue contractor developmental test planning and preparation						
- Start build of three (3) EMD production ready units; fabricate components & subsystems						
- Start contractor developmental testing of components & subsystems						
- Support planning of Government Developmental Test & Evaluation (DT&E)						
- Support studies and analysis to assess future capabilities						
- Implement latest cyber security controls into system design and support accreditation						

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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
<ul style="list-style-type: none"> <li>- Support activities to develop the Modeling and Simulation (M&amp;S) plan</li> <li>- Support activities to develop the Test and Evaluation Master Plan (TEMP)</li> <li>- Continue development of Technical Manuals</li> </ul> <b>FY 2019 Plans:</b> Activities will include but are not limited to the following: <ul style="list-style-type: none"> <li>- Will continue to conduct Test Readiness Review (TRR) prior to Contractor Developmental Test and Evaluation (CDT&amp;E)</li> <li>- Complete build of three (3) Engineering &amp; Manufacturing Development (EMD) units</li> <li>- Continue contractor developmental testing of components &amp; subsystems</li> <li>- Start full system CDT&amp;E</li> <li>- Continue support for planning of Government Developmental Test &amp; Evaluation (DT&amp;E)</li> <li>- Conduct physical configuration audit</li> <li>- Support studies and analyses to assess future capabilities</li> <li>- Update the Modeling and Simulation (M&amp;S) plan as needed</li> <li>- Update the Test and Evaluation Master Plan (TEMP) as needed</li> <li>- Continue development of technical manuals</li> <li>- Will continue to engage with external customers regarding interoperability</li> </ul> <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funds increase from FY18 to FY19 for ramp up to full system CDT&E.				
<b>Title:</b> Government Developmental Test and Evaluation (DT&E) Planning/Preparation  <b>Description:</b> Early planning and preparation for Government DT&E.  <b>FY 2018 Plans:</b> Activities include but are not limited to the following: <ul style="list-style-type: none"> <li>- Provide test expertise and support at Critical Design Review (CDR) and Integrated Baseline Review (IBR)</li> <li>- Coordinate post-CDR TEMP for approval</li> <li>- Continue development and refinement of test planning documentation</li> <li>- Conduct site-surveys, prepare test sites and continue cyber-security planning</li> <li>- Integrate M&amp;S into test plans</li> <li>- Monitor and evaluate contractor component and developmental testing; tailor lessons for Government DT&amp;E</li> <li>- Contribute to technical interchanges and test-related working groups</li> <li>- Site infrastructure improvements to support Government DT&amp;E</li> </ul> <b>FY 2019 Plans:</b>		0.676	1.681	3.374

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<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 4: Advanced Component Development &amp; Prototypes (ACD&amp;P)</i>		<b>R-1 Program Element (Number/Name)</b> PE 0207455F / <i>Three Dimensional Long-Range Radar (3DELRR)</i>		
<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>
Activities will include but are not limited to the following: - Will continue to monitor and evaluate CDT&E: tailor lessons for Government DT&E - Witness formal CDT&E events - Continue development and refinement of TEMP and other test planning documentation - Conduct site surveys and continue cybersecurity planning - Continue to integrate Modeling and Simulation (M&S) into test plans - Prepare for Test Readiness Review (TRR) to support Government Developmental Test & Evaluation (DT&E) - Will continue site infrastructure improvements to support Government DT&E - NOTE: Training and travel ramp up this FY in preparation for Government DT&E  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> Funding increase due to ramp up in contractor T&E activities.				
<b>Title:</b> Systems Engineering/Technical Support  <b>Description:</b> Efforts provide management, engineering and technical support to the program office.  <b>FY 2018 Plans:</b> Activities include but are not limited to the following: - Continue Engineering and Manufacturing Development (EMD) efforts to further mature technology readiness and manufacturing capabilities - Lead and manage program through daily interaction with contractor and key stakeholders - Oversee programmatic, design and technical reviews, program reviews, etc. - Monitor reliability growth during contractor component, subsystem and system level testing - Identify, monitor and mitigate program and technical risks; facilitate program office reporting - Support follow-on sustainment planning Business Case Analysis (BCA), various studies/analyses and planning activities  <b>FY 2019 Plans:</b> Activities will include but are not limited to the following: - Will continue EMD efforts to further mature technology readiness and manufacturing capabilities - Lead and manage program through daily interaction with contractor and key stakeholders - Oversee programmatic design and technical reviews - Monitor reliability growth during contractor component, subsystem and system level testing - Identify, monitor and mitigate program and technical risks; facilitate program office reporting - Continue preparation of Milestone C documentation - Continue follow-on sustainment planning BCA, various studies/analyses and planning activities		8.448	8.964	7.935

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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)							
C. Accomplishments/Planned Programs (\$ in Millions)										FY 2017	FY 2018	FY 2019
- Will continue to engage with external customers regarding interoperability												
FY 2018 to FY 2019 Increase/Decrease Statement: Funding decreased due to reduction in external Federally-Funded Research and Development Center (FFRDC) support.												
Accomplishments/Planned Programs Subtotals										47.166	10.645	40.326
D. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost	
• OPAF 03 Line Item 833060: 3D Expeditionary Long Range-Radar	-	-	0.000	-	0.000	0.000	63.075	21.902	156.775	636.350	878.102	
Remarks												
E. Acquisition Strategy												
The 3DELRR strategy is 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; with options to produce Low Rate Initial Production (LRIP) units, conduct Interim Contractor Support (ICS), and produce Full Rate Production (FRP) units.												
The primary contract type for EMD is a Fixed Price Incentive Firm (FPIF). The contract also includes a FPIF option to execute LRIP, Cost Plus Fixed Fee (CPFF) options for ICS and Firm Fixed Price (FFP) options for FRP. A CPFF option is planned for ICS due to the uncertainty of the quantity and the exact nature of the work. An FFP option is planned for FRP due to stable requirements and low risk of changes in scope. The program office will exercise the LRIP option upon Milestone Decision Authority (MDA) approval at MS C. The program office will also seek MDA approval to exercise ICS options (as necessary) and FRP options.												
The EMD prime contractor will deliver three (3) EMD units, which will be the primary assets used for Contractor Developmental Test and Evaluation (CDT&E) and Government Developmental Test and Evaluation (DT&E). The LRIP option provides scope for the retrofit of these three (3) EMD units to production quality specifications, which will be used for Government operational testing. The LRIP option also enables the delivery of three (3) additional production quality units for a total of six (6) units at Initial Operational Capability (IOC). Program office will request MDA approval to use procurement funds prior to MS C to procure early Low Rate Initial Production (LRIP) materials to reduce schedule risk. The FRP options will deliver an additional twenty-nine (29) units for a total of thirty-five (35) units at Full Operational Capability (FOC).												

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity	R-1 Program Element (Number/Name)	
3600: Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)	PE 0207455F I Three Dimensional Long-Range Radar (3DELRR)	
The MDA for the 3DELRR program is the Assistant Secretary of the Air Force (Acquisition). The Air Force Program Executive Officer (PEO) for Battle Management (AFPEO BM) 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, as AFLCMC provides contracting, legal, comptroller, programmatic, engineering, test and logistics support.		
F. Performance Metrics		
Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.		

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Air Force</b>												<b>Date:</b> February 2018			
<b>Appropriation/Budget Activity</b> 3600 / 4						<b>R-1 Program Element (Number/Name)</b> PE 0207455F / <i>Three Dimensional Long-Range Radar (3DELRR)</i>						<b>Project (Number/Name)</b> 646002 / <i>Three Dimensional Expeditionary Long Range Radar</i>			
<b>Product Development (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
EMD Phase (Prime Contract)	C/FPIF	Raytheon, Woburn, MA : NV	72.659	38.042	May 2017	-		29.017	Oct 2018	-		29.017	64.548	204.266	56.640
<b>Subtotal</b>			72.659	38.042		-		29.017		-		29.017	64.548	204.266	N/A
<b>Remarks</b> - FINANCIAL PERFORMANCE: 3DELRR is evaluated against traditional Research and Development (R&D) program expenditure benchmarks. Unlike many traditional R&D programs, however, the 3DELRR EMD contract is a FPIF contract with progress payments. 20 percent of incurred costs are withheld until the end of the contract, when they are 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.															
<b>Support (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
System Engineering - A	SS/CPFF	MIT/Lincoln Laboratory : Lexington, MA	4.987	1.900	Nov 2016	1.600	Nov 2017	1.006	Nov 2018	-		1.006	2.072	11.565	-
System Engineering - B	SS/CPFF	Carnegie Mellon University : Pittsburgh, PA	0.269	0.150	Oct 2016	0.150	Oct 2017	0.314	Oct 2018	-		0.314	0.648	1.531	-
System Engineering - C	SS/CPFF	GTRI : Atlanta, GA	0.725	0.725	Feb 2017	0.725	Feb 2018	0.725	Feb 2019	-		0.725	1.450	4.350	-
System Engineering - D	SS/CPFF	MITRE : Bedford, MA	2.758	1.867	Oct 2016	3.080	Oct 2017	3.094	Oct 2018	-		3.094	6.375	17.174	-
<b>Subtotal</b>			8.739	4.642		5.555		5.139		-		5.139	10.545	34.620	N/A
<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Government Developmental Test and Evaluation Planning and Preparation	PO	46 TS : Eglin AFB, FL	1.502	0.676	Oct 2016	1.681	Jan 2018	3.374	Jan 2019	-		3.374	9.168	16.401	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force												Date: February 2018			
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					
Test and Evaluation (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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
Subtotal			1.502	0.676		1.681		3.374		-		3.374	9.168	16.401	N/A
Management Services (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 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
Program Management Administration	Various	AFLCMC/HBDD : Hanscom AFB, MA	16.688	3.806	Oct 2016	3.409	Oct 2017	2.796	Oct 2018	-		2.796	6.088	32.787	-
Subtotal			16.688	3.806		3.409		2.796		-		2.796	6.088	32.787	N/A
			Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			99.588	47.166		10.645		40.326		-		40.326	90.349	288.074	N/A
Remarks															



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Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Air Force

Date: February 2018

## 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*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	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>Three Dimensional Expeditionary Long Range Radar</i></b>																												
EMD Contract Award																												
EMD																												
Government DT&E Planning/Preparation																												
Critical Design Review (CDR) (June 2018)																												
Contractor Test																												
Developmental Test and Evaluation Test Readiness Review (April 2020)																												
Government Development Test																												
EMD Unit Delivery																												
Operational Test Readiness Review (OTRR) (January 2022)																												
Milestone C (December 2021)																												
Government Operational Test																												
Low Rate Initial Production (LRIP)																												
Full Rate Production (FRP) Decision (December 2022)																												
Full Rate Production																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Air Force			<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 3600 / 4	<b>R-1 Program Element (Number/Name)</b> PE 0207455F / <i>Three Dimensional Long-Range Radar (3DELRR)</i>	<b>Project (Number/Name)</b> 646002 / <i>Three Dimensional Expeditionary Long Range Radar</i>	

**Schedule Details**

<b>Events by Sub Project</b>	<b>Start</b>		<b>End</b>	
	<b>Quarter</b>	<b>Year</b>	<b>Quarter</b>	<b>Year</b>
<b><i>Three Dimensional Expeditionary Long Range Radar</i></b>				
EMD Contract Award	3	2017	3	2017
EMD	3	2017	1	2022
Government DT&E Planning/Preparation	3	2017	3	2020
Critical Design Review (CDR) (June 2018)	3	2018	3	2018
Contractor Test	4	2019	1	2021
Developmental Test and Evaluation Test Readiness Review (April 2020)	3	2020	3	2020
Government Development Test	3	2020	1	2022
EMD Unit Delivery	1	2021	1	2021
Operational Test Readiness Review (OTRR) (January 2022)	2	2022	2	2022
Milestone C (December 2021)	1	2022	1	2022
Government Operational Test	2	2022	1	2023
Low Rate Initial Production (LRIP)	1	2022	4	2023
Full Rate Production (FRP) Decision (December 2022)	1	2023	1	2023
Full Rate Production	1	2023	4	2023

**Note**

LRIP phase ends 1QFY24  
FRP phase ends 1QFY29