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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force / BA 5: System Development & Demonstration (SDD)</i>	R-1 Program Element (Number/Name) PE 0207171F / <i>F-15 EPAWSS</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	0.000	133.382	47.322	170.679	0.000	170.679	12.251	0.000	0.000	0.000	0.000	363.634
657108: <i>EPAWSS DEVELOPMENT</i>	0.000	133.382	47.322	170.679	0.000	170.679	12.251	0.000	0.000	0.000	0.000	363.634
Quantity of RDT&E Articles	-	2	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 485

Note

In FY 2016, PE 0207171F, F-15 EPAWSS, Project 676038, EPAWSS, Budget Activity 07, Operational Systems Development was transferred to PE 0207171F, F-15 EPAWSS, Project 657108, EPAWSS Development, Budget Activity 05, System Development and Demonstration to align the program in the correct budget activity.

In FY 2015, PE 0207134F, F-15E Squadrons, Project 670131, Initial Operational Test and Evaluation, F-15 EPAWSS development efforts were transferred to PE 0207171F, F-15 EPAWSS, Project 676038, EPAWSS in order to provide budget transparency.

Prior Years funding in FY 2013 and FY 2014 of \$15.100M was executed in PE 0207134F. Prior Year funding in FY 2015 of \$37.726M was executed in PE 0207171F, Project 676038.

A. Mission Description and Budget Item Justification

The current F-15's self-protection suite called the Tactical Electronic Warfare System (TEWS) is functionally obsolete. It uses 1970's analog technology designed for combat operations in environments defended by 1980s-era radar-based ground and air threats. In addition, this aging system is becoming more difficult and expensive to support. As a result, Air Force is replacing TEWS with the F-15 Eagle Passive/Active Warning and Survivability System (EPAWSS). F-15 EPAWSS is an advanced digital electronic warfare system capable of detecting, identifying, locating, denying, degrading, disrupting, and defeating modern and emerging threat systems in up to contested environments. This upgrade will significantly improve the F-15's capability to autonomously and automatically detect, identify and locate radio frequency (RF) threats as well as provide the ability to deny, degrade, deceive, disrupt and defeat RF and electro-optical/infrared (EO/IR) threat systems in contested and unplanned operations within highly contested environments through 2040. F-15 EPAWSS will provide indication, type and position of ground-based RF threats as well as the indication, type and bearing of airborne threats with the situational awareness needed to avoid, engage or negate the threat. It will also prevent RF and IR threat systems from detecting or acquiring accurate targeting information prior to threat engagement to complicate and/or negate an enemy threat targeting solution and effectively counter enemy missiles/weapons if adversary threat systems engage and employ weapons against friendly forces through components such as chaff, flares, decoys/angle countermeasures and jamming.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver F-15 EPAWSS weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

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This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	137.095	47.322	23.942	0.000	23.942
Current President's Budget	133.382	47.322	170.679	0.000	170.679
Total Adjustments	-3.713	0.000	146.737	0.000	146.737
• 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	0.000	0.000			
• SBIR/STTR Transfer	-3.713	0.000			
• Other Adjustments	0.000	0.000	146.737	0.000	146.737

Change Summary Explanation

FY2021 increase for F-15 EPAWSS requirements

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Eagle Passive/Active Warning Survivability System (EPAWSS)	133.382	47.322	170.679	0.000	170.679
Description: Planned replacement of the existing F-15 self-protection, Tactical Electronic Warfare System (TEWS). This includes technical and acquisition related studies.					
FY 2020 Plans: Continue test aircraft modifications. Continue developmental ground and flight tests, software integration, qualification testing, and test program set development. Complete electronic warfare design verification testing and hardware production. Funds may be used to resolve emerging safety of flight issues, accommodate technology insertion and fulfill FAA or other mandates necessary to ensure continued aircrew safety and mission effectiveness.					
FY 2021 Base Plans: Complete test aircraft modifications and qualification testing. Continue developmental ground and flight tests, software integration, and test program set development. Funds may be used to resolve emerging safety of flight					

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C. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
issues, accommodate technology insertion and fulfill FAA or other mandates necessary to ensure continued aircrew safety and mission effectiveness.					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: The budget increase from FY20 to FY21 is a result of program delays caused by design maturity and producibility challenges with electronic warfare hardware. This left the program with insufficient quantities of hardware to support parallel installation, integration, and test activities. Although these hardware challenges are largely resolved, the resulting inefficiencies had a compounding effect on the program's overall cost and schedule. As a result, significant development work continues in FY21 including the completion of the program's last flight test jet modification along with flight and ground testing.					
Accomplishments/Planned Programs Subtotals	133.382	47.322	170.679	0.000	170.679

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

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• APAF 05 Line Item	147.685	125.417	31.995	-	31.995	308.509	337.335	265.765	270.625	1,256.110	2,743.441
F15EWS: <i>Aircraft Modification</i>											
• APAF 07 Line Item 000999:	-	4.185	8.036	-	8.036	10.204	19.580	11.086	11.289	33.985	98.365
<i>Aircraft Spares and Repair Parts</i>											
• APAF 07 000075:	-	-	52.058	-	52.058	37.388	-	-	-	0.000	89.446
<i>OTHER PRODUCTION CHARGES (OVERVIEW)</i>											

Remarks

FY 2019 - FY 2023 funding is for F-15E Increment 1 Procurement.

E. Acquisition Strategy

F-15 EPAWSS is using an evolutionary acquisition model consisting of two increments. Increment 1 replaces the existing radar warning receiver, internal countermeasure system and countermeasure dispenser system. Increment 2 adds a towed decoy and monopulse angle countermeasure capability. F-15 EPAWSS technical approach is to leverage mature technology where possible from other Air Force or Foreign Military Sales electronic warfare programs. To rapidly field this capability, F-15 EPAWSS is using two decision points in-lieu of a single Milestone C. Decision Point #1 will initiate production activities. Decision Point #2 will initiate

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installation activities. This tailoring provides the Milestone Decision Authority the ability to accelerate Initial Operational Capability by reducing the schedule impact of kit lead times.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0207171F / F-15 EPAWSS	Project (Number/Name) 657108 / EPAWSS DEVELOPMENT
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Product Development	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-
F-15 EPAWSS TMRR	SS/ Various	Boeing : St. Louis, MO	0.000	-		-		-		-		-	0.000	0.000	175.860
F-15 EPAWSS EMD	SS/ Various	Boeing : St. Louis, MO	0.000	112.923	Feb 2019	29.596	Feb 2020	135.321	Feb 2021	-		135.321	9.763	287.603	478.786
F-15 EPAWSS	Various	Various : Various	0.000	6.744	Mar 2019	10.328	Feb 2020	10.241		-		10.241	2.205	29.518	115.854
Subtotal			0.000	119.667		39.924		145.562		-		145.562	11.968	317.121	N/A

Remarks
 FY16PB- EPAWSS efforts were transferred from Budget Activity 7, Operational Systems Development, PE 0207171F, Project Number 676038 to Budget Activity 5, Engineering and Manufacturing Development, PE 0207171F, Project Number 657108 per OSD direction.

The individual program reference to "various" contract methods addresses other government costs for trainers, hardware, special studies, etc., that are required to meet F-15 EPAWSS program objectives. The execution vehicles between these DoD entities vary by effort.

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	-		-		-		-		-	0.000	0.000	-
Government Flight Test	Various	Various : Various	0.000	11.208	Jan 2019	6.201	Jan 2020	23.235		-		23.235	0.000	40.644	72.735
Subtotal			0.000	11.208		6.201		23.235		-		23.235	0.000	40.644	N/A

Remarks
 The individual program reference to "various" contract methods addresses other government costs for trainers, test, hardware, special studies, etc. that are required to meet F-15 EPAWSS program objectives. The execution vehicles between these DoD entities vary by effort.

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0207171F / F-15 EPAWSS	Project (Number/Name) 657108 / EPAWSS DEVELOPMENT
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Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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			
Program Management Support Costs	Various	Various : Various	0.000	2.507	Feb 2019	1.197	Feb 2020	1.882		-		1.882	0.283	5.869	44.399
Subtotal			0.000	2.507		1.197		1.882		-		1.882	0.283	5.869	N/A

Remarks
The individual program reference to "various" contract methods addresses other government costs for trainers, test, hardware, special studies, etc. that are required to meet F-15 EPAWSS program objectives. The execution vehicles between these DoD entities vary by effort.

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	133.382	47.322	170.679	-	170.679	12.251	363.634	N/A

Remarks
Prior Years funding in FY 2013 and FY 2014 of \$15.100M was executed in PE 0207134F.
Prior Year funding in FY 2015 of \$37.726M was executed in PE 0207171F, Project 676038.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

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FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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>F-15 EPAWSS</i>	
Developmental Test	
EPAWSS Milestone C - Decision Point 1	
EPAWSS Decision Point 2	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0207171F / <i>F-15 EPAWSS</i>	Project (Number/Name) 657108 / <i>EPAWSS DEVELOPMENT</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>F-15 EPAWSS</i>				
Developmental Test	1	2019	2	2023
EPAWSS Milestone C - Decision Point 1	1	2021	1	2021
EPAWSS Decision Point 2	3	2022	3	2022