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Selected Acquisition Report (SAR)

RCS: DD-A&T(Q&A)823-485



F-15 Eagle Passive Active Warning Survivability System (F-15 EPAWSS)

As of FY 2020 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

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Sensitivity Originator

No originator information is available at this time.

Common Acronyms and Abbreviations for MDAP Programs

Acq O&M - Acquisition-Related Operations and Maintenance
ACAT - Acquisition Category
ADM - Acquisition Decision Memorandum
APB - Acquisition Program Baseline
APPN - Appropriation
APUC - Average Procurement Unit Cost
\$B - Billions of Dollars
BA - Budget Authority/Budget Activity
Blk - Block
BY - Base Year
CAPE - Cost Assessment and Program Evaluation
CARD - Cost Analysis Requirements Description
CDD - Capability Development Document
CLIN - Contract Line Item Number
CPD - Capability Production Document
CY - Calendar Year
DAB - Defense Acquisition Board
DAE - Defense Acquisition Executive
DAMIR - Defense Acquisition Management Information Retrieval
DoD - Department of Defense
DSN - Defense Switched Network
EMD - Engineering and Manufacturing Development
EVM - Earned Value Management
FOC - Full Operational Capability
FMS - Foreign Military Sales
FRP - Full Rate Production
FY - Fiscal Year
FYDP - Future Years Defense Program
ICE - Independent Cost Estimate
IOC - Initial Operational Capability
Inc - Increment
JROC - Joint Requirements Oversight Council
\$K - Thousands of Dollars
KPP - Key Performance Parameter
LRIP - Low Rate Initial Production
\$M - Millions of Dollars
MDA - Milestone Decision Authority
MDAP - Major Defense Acquisition Program
MILCON - Military Construction
N/A - Not Applicable
O&M - Operations and Maintenance
ORD - Operational Requirements Document
OSD - Office of the Secretary of Defense
O&S - Operating and Support
PAUC - Program Acquisition Unit Cost

PB - President's Budget
PE - Program Element
PEO - Program Executive Officer
PM - Program Manager
POE - Program Office Estimate
RDT&E - Research, Development, Test, and Evaluation
SAR - Selected Acquisition Report
SCP - Service Cost Position
TBD - To Be Determined
TY - Then Year
UCR - Unit Cost Reporting
U.S. - United States
USD(AT&L) - Under Secretary of Defense (Acquisition, Technology and Logistics)
USD(A&S) - Under Secretary of Defense (Acquisition and Sustainment)

Program Information

Program Name

F-15 Eagle Passive Active Warning Survivability System (F-15 EPAWSS)

DoD Component

Air Force

Program Executive Officer Fighters and Bombers

F-15 Division

Responsible Office

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Date Assigned: July 1, 2015

References

SAR Baseline (Development Estimate)

Component Acquisition Executive (CAE) Approved Acquisition Program Baseline (APB) dated November 2, 2016

Approved APB

Component Acquisition Executive (CAE) Approved Acquisition Program Baseline (APB) dated November 2, 2016

Mission and Description

The F-15 is the most versatile fighter in the world today. A mainstay in both air to air and air to ground operations domestic and abroad. Upgrades to the F-15C/E are critical to maintaining its viability past 2040. The proliferation of fourth generation enemy aircraft, sophisticated "double-digit" anti-aircraft missile systems and other enemy systems pose a significant threat to F-15 survivability. The F-15 Eagle Passive Active Warning and Survivability System (EPAWSS) program replaces the existing functionally obsolete F-15 self-protection system. F-15 EPAWSS is an electronic warfare system which includes electronic detection and identification, internal countermeasures, associated antennas, and countermeasures dispensing. F-15 EPAWSS 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 threat systems in within highly contested environments.

Executive Summary

Program Highlights Since Last Report

F-15 EPAWSS is an ACAT IC program entering the formal acquisition reporting process at the EMD phase. The MDA authorized entry into EMD on November 2, 2016. In support of aggressive schedule objectives, the program is executing a tailored DoD Instruction 5000.02 acquisition strategy with Milestone C encompassing two decision points. Decision Point #1 (Production Decision) encompasses approval to award an LRIP contract, buy hardware and conduct other preparatory activities leading up to EPAWSS installation. Decision Point #2 (Deployment Decision) encompasses approval to proceed with system installation on aircraft.

Group B hardware (the electronic warfare mission system) and test jet modification delays continue to pace the program. To help mitigate the impact of these delays, the limited electronic warfare hardware is being allocated to priority integration and test events. This helped ensure that the program could complete a Systems Integration Lab Test Readiness Review on June 20, 2018. Although the quantity of software bundles to complete integration testing is less than planned due to hardware delays, software quality is meeting requirements. In addition, F-15 EPAWSS completed an important electronic warfare demonstration in October 2018. Although there is more work to do, the system demonstrated an ability to detect and identify threats in a dense radio frequency background without freezing / rebooting during the three week test -- a good early indication of maturity. Also, F-15 EPAWSS inducted five aircraft into the extensive EPAWSS modification line at Eglin Air Force Base. The first EPAWSS modified aircraft achieved first flight on 3 April 2019. Finally, in preparation for Decision Point #1, F-15 EPAWSS released an LRIP RFP on March 29, 2018, 1-day early.

Unfortunately, with the removal of F-15C costs / quantities, the program is at a significant Nunn-McCurdy Program Acquisition Unit Cost (PAUC) breach. Although this breach is predominately driven by a reduction in total quantities from 413 to 221, the program is re-evaluating cost and schedule impacts and will likely report cost growth in the near future due to delays mentioned previously.

There are no significant software related issues with this program at this time.

History of Significant Developments Since Program Initiation	
History of Significant Developments Since Program Initiation	
Date	Significant Development Description
July 2015	July 23, 2015: Completed successful Milestone A review with DAE.
August 2015	August 14, 2015: The DAE signed an ADM approving Milestone A, authorizing entry into the Technology Maturation and Risk Reduction (TMRR) Phase and release of the Request for Proposal for EMD, and delegated the program to the Air Force.
September 2015	September 30, 2015: The TMRR contract was awarded to the Boeing Company to begin the risk reduction phase.
July 2016	July 15, 2016: Preliminary Design Review was successfully completed.
September 2016	September 23, 2016: Completed successful Milestone B review with MDA.
November 2016	November 2, 2016: The MDA signed an ADM approving Milestone B and authorizing entry into the EMD Phase.
November 2016	November 3, 2016: Issued Undefinitized Contract Action to begin development phase.
December 2016	December 16, 2016: Definitized EMD contract.
February 2017	February 21, 2017: Critical Design Review successfully completed.
May 2017	May 29, 2017: Group A Modification Kit design complete
June 2017	June 29, 2017: Integrated Baseline Review complete
December 2017	December 4, 2017: Initial Group A modification kits delivered to Eglin Air Force Base.
December 2017	December 5, 2017: 1st Test Aircraft (F-15E #1) inducted for modification at Eglin Air Force Base.
January 2018	January 22, 2018: 2nd Test Aircraft (F-15C # 1) inducted for modification at Eglin Air Force Base.
June 2018	June 20, 2018: Boeing Electronic Systems Integration Laboratory Test Readiness Review
October 2018	October 12, 2018: Air Force Research Laboratory's Integrated Demonstrations and Applications Laboratory # 2 completed
November 2018	Flight Test Readiness Review

Threshold Breaches

APB Breaches

Schedule		<input checked="" type="checkbox"/>
Performance		<input type="checkbox"/>
Cost	RDT&E	<input type="checkbox"/>
	Procurement	<input type="checkbox"/>
	MILCON	<input type="checkbox"/>
	Acq O&M	<input type="checkbox"/>
O&S Cost		<input type="checkbox"/>
Unit Cost	PAUC	<input checked="" type="checkbox"/>
	APUC	<input type="checkbox"/>

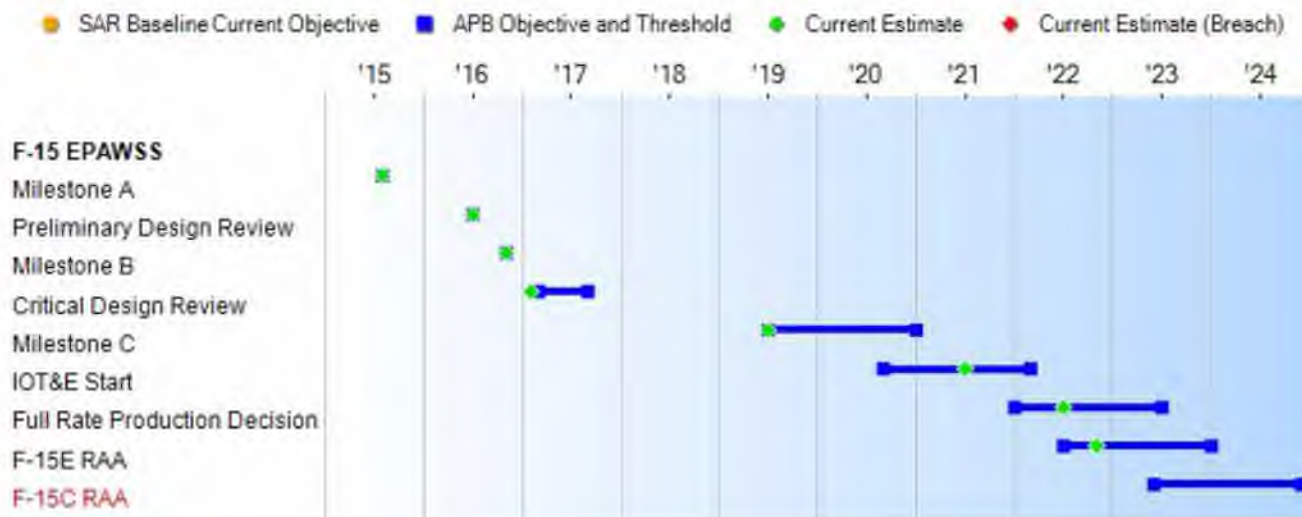
Explanation of Breach

The PAUC and schedule breach is due to a quantity decrease of 192 F-15C models. For the PAUC breach, a cost estimate is in work in order to update the APB. For the schedule breach, the program will update F-15C RAA projections if necessary once a fighter force structure decision is made.

Nunn-McCurdy Breaches

Current UCR Baseline		
	PAUC	Significant
	APUC	None
Original UCR Baseline		
	PAUC	None
	APUC	None

Schedule



Schedule Events					
Events	SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Current Estimate	
Milestone A	Aug 2015	Aug 2015	Aug 2015	Aug 2015	
Preliminary Design Review	Jul 2016	Jul 2016	Jul 2016	Jul 2016	
Milestone B	Nov 2016	Nov 2016	Nov 2016	Nov 2016	
Critical Design Review	Mar 2017	Mar 2017	Sep 2017	Feb 2017	
Milestone C	Jul 2019	Jul 2019	Jan 2021	Jul 2019	(Ch-1)
IOT&E Start	Sep 2020	Sep 2020	Mar 2022	Jul 2021	(Ch-2)
Full Rate Production Decision	Jan 2022	Jan 2022	Jul 2023	Jul 2022	(Ch-3)
F-15E RAA	Jul 2022	Jul 2022	Jan 2024	Nov 2022	(Ch-4)
F-15C RAA	Jun 2023	Jun 2023	Dec 2024	TBD ¹	(Ch-5)

¹ APB Breach

Change Explanations

(Ch-1) The Milestone C current estimate has changed from August 2019 to July 2019 due to F-15 EPAWSS executing a tailored DoD Instruction 5000.02 acquisition strategy that breaks what is traditionally a single Milestone C decision into two decision points. Decision Point #1 (Production Decision) is based on hardware maturity and will allow the program to initiate LRIP kit purchases and other preparatory activities prior to installation. Decision Point #2 (Deployment Decision) is based on overall system maturity and will initiate installation of EPAWSS kits on operational aircraft. This flexibility allows the program to accelerate its Milestone C decision.

(Ch-2) The IOT&E current estimate has changed from September 2020 to July 2021 due to Group B hardware delivery delays pushing development and integration to the right.

(Ch-3) The FRP decision current estimate has changed from January 2022 to July 2022 due Group B hardware pacing the start / completion of developmental testing, IOT&E and causing the Full Rate Production Decision slip.

(Ch-4) The F-15E RAA current estimate has changed from August 2022 to November 2022 based on better information on Group B lead times.

(Ch-5) For the schedule breach, the program will update F-15C RAA projections if necessary once a fighter force structure decision is made.

Notes

1. Milestone B: Briefing held September 23, 2016

2. Critical Design Review: Review completed February 21, 2017

3. F-15E RAA: Includes Val/Ver. RAA is being used as a surrogate for IOC; RAA: 24 F-15E aircraft

4. F-15C RAA: The program will update F-15C RAA projections if necessary once a fighter force structure decision is made.

Acronyms and Abbreviations

IOT&E - Initial Operational Test and Evaluation

RAA - Required Assets Available

Val / Ver - Validation and Verification

Performance

Performance Characteristics				
SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Demonstrated Performance	Current Estimate
Sustainment (Ao and Am)				
Ao = 99% Am = 90%	Ao = 99% Am = 90%	Ao = 97% Am = 88%	TBD	Ao = 99% Am = 90%

Classified Performance information is provided in the classified annex to this submission.

Requirements Reference

CDD dated September 18, 2014

Change Explanations

None

Acronyms and Abbreviations

Am - Materiel Availability
Ao - Aircraft Availability

Track to Budget

General Notes

This section contains Government Budget and cost estimates.

RDT&E

Appn	BA	PE		
Air Force	3600	05	0207171F	
	Project		Name	
	657108		EPAWSS Development	
Air Force	3600	07	0207171F	
	Project		Name	
	676038		EPAWSS Development	(Sunk)

Procurement

Appn	BA	PE		
Air Force	3010	07	0207171F	
	Line Item		Name	
	000075		F-15 EPAWSS Depot Activation	(Shared)
	Notes:	Funding for Depot Activation begins in FY 2021		
Air Force	3010	06	0207171F	
	Line Item		Name	
	000999		Initial Spares/Repair Parts	(Shared)
Air Force	3010	05	0207171F	
	Line Item		Name	
	F15EWS		F-15 EPAWSS	

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 2016 \$M			BY 2016 \$M	TY \$M		
	SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Current Estimate	SAR Baseline Development Estimate	Current APB Development Objective	Current Estimate
RDT&E	876.5	876.5	964.2	938.5	911.3	911.3	984.8
Procurement	3375.0	3375.0	3712.5	1890.3	4114.2	4114.2	2275.1
Flyaway	--	--	--	1537.4	--	--	1841.6
Recurring	--	--	--	1537.4	--	--	1841.6
Non Recurring	--	--	--	0.0	--	--	0.0
Support	--	--	--	352.9	--	--	433.5
Other Support	--	--	--	289.2	--	--	356.2
Initial Spares	--	--	--	63.7	--	--	77.3
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	4251.5	4251.5	N/A	2828.8	5025.5	5025.5	3259.9

Current APB Cost Estimate Reference

SCP dated September 09, 2016

Cost Notes

The program APB reflects Increment 1 only.

The program APB includes modifying both F-15E and F-15C aircraft fleets. However, the Air Force decided not to fund F-15C production in the FY 2018 PB. Despite a congressional add in the FY19 Appropriations Act for four F-15C production kits / installations, the overall reduction in quantities drove an APB deviation as reported in previous SARs, and a Nunn-McCurdy PAUC breach in this SAR. The program is re-evaluating cost and schedule impacts and will likely report cost growth in the near future due to delays mentioned previously.

Total Quantity			
Quantity	SAR Baseline Development Estimate	Current APB Development	Current Estimate
RDT&E	0	0	0
Procurement	413	413	221
Total	413	413	221

Quantity Notes

With the removal of 192 F-15Cs out of EPAWSS, the program's current quantity is 221.

Cost and Funding

Funding Summary

Appropriation Summary									
FY 2020 President's Budget / December 2018 SAR (TY\$ M)									
Appropriation	Prior	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
RDT&E	669.9	137.1	131.8	46.0	0.0	0.0	0.0	0.0	984.8
Procurement	0.0	214.9	153.2	239.3	356.5	357.4	277.2	676.6	2275.1
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB 2020 Total	669.9	352.0	285.0	285.3	356.5	357.4	277.2	676.6	3259.9
PB 2019 Total	677.7	288.8	220.5	150.5	319.0	269.4	209.5	859.4	2994.8
Delta	-7.8	63.2	64.5	134.8	37.5	88.0	67.7	-182.8	265.1

Quantity Summary										
FY 2020 President's Budget / December 2018 SAR (TY\$ M)										
Quantity	Undistributed	Prior	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
Development	0	0	0	0	0	0	0	0	0	0
Production	0	0	18	12	23	27	33	26	82	221
PB 2020 Total	0	0	18	12	23	27	33	26	82	221
PB 2019 Total	4	0	14	12	14	27	27	26	97	221
Delta	-4	0	4	0	9	0	6	0	-15	0

Cost and Funding

Annual Funding By Appropriation

Annual Funding							
3600 RDT&E Research, Development, Test, and Evaluation, Air Force							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2013	--	--	--	--	--	--	4.7
2014	--	--	--	--	--	--	9.6
2015	--	--	--	--	--	--	37.7
2016	--	--	--	--	--	--	174.4
2017	--	--	--	--	--	--	241.5
2018	--	--	--	--	--	--	202.0
2019	--	--	--	--	--	--	137.1
2020	--	--	--	--	--	--	131.8
2021	--	--	--	--	--	--	46.0
Subtotal	--	--	--	--	--	--	984.8

Annual Funding							
3600 RDT&E Research, Development, Test, and Evaluation, Air Force							
Fiscal Year	Quantity	BY 2016 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2013	--	--	--	--	--	--	4.8
2014	--	--	--	--	--	--	9.7
2015	--	--	--	--	--	--	37.8
2016	--	--	--	--	--	--	172.3
2017	--	--	--	--	--	--	233.8
2018	--	--	--	--	--	--	191.5
2019	--	--	--	--	--	--	127.4
2020	--	--	--	--	--	--	120.1
2021	--	--	--	--	--	--	41.1
Subtotal	--	--	--	--	--	--	938.5

Annual Funding								
3010 Procurement Aircraft Procurement, Air Force								
Fiscal Year	Quantity	TY \$M						
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program	
2019	18	184.0	9.4	--	193.4	21.5	214.9	
2020	12	129.3	9.6	--	138.9	14.3	153.2	
2021	23	192.9	9.5	--	202.4	36.9	239.3	
2022	27	304.2	6.6	--	310.8	45.7	356.5	
2023	33	296.7	7.4	--	304.1	53.3	357.4	
2024	26	200.2	7.5	--	207.7	69.5	277.2	
2025	25	140.6	7.7	--	148.3	44.8	193.1	
2026	25	121.6	7.9	--	129.5	46.3	175.8	
2027	25	121.1	7.8	--	128.9	46.4	175.3	
2028	7	72.8	4.8	--	77.6	34.0	111.6	
2029	--	--	--	--	--	20.8	20.8	
Subtotal	221	1763.4	78.2	--	1841.6	433.5	2275.1	

Annual Funding								
3010 Procurement Aircraft Procurement, Air Force								
Fiscal Year	Quantity	BY 2016 \$M						
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program	
2019	18	165.9	8.5	--	174.4	19.3	193.7	
2020	12	114.3	8.5	--	122.8	12.6	135.4	
2021	23	167.1	8.2	--	175.3	32.0	207.3	
2022	27	258.4	5.6	--	264.0	38.8	302.8	
2023	33	247.1	6.2	--	253.3	44.4	297.7	
2024	26	163.5	6.1	--	169.6	56.7	226.3	
2025	25	112.5	6.2	--	118.7	35.9	154.6	
2026	25	95.4	6.2	--	101.6	36.4	138.0	
2027	25	93.2	6.0	--	99.2	35.7	134.9	
2028	7	54.9	3.6	--	58.5	25.7	84.2	
2029	--	--	--	--	--	15.4	15.4	
Subtotal	221	1472.3	65.1	--	1537.4	352.9	1890.3	

Previous SARs reflected the Air Force removal of funding for modifying 196 F-15C aircraft. However, Congress added funding in the FY 2019 Appropriations Act (\$67.2M) for four F-15C production kits / installations.

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	11/2/2016	11/2/2016
Approved Quantity	78	78
Reference	Milestone B ADM	Milestone B ADM
Start Year	2019	2019
End Year	2023	2023

The Current Total LRIP Quantity is more than 10% of the total production quantity in order to meet the E-model IOC CDD requirement of 24 aircraft (1 Squadron) and C-model IOC CDD requirement of 18 aircraft (1 Squadron) while providing spares and continued production until the FRP Decision. The Milestone B ADM assigned a total LRIP Quantity of 78 kits.

Foreign Military Sales

None

Nuclear Costs

The program does not use Department of Energy nuclear resources.

Unit Cost

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2016 \$M	BY 2016 \$M	% Change
	Current UCR Baseline (Nov 2016 APB)	Current Estimate (Dec 2018 SAR)	
Program Acquisition Unit Cost			
Cost	4251.5	2828.8	
Quantity	413	221	
Unit Cost	10.294	12.800¹	+24.34¹
Average Procurement Unit Cost			
Cost	3375.0	1890.3	
Quantity	413	221	
Unit Cost	8.172	8.553	+4.66

Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2016 \$M	BY 2016 \$M	% Change
	Original UCR Baseline (Nov 2016 APB)	Current Estimate (Dec 2018 SAR)	
Program Acquisition Unit Cost			
Cost	4251.5	2828.8	
Quantity	413	221	
Unit Cost	10.294	12.800	+24.34
Average Procurement Unit Cost			
Cost	3375.0	1890.3	
Quantity	413	221	
Unit Cost	8.172	8.553	+4.66

Current UCR Baseline and Current Estimate (Then-Year Dollars)			
Item	TY \$M		TY % Change
	Current UCR Baseline (Nov 2016 APB)	Current Estimate (Dec 2018 SAR)	
Program Acquisition Unit Cost (PAUC)			
Cost	5025.5	3259.9	
Unit Cost	12.168	14.751	+21.23
Average Procurement Unit Cost (APUC)			
Cost	4114.2	2275.1	
Unit Cost	9.962	10.295	+3.34

Original UCR Baseline and Current Estimate (Then-Year Dollars)			
Item	TY \$M		TY % Change
	Original UCR Baseline (Nov 2016 APB)	Current Estimate (Dec 2018 SAR)	
Program Acquisition Unit Cost (PAUC)			
Cost	5025.5	3259.9	
Unit Cost	12.168	14.751	+21.23
Average Procurement Unit Cost (APUC)			
Cost	4114.2	2275.1	
Unit Cost	9.962	10.295	+3.34

¹ Nunn McCurdy Unit Cost Breach and APB Unit Cost Breach

Unit Cost Breach Data		
Changes From Previous SAR	\$M/Qty.	Percent
PAUC (BY \$M)	1.052	+8.95
APUC (BY \$M)	0.506	+6.29
PAUC Quantity		0.00
PAUC (TY \$M)	1.200	+8.86
APUC (TY \$M)	0.559	+5.74

Initial SAR Information		
Initial SAR Information - Jan 2017	BY2016 \$M	TY \$M
Program Acquisition Cost	4251.5	5025.5

Unit Cost PAUC Changes

With the removal of F-15C costs / quantities, the program is at a significant Nunn-McCurdy Program Acquisition Unit Cost (PAUC) breach. Although this breach is predominately driven by a reduction in total quantities from 413 to 221, the program is re-evaluating cost and schedule impacts and will likely report cost growth in the near future due to delays mentioned previously.

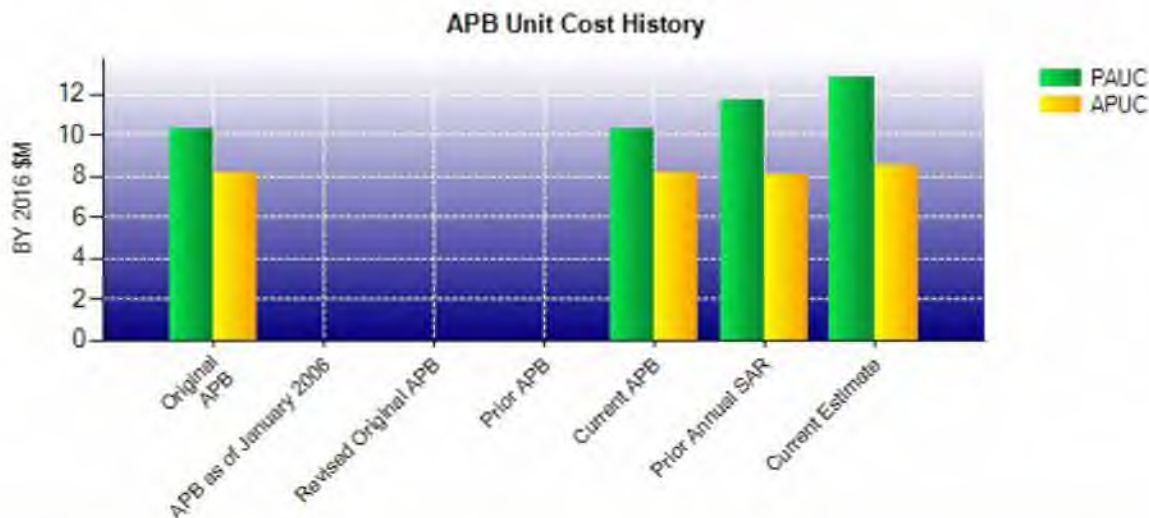
Unit Cost APUC Changes

Impact of Performance or Schedule Changes

Program Management or Control

Cost Control Actions

Nunn-McCurdy Comments



APB Unit Cost History					
Item	Date	BY 2016 \$M		TY \$M	
		PAUC	APUC	PAUC	APUC
Original APB	Nov 2016	10.294	8.172	12.168	9.962
APB as of January 2006	N/A	N/A	N/A	N/A	N/A
Revised Original APB	N/A	N/A	N/A	N/A	N/A
Prior APB	N/A	N/A	N/A	N/A	N/A
Current APB	Nov 2016	10.294	8.172	12.168	9.962
Prior Annual SAR	Dec 2017	11.748	8.047	13.551	9.736
Current Estimate	Dec 2018	12.800	8.553	14.751	10.295

SAR Unit Cost History

Current SAR Baseline to Current Estimate (TY \$M)									
PAUC Development Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
12.168	0.081	2.597	0.544	0.000	-0.331	0.000	-0.308	2.583	14.751

Current SAR Baseline to Current Estimate (TY \$M)									
Initial APUC Development Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
9.962	0.071	0.961	0.048	0.000	-0.439	0.000	-0.308	0.333	10.295

SAR Baseline History				
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current Estimate
Milestone A	N/A	Aug 2015	N/A	Aug 2015
Milestone B	N/A	Nov 2016	N/A	Nov 2016
Milestone C	N/A	Jul 2019	N/A	Jul 2019
IOC	N/A	Jul 2022	N/A	Nov 2022
Total Cost (TY \$M)	N/A	5025.5	N/A	3259.9
Total Quantity	N/A	413	N/A	221
PAUC	N/A	12.168	N/A	14.751

Cost Variance

Summary TY \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Development Estimate)	911.3	4114.2	--	5025.5
Previous Changes				
Economic	-2.3	-5.2	--	-7.5
Quantity	--	-1728.4	--	-1728.4
Schedule	--	+35.6	--	+35.6
Engineering	--	--	--	--
Estimating	-26.9	-208.7	--	-235.6
Other	--	--	--	--
Support	--	-94.8	--	-94.8
Subtotal	-29.2	-2001.5	--	-2030.7
Current Changes				
Economic	+4.5	+20.9	--	+25.4
Quantity	-62.4	+28.2	--	-34.2
Schedule	+109.8	-25.1	--	+84.7
Engineering	--	--	--	--
Estimating	+50.8	+111.6	--	+162.4
Other	--	--	--	--
Support	--	+26.8	--	+26.8
Subtotal	+102.7	+162.4	--	+265.1
Total Changes	+73.5	-1839.1	--	-1765.6
CE - Cost Variance	984.8	2275.1	--	3259.9
CE - Cost & Funding	984.8	2275.1	--	3259.9

Summary BY 2016 \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Development Estimate)	876.5	3375.0	--	4251.5
Previous Changes				
Economic	--	--	--	--
Quantity	--	-1366.7	--	-1366.7
Schedule	--	-22.6	--	-22.6
Engineering	--	--	--	--
Estimating	-26.3	-152.3	--	-178.6
Other	--	--	--	--
Support	--	-87.3	--	-87.3
Subtotal	-26.3	-1628.9	--	-1655.2
Current Changes				
Economic	--	--	--	--
Quantity	-60.4	+21.3	--	-39.1
Schedule	+99.2	+0.1	--	+99.3
Engineering	--	--	--	--
Estimating	+49.5	+97.5	--	+147.0
Other	--	--	--	--
Support	--	+25.3	--	+25.3
Subtotal	+88.3	+144.2	--	+232.5
Total Changes	+62.0	-1484.7	--	-1422.7
CE - Cost Variance	938.5	1890.3	--	2828.8
CE - Cost & Funding	938.5	1890.3	--	2828.8

Previous Estimate: December 2017

RDT&E	\$M	
	Base Year	Then Year
Current Change Explanations		
Revised escalation indices. (Economic)	N/A	+4.5
Quantity variance due to the removal of four F-15C aircraft which are now being retrofitted and included in production quantities. (Quantity)	-60.4	-62.4
Schedule variance due to EMD hardware delivery delays driving increased integration timeline and the duration of EPAWSS test jet modifications which are taking much longer than originally planned. (Schedule)	+99.2	+109.8
Adjustment for current and prior escalation. (Estimating)	-3.6	-3.8
Revised estimate related to system IOT&E aircraft costs for the four F-15C aircraft that were realigned to production units; costs still incurred due to use as developmental test aircraft. (Estimating) (QR)	+60.5	+62.4
Revised estimate due to MDAP penalties and SBIR allocation in FY 2020 and FY 2021. (Estimating)	-7.4	-7.8
RDT&E Subtotal	+88.3	+102.7

(QR) Quantity Related

Procurement	\$M	
	Base Year	Then Year
Current Change Explanations		
Revised escalation indices. (Economic)	N/A	+20.9
Total Quantity variance resulting from an increase of four F-15s from 217 to 221. (Subtotal)	+20.7	+27.4
Quantity variance resulting from an increase of four F-15s from 217 to 221. (Quantity)	(+21.3)	(+28.2)
Allocation to Estimating resulting from Quantity change. (Estimating) (QR)	(-0.7)	(-0.9)
Allocation to Schedule resulting from Quantity change. (Schedule) (QR)	(+0.1)	(+0.1)
Schedule variance related to acceleration of procurement buy profile to align to the updated DoD Instruction 5000.02 acquisition strategy. (Schedule)	0.0	-25.2
Adjustment for current and prior escalation. (Estimating)	-1.1	-1.2
Revised estimate due to planning assumptions adjustment for modification location change, support equipment, Interim Contractor Support and Sustaining Engineering and Program Management expected during fielding. (Estimating)	+93.2	+113.7
Revised estimate to align to the FY 2020 PB. (Estimating)	+88.3	+106.0
Revised estimate due to funding realignment beyond the FYDP as a result of budgetary adjustments. (Estimating)	-82.2	-106.0
Adjustment for current and prior escalation. (Support)	-0.2	-0.2
Increase in Other Support due to increased install support. (Support)	+21.3	+22.0
Increase in Initial Spares to support four F-15C's funded through Congressional add. (Support) (QR)	+4.2	+5.0
Procurement Subtotal	+144.2	+162.4

(QR) Quantity Related

Contracts

Contract Identification

Appropriation: RDT&E
Contract Name: F-15 EPAWSS EMD
Contractor: Boeing (Defense, Space, and Security)
Contractor Location: 6200 JS McDonnell BLVD
 Saint Louis, MO 63134
Contract Number: FA8634-17-C-2650
Contract Type: Cost Plus Incentive Fee (CPIF), Cost Plus Fixed Fee (CPFF)
Award Date: November 03, 2016
Definitization Date: December 16, 2016

Contract Price

Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
478.8	N/A	0	478.8	N/A	0	478.8	478.8

Contract Variance

Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (11/30/2018)	-11.9	-17.6
Previous Cumulative Variances	-7.7	-12.8
Net Change	-4.2	-4.8
Percent Variance		
Percent Complete		

Cost and Schedule Variance Explanations

The unfavorable net change in the cost variance is due to The Group B supplier British Aerospace (BAE) taking longer than planned to deliver the quantity of EMD hardware needed to support the program. This is having a negative impact on cost and schedule.

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Notes

Five F-15E and four F-15C aircraft will be modified during EMD and used for development flight testing.

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	0	0	0	--
Production	0	0	221	0.00%
Total Program Quantity Delivered	0	0	221	0.00%

Expended and Appropriated (TY \$M)			
Total Acquisition Cost	3259.9	Years Appropriated	7
Expended to Date	529.0	Percent Years Appropriated	41.18%
Percent Expended	16.23%	Appropriated to Date	1021.9
Total Funding Years	17	Percent Appropriated	31.35%

The above data is current as of December 31, 2018.

Operating and Support Cost

Cost Estimate Details

Date of Estimate:	September 09, 2016
Source of Estimate:	SCP
Quantity to Sustain:	221
Unit of Measure:	System
Service Life per Unit:	28.00 Years
Fiscal Years in Service:	FY 2021 - FY 2048

System: The F-15 EPAWSS is an electronic warfare system which includes electronic detection and identification, internal countermeasures, associated antennas, and countermeasures dispensing.

Sustainment Strategy

The sustainment strategy is based on United States Air Force organic two-level (Organizational and Depot) maintenance. Per the Source of Repair Assignment decision, the F-15 EPAWSS is designated as a core capability. Warner-Robins Air Logistics Complex is the designated depot for both the hardware and software maintenance. The sustainment strategy implements maintenance and logistics support concepts that emphasize increased reliability, operational availability, and a reduced logistics footprint.

Antecedent Information

The Antecedent System is the F-15 Tactical Electronic Warfare System (TEWS) consisting of electronic detection and identification, internal countermeasures, and countermeasures dispensing. TEWS Source: Air Force Total Ownership Cost Supply Distribution Table FY 2011 - FY 2015.

Cost Element	Annual O&S Costs BY2016 \$K	
	F-15 EPAWSS Average Annual Cost Per System	F-15 TEWS (Antecedent) Average Annual Cost Per System
Unit-Level Manpower	0.000	0.000
Unit Operations	0.000	0.000
Maintenance	103.000	245.000
Sustaining Support	5.000	11.000
Continuing System Improvements	20.000	47.000
Indirect Support	0.000	0.000
Other	0.000	0.000
Total	128.000	303.000

The EPAWSS and TEWS O&S costs are not completely comparable. Portions of the TEWS system O&S costs are not included in the Annual Costs table because they are not included in the available historical costs and development systems will not be sustained.

Item	Total O&S Cost \$M			
	F-15 EPAWSS		Current Estimate	F-15 TEWS (Antecedent)
	Current Development APB Objective/Threshold			
Base Year	1456.2	1601.8	792.1	1837.5
Then Year	2159.4	N/A	1155.5	N/A

Equation to Translate Annual Cost to Total Cost

Total O&S costs = The annual O&S costs per aircraft * 28 years of service * 221 aircraft

O&S Cost Variance		
Category	BY 2016 \$M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2017 SAR	772.9	
Programmatic/Planning Factors	19.2	Increase based on four additional F-15s related to FY 2019 Congressional add.
Cost Estimating Methodology	0.0	
Cost Data Update	0.0	
Labor Rate	0.0	
Energy Rate	0.0	
Technical Input	0.0	
Other	0.0	
Total Changes	19.2	
Current Estimate	792.1	

Disposal Estimate Details

Date of Estimate: September 09, 2016
Source of Estimate: SCP
Disposal/Demilitarization Total Cost (BY 2016 \$M): 0.0

No additional disposal costs expect due to this modification.