RCS: DD-A&T(Q&A)823-474

F-22 Increment 3.2B Modernization (F-22 Inc 3.2B Mod)

As of FY 2021 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

Table of Contents

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-22 Increment 3.2B Modernization (F-22 Inc 3.2B Mod)

DoD Component
Air Force

Responsible Office

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References

SAR Baseline (Production Estimate)

Component Acquisition Executive (CAE) Approved Acquisition Program Baseline (APB) dated March 11, 2017

Approved APB

Component Acquisition Executive (CAE) Approved Acquisition Program Baseline (APB) dated March 11, 2017

Mission and Description

The F-22's combination of stealth, supercruise, maneuverability, Intra-Flight Data Link (IFDL), sensor fusion coupled with improved supportability provides an exponential leap in warfighting capabilities and allows full realization of operational concepts vital to the 21st Century Air Force and joint warfighting anti-access area denial environment. As a critical component of the Global Strike Concept of Operations, the F-22 provides unmatched air-to-air and air-to-ground capabilities.

F-22 Increment 3.2B Modernization (F-22 Inc 3.2B Mod) integrates the Air Intercept Missiles (AIM) AIM-9X and AIM-120D into the F-22, adds Electronic Protection techniques, incorporates new hardware, enhances Geolocate capability, and expands IFDL functionality.

Executive Summary

Program Highlights Since Last Report

F-22 Inc 3.2B Modernization program received the first LRIP kit in April 2019 and began retrofit on May 6, 2019. As of February 10, 2020, 24 aircraft had completed Inc 3.2B retrofit.

Required Asset Available was achieved on August 27, 2019, prior to the September 30, 2019 threshold.

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**
December 2011	USD(AT&L) approved the Material Development Decision and designated F-22 Increment 3.2B Modernization as a pre-MDAP for entry into the acquisition management system at Milestone B as an ACAT 1D program.
December 2012	USD(AT&L) approves the F-22 Increment 3.2B Modernization Acquisition Strategy.
June 2013	USD(AT&L) approves the Milestone B Decision and entry into EMD as an ACAT 1D program.
June 2013	The F-22 Program Office awarded the F-22 Increment 3.2B Modernization EMD contract.
October 2014	F-22 Increment 3.2B Modernization Developmental Test and Evaluation flight testing began.
April 2015	USD(AT&L) delegated F-22 Increment 3.2B Modernization to the Secretary of the Air Force and designated the program as ACAT IC.
July 2015	The F-22 Program Office awarded the LRIP Advance Procurement Contract.
1st Quarter FY 2016	Air Force Operational Test and Evaluation Center conducted an Operational Assessment for F-22 Increment 3.2B Modernization.
September 2016	The SAE approved the F-22 Increment 3.2B Modernization Milestone C Decision and entry into the Production and Deployment Phase.
December 2016	Modifications for the nine aircraft needed to support Initial Operational Test and Evaluation completed.
February 2017	The F-22 Program Office awarded the LRIP I and II contracts.
March 2017	The SAE approved F-22 Increment 3.2B Modernization Milestone C APB.
April 2017	The Capstone Live Fire Event was successfully accomplished.
August 2017	Entered Initial Operational Test and Evaluation.
August 2017	USD(AT&L) signed the Increment 3.2B waiver package allowing cost-plus kit installs.
August 2018	F-22 Increment 3.2B FRP Decision Review ADM issued.
September 2018	FRP contract awarded.
May 2019	LRIP I deliveries began in April 2019 for retrofit that began May 2019
August 2019	Required Asset Available was achieved on August 27, 2019, prior to the September 30, 2019 threshold.

Threshold Breaches

APB Breaches		
Schedule		☐
Performance		☐
Cost	RDT&E	☐
	Procurement	☐
	MILCON	☐
	Acq O&M	☐
O&S Cost		☐
Unit Cost	PAUC	☐
	APUC	☐

Nunn-McCurdy Breaches		
Current UCR Baseline		
	PAUC	None
	APUC	None
Original UCR Baseline		
	PAUC	None
	APUC	None

Schedule

Schedule Events					
Events	SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Current Estimate	
Materiel Development Decision	Dec 2011	Dec 2011	Dec 2011	Dec 2011	
Milestone B	Jun 2013	Jun 2013	Jun 2013	Jun 2013	
Milestone C	Aug 2016	Aug 2016	Aug 2016	Aug 2016	
Full Rate Production	Jul 2018	Jul 2018	Jan 2019	Aug 2018	
Required Assets Available (RAA)	Mar 2019	Mar 2019	Sep 2019	Aug 2019	(Ch-1)

Change Explanations

(Ch-1) RAA was changed from the goal of July 31, 2019 to the actual date of August 27, 2019.

Notes

RAA is defined as six aircraft and associated support equipment.

Performance

Performance Characteristics				
SAR Baseline Production Estimate	**Current APB Production Objective/Threshold**		**Demonstrated Performance**	**Current Estimate**
Materiel Availability (Am)				
Do not degrade aircraft Am below current baseline performance. Baseline performance KPP: By the end of: FY 2011: 61.2% FY 2012: 62.6% FY 2013: 65.8% FY 2014: 67.6% FY 2015: 70.6%	Do not degrade aircraft Am below current baseline performance. Baseline performance KPP: By the end of: FY 2011: 61.2% FY 2012: 62.6% FY 2013: 65.8% FY 2014: 67.6% FY 2015: 70.6%	(T=O) Do not degrade aircraft Am below current baseline performance. Baseline performance KPP: By the end of: FY 2011: 61.2% FY 2012: 62.6% FY 2013: 65.8% FY 2014: 67.6% FY 2015: 70.6%	65.1%	65.1%
Reliability, MTBCF				
Do not degrade aircraft MTBCF below current baseline performance.	Do not degrade aircraft MTBCF below current baseline performance.	(T=O) Do not degrade aircraft MTBCF below current baseline performance.	3.42 hours	3.42 hours
Weapons Integration				
The F-22A shall be modified as required to enable employment of the AIM-120D and the AIM-9X Block II.	The F-22A shall be modified as required to enable employment of the AIM-120D and the AIM-9X Block II.	(T=O) The F-22A shall be modified as required to enable employment of the AIM-120D and the AIM-9X Block II.	Required capabilities provided.	Required capabilities provided

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

Requirements Reference

CPD, dated January 4, 2007, as modified by JROC Memorandum 052-11 dated April 19, 2011

Change Explanations

None

Acronyms and Abbreviations

AIM - Air Intercept Missile
Am - Materiel Availability
MTBCF - Mean Time Between Critical Failure

Track to Budget

RDT&E

Appn	BA	PE		
Air Force	3600	07	0207138F	
	Project	**Name**		
	674785	F-22		(Sunk)
Air Force	3600	07	0207163F	
	Project	**Name**		
	673777	AIM-120D		(Sunk)
Air Force	3600	05	0605213F	
	Project	**Name**		
	654785	F-22 Increment 3.2B		(Sunk)

Procurement

Appn	BA	PE		
Air Force	3010	06	0207138F	
	Line Item	**Name**		
	000999	Initial Spares/Repair Parts		(Sunk)
Air Force	3010	05	0207138F	
	Line Item	**Name**		
	F2232B	Increment 3.2B		
	F2232B	Advance Procurement		(Sunk)

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 2016 $M			BY 2016 $M	TY $M		
	SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Current Estimate	SAR Baseline Production Estimate	Current APB Production Objective	Current Estimate
RDT&E	1181.2	1181.2	1299.3	1171.9	1139.7	1139.7	1130.4
Procurement	301.6	301.6	331.8	260.8	321.2	321.2	278.7
Flyaway	--	--	--	240.8	--	--	257.3
Recurring	--	--	--	240.8	--	--	257.3
Non Recurring	--	--	--	0.0	--	--	0.0
Support	--	--	--	20.0	--	--	21.4
Other Support	--	--	--	6.9	--	--	7.4
Initial Spares	--	--	--	13.1	--	--	14.0
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	1482.8	1482.8	N/A	1432.7	1460.9	1460.9	1409.1

Current APB Cost Estimate Reference

F-22 Increment 3.2B SCP signed by SAF/FMC, dated July 29, 2016

Cost Notes

CAPE Cost Risks: A Program Office Estimate was completed for this program on August 14, 2019. No program risks were identified in the estimate.

Total Quantity			
Quantity	SAR Baseline Production Estimate	Current APB Production	Current Estimate
RDT&E	9	9	9
Procurement	143	143	143
Total	152	152	152

Cost and Funding

Funding Summary

Appropriation Summary FY 2021 President's Budget / December 2019 SAR (TY$ M)									
Appropriation	Prior	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	To Complete	Total
RDT&E	1130.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1130.4
Procurement	252.6	20.2	5.9	0.0	0.0	0.0	0.0	0.0	278.7
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 2021 Total	1383.0	20.2	5.9	0.0	0.0	0.0	0.0	0.0	1409.1
PB 2020 Total	1384.5	20.2	6.0	0.0	0.0	0.0	0.0	0.0	1410.7
Delta	-1.5	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	-1.6

Quantity Summary FY 2021 President's Budget / December 2019 SAR (TY$ M)										
Quantity	Undistributed	Prior	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	To Complete	Total
Development	9	0	0	0	0	0	0	0	0	9
Production	0	143	0	0	0	0	0	0	0	143
PB 2021 Total	9	143	0	0	0	0	0	0	0	152
PB 2020 Total	9	143	0	0	0	0	0	0	0	152
Delta	0	0	0	0	0	0	0	0	0	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
2004	--	--	--	--	--	--	6.4
2005	--	--	--	--	--	--	--
2006	--	--	--	--	--	--	16.5
2007	--	--	--	--	--	--	33.0
2008	--	--	--	--	--	--	31.4
2009	--	--	--	--	--	--	40.8
2010	--	--	--	--	--	--	131.0
2011	--	--	--	--	--	--	129.5
2012	--	--	--	--	--	--	126.0
2013	--	--	--	--	--	--	128.5
2014	--	--	--	--	--	--	108.5
2015	--	--	--	--	--	--	179.4
2016	--	--	--	--	--	--	120.9
2017	--	--	--	--	--	--	64.9
2018	--	--	--	--	--	--	13.6
Subtotal	9	--	--	--	--	--	1130.4

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
2004	--	--	--	--	--	--	7.9
2005	--	--	--	--	--	--	--
2006	--	--	--	--	--	--	19.2
2007	--	--	--	--	--	--	37.4
2008	--	--	--	--	--	--	34.9
2009	--	--	--	--	--	--	44.7
2010	--	--	--	--	--	--	141.8
2011	--	--	--	--	--	--	137.6
2012	--	--	--	--	--	--	131.6
2013	--	--	--	--	--	--	131.9
2014	--	--	--	--	--	--	109.9
2015	--	--	--	--	--	--	179.9
2016	--	--	--	--	--	--	119.4
2017	--	--	--	--	--	--	62.8
2018	--	--	--	--	--	--	12.9
Subtotal	9	--	--	--	--	--	1171.9

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
2015	--	31.0	--	--	31.0	--	31.0
2016	35	61.7	--	--	61.7	4.6	66.3
2017	36	46.0	--	--	46.0	5.9	51.9
2018	72	91.1	--	--	91.1	10.3	101.4
2019	--	1.8	--	--	1.8	0.2	2.0
2020	--	19.8	--	--	19.8	0.4	20.2
2021	--	5.9	--	--	5.9	--	5.9
Subtotal	143	257.3	--	--	257.3	21.4	278.7

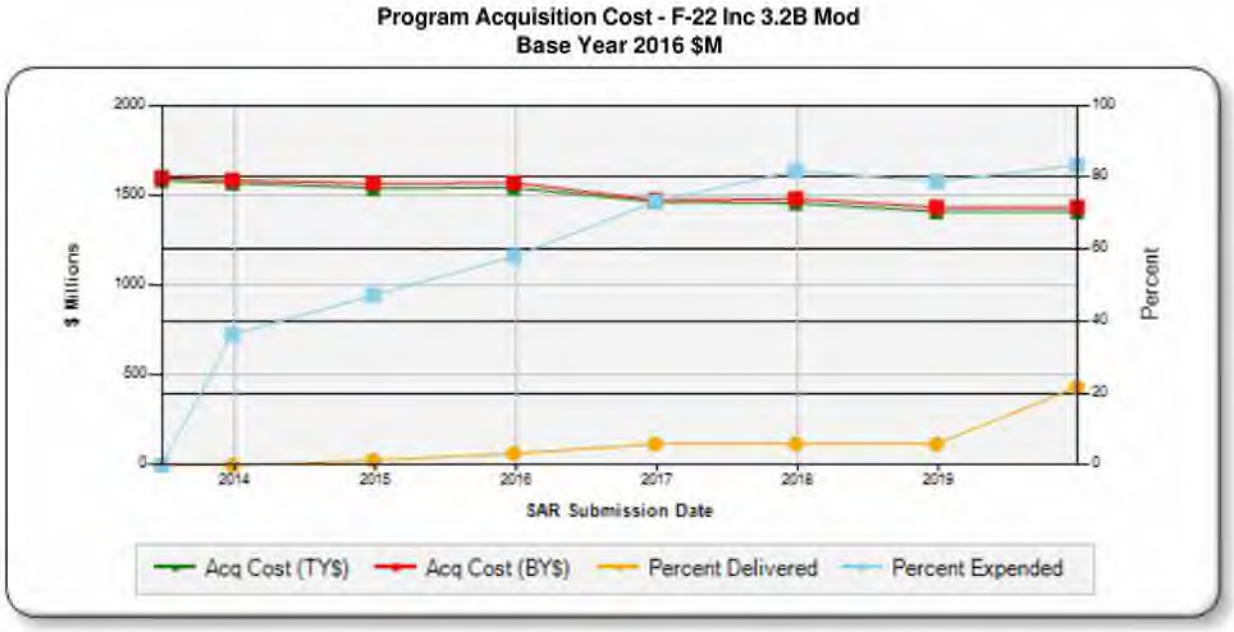
Annual Funding 3010 | Procurement | Aircraft Procurement, Air Force							
Fiscal Year	Quantity	BY 2016 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2015	--	30.3	--	--	30.3	--	30.3
2016	35	59.2	--	--	59.2	4.4	63.6
2017	36	43.3	--	--	43.3	5.5	48.8
2018	72	83.8	--	--	83.8	9.5	93.3
2019	--	1.6	--	--	1.6	0.2	1.8
2020	--	17.5	--	--	17.5	0.4	17.9
2021	--	5.1	--	--	5.1	--	5.1
Subtotal	143	240.8	--	--	240.8	20.0	260.8

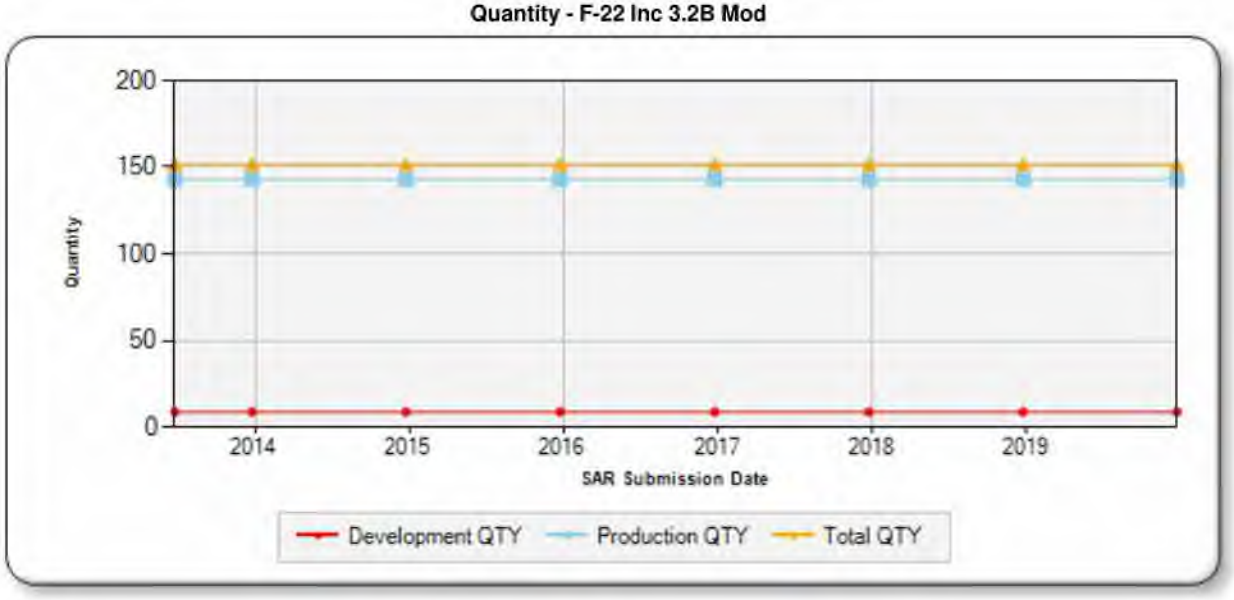
Inc 3.2B paid $0.072M toward System tax

Cost Quantity Information 3010 | Procurement | Aircraft Procurement, Air Force		
Fiscal Year	**Quantity**	**End Item Recurring Flyaway (Aligned With Quantity) BY 2016 $M**
2015	--	--
2016	35	58.9
2017	36	60.7
2018	72	121.2
2019	--	--
2020	--	--
2021	--	--
Subtotal	143	240.8

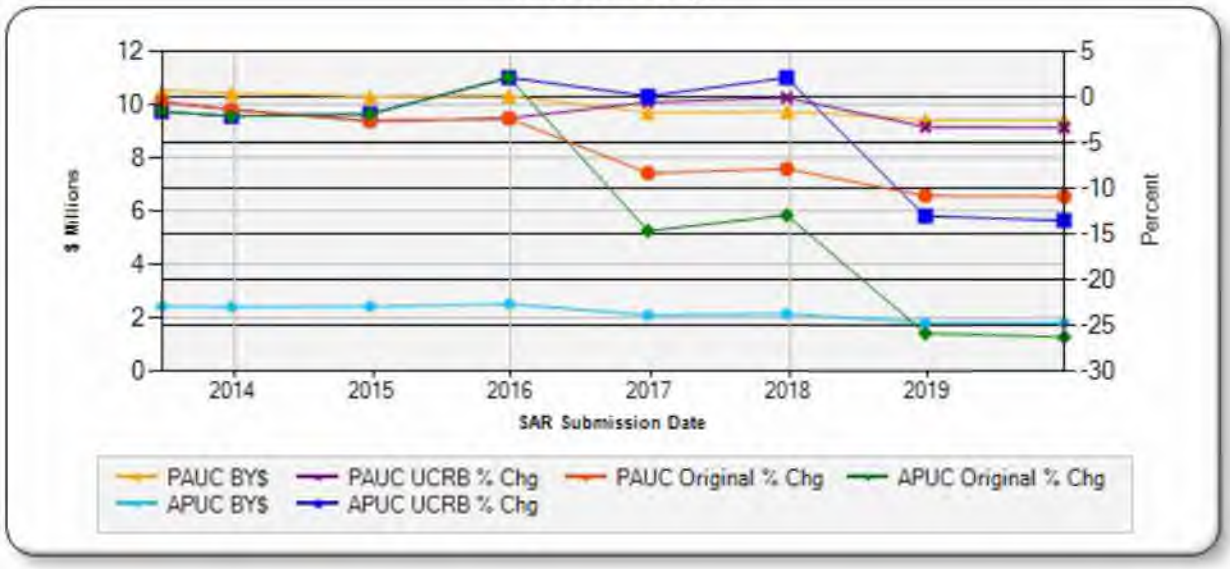
Charts

F-22 Inc 3.2B Mod first began SAR reporting in June 2013





Unit Cost - F-22 Inc 3.2B Mod
Base Year 2016 $M



Risks

Significant Schedule and Technical Risks

Significant Schedule and Technical Risks	
Full Rate Production (August 2018)	
1.	Global Positioning System Inertial Navigation System (GINS) field failures reduce quantity of GINS assets available to seed retrofit program. If GINS field failures reduce the quantity of spares available to support GINS turnaround, then GINS may not be available to support aircraft modifications.
2.	GINS Supplier Modification Retrofit Turnaround. If GINS supplier retrofit turnaround time cannot be met, then GINS may not be available to support aircraft modifications. FRP contract awarded September 25, 2018 and included turnaround spares assets and enhanced rapid pit stop capability to support improved turnaround time.
Milestone B (June 2013)	
1.	Risk: Air Intercept Missile (AIM)-9X Block 2 Operational Flight Software (OFS) 9.4. If AIM-9X Block 2 OFS development schedule does not meet Inc. 3.2B Operational Test need date, then AIM-9X Block 2 will not field as part of Inc. 3.2B. (This risk has been retired)
2.	Risk: GINS Ability to Meet Geolocation 2 (GEO2) Timing Requirements due to Environmental Affect. If environmental affects have a negative impact on the GINS to create accurate Universal Time Coordinated at Time-Sync Pulse timetag, then overall GEO2 functional requirements cannot be met. (This risk has been retired)
3.	Risk: Radome Risk x3 (Classified). (This risk has been retired)
4.	Risk: Electronic Protection (EP13)/GEO 2 Flight Test Verification. If EP13/GEO2 capability verification can only be accomplished via flight test and a significant problem is found, then additional corrective action and problem report resolution will need to take place, forcing an additional software releases and delaying completion of Development Test. (This risk has been retired)
5.	Risk: Inc. 3.2B Laboratory Accreditation. If laboratory accreditations for new Inc 3.2B capabilities are not obtained, then Inc 3.2B flight test schedules, sorties, and staffing will have to be renegotiated and reworked in order to shift testing from the Laboratories to Flight Test. (This risk has been retired)
6.	Risk: AIM-120D Integration Risk. If functional Multi-Target Interface Units (MTIU) are not available to support Inc 3.2B, then functionality requiring verification via the MTIU will continue to be accompanied by an aircraft operating limitation. (This risk has been retired)
Milestone C (August 2016)	
1.	AIM-120 Model Acquisition. If the Air Combat Simulation (ACS) does not receive a representative AIM-120D missile model, then simulation events in the ACS will not be adequate to conduct Air Force Operational Test Center testing. (This risk has been retired)
2.	GINS field failures reduce quantity of GINS assets available to seed retrofit program. If GINS field failures reduce the quantity of spares available to support GINS turnaround, then GINS may not be available to support aircraft modifications.
3.	GINS Supplier Mod Retrofit Turnaround. If GINS supplier retrofit turnaround time cannot be met, then GINS may not be available to support aircraft modifications.
4.	Long Lead Enhanced Stores Management System Backplane Assembly Timeline. If long lead procurement for FRP backplane (molded cable) is not funded in LRIP II, then FRP kit delivery will not support modification timeline. (This risk has been retired)

Current Estimate (December 2019)	
1.	Inc 3.2B updates the Global Positioning System Inertial Navigation System (GINS) units using a turnaround pool concept. If GINS field failures reduce the quantity of GINS available for update, then GINS may not be available to support aircraft modification schedule.
2.	GINS Supplier Modification Retrofit Turnaround. If GINS need repair to complete their update, turnaround times may not support aircraft modifications. Full Rate Production contract funded an enhanced rapid pit stop capability to improve turnaround time; the capability began operation in January, 2020.

Risks

Risk and Sensitivity Analysis

Risks and Sensitivity Analysis	
Current Baseline Estimate (March 2017)	
1.	Total Acquisition Cost (BY13$M) - $1,418M (Qty 152); PAUC - $9.33M (Qty 152); APUC - $2.02M (Qty 143). Risks - Software development; Nine months of RDT&E work added to the original period of performance to account for any issues encountered during flight test.
Original Baseline Estimate (June 2013)	
1.	Total Acquisition Cost (BY13$M) - $1,538M (Qty 152); PAUC - $10.12M (Qty 152); APUC - $2.37M (Qty 143). Risks - Four months of flight test work added to account for possible impacts related to multiple software releases.
Revised Original Estimate (N/A)	
None	
Current Procurement Cost (December 2019)	
1.	Total Acquisition Cost (BY13$M) - $1,405M (Qty 152); PAUC - $9.24M (Qty 152); APUC - $1.98M (Qty 143). 2 Risks – (1) Delaying contract award may result in a hardware production break between LRIP and FRP and (2) Possible non-Increment 3.2B retrofits impacting the Increment 3.2B installation timeline and costs. There is no increase to the PAUC or APUC with this additional risk

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	6/26/2013	6/26/2013
Approved Quantity	71	71
Reference	Milestone B ADM	Milestone B ADM
Start Year	2016	2016
End Year	2017	2017

The Current Total LRIP Quantity is more than 10% of the total production quantity due to an opportunity to capture economic order quantity efficiencies. This strategy was approved as part of the Milestone B review.

Foreign Military Sales

None

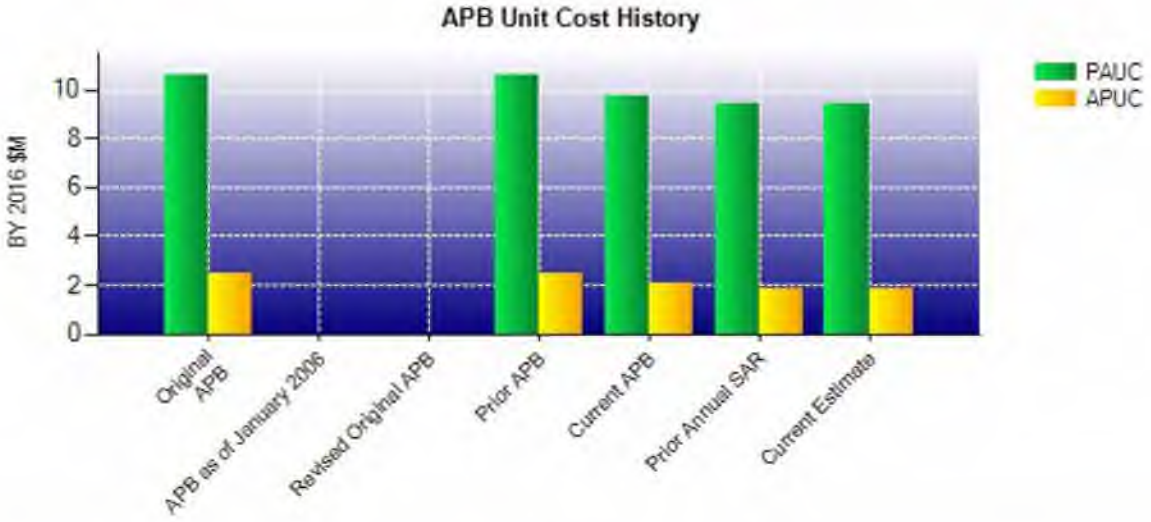
Nuclear Costs

None

Unit Cost

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2016 $M Current UCR Baseline (Mar 2017 APB)	BY 2016 $M Current Estimate (Dec 2019 SAR)	% Change
Program Acquisition Unit Cost			
Cost	1482.8	1432.7	
Quantity	152	152	
Unit Cost	9.755	9.426	-3.37
Average Procurement Unit Cost			
Cost	301.6	260.8	
Quantity	143	143	
Unit Cost	2.109	1.824	-13.51

Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2016 $M Original UCR Baseline (Jun 2013 APB)	BY 2016 $M Current Estimate (Dec 2019 SAR)	% Change
Program Acquisition Unit Cost			
Cost	1607.9	1432.7	
Quantity	152	152	
Unit Cost	10.578	9.426	-10.89
Average Procurement Unit Cost			
Cost	353.7	260.8	
Quantity	143	143	
Unit Cost	2.473	1.824	-26.24



APB Unit Cost History					
Item	Date	BY 2016 $M		TY $M	
		PAUC	APUC	PAUC	APUC
Original APB	Jun 2013	10.578	2.473	10.422	2.635
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	Jun 2013	10.578	2.473	10.422	2.635
Current APB	Mar 2017	9.755	2.109	9.611	2.246
Prior Annual SAR	Dec 2018	9.435	1.834	9.281	1.960
Current Estimate	Dec 2019	9.426	1.824	9.270	1.949

SAR Unit Cost History

Initial SAR Baseline to Current SAR Baseline (TY $M)									
Initial PAUC Development Estimate	Changes								PAUC Production Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
10.422	0.051	0.000	0.000	0.000	-0.860	0.000	-0.002	-0.811	9.611

Current SAR Baseline to Current Estimate (TY $M)									
PAUC Production Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
9.611	0.008	0.000	0.000	0.000	-0.340	0.000	-0.009	-0.341	9.270

Initial SAR Baseline to Current SAR Baseline (TY $M)									
Initial APUC Development Estimate	Changes								APUC Production Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
2.635	0.029	0.000	0.000	0.000	-0.416	0.000	-0.002	-0.389	2.246

Current SAR Baseline to Current Estimate (TY $M)									
APUC Production Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
2.246	0.006	0.000	0.000	0.000	-0.294	0.000	-0.009	-0.297	1.949

SAR Baseline History				
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current Estimate
Milestone A	N/A	N/A	N/A	N/A
Milestone B	N/A	Mar 2013	Jun 2013	Jun 2013
Milestone C	N/A	Mar 2016	Aug 2016	Aug 2016
RAA	N/A	Mar 2019	N/A	N/A
Total Cost (TY $M)	N/A	1584.1	1460.9	1409.1
Total Quantity	N/A	152	152	152
PAUC	N/A	10.422	9.611	9.270

Cost Variance

Summary TY $M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	1139.7	321.2	--	1460.9
Previous Changes				
Economic	+0.3	+1.0	--	+1.3
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-9.6	-40.6	--	-50.2
Other	--	--	--	--
Support	--	-1.3	--	-1.3
Subtotal	-9.3	-40.9	--	-50.2
Current Changes				
Economic	--	-0.1	--	-0.1
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	-1.5	--	-1.5
Other	--	--	--	--
Support	--	--	--	--
Subtotal	--	-1.6	--	-1.6
Total Changes	-9.3	-42.5	--	-51.8
Current Estimate	1130.4	278.7	--	1409.1

Summary BY 2016 $M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	1181.2	301.6	--	1482.8
Previous Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-9.3	-38.1	--	-47.4
Other	--	--	--	--
Support	--	-1.3	--	-1.3
Subtotal	-9.3	-39.4	--	-48.7
Current Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	-1.3	--	-1.3
Other	--	--	--	--
Support	--	-0.1	--	-0.1
Subtotal	--	-1.4	--	-1.4
Total Changes	-9.3	-40.8	--	-50.1
Current Estimate	1171.9	260.8	--	1432.7

Previous Estimate: December 2018

Procurement	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-0.1
New Estimating change. Revised cost estimate to reflect actuals. Decrease in Initial Spares to reflect the updated estimate. (Estimating)	-1.5	-1.6
Adjustment for current and prior escalation. (Estimating)	+0.2	+0.1
Adjustment for current and prior escalation. (Support)	-0.1	0.0
Procurement Subtotal	-1.4	-1.6

Contracts

Contract Identification

Appropriation: Procurement
Contract Name: Increment 3.2B Production
Contractor: Lockheed Martin Corporation
Contractor Location: 1 Lockheed Blvd
Fort Worth, TX 76108-3619
Contract Number: FA8611-13-D-2850/5
Contract Type: Firm Fixed Price (FFP)
Award Date: July 22, 2015
Definitization Date: July 22, 2015

Contract Price							
Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
20.4	N/A	0	248.7	N/A	143	248.7	248.7

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to multiple modifications for Advance Procurement for EMD, Diminishing Manufacturing Sources, and Processor Interface Control and Communication 3 for $7.6M, the awards on February 28, 2017 of 3.2B Production and Deployment LRIPs I and II in the amount of $114.3M, and the award on March 28, 2017 of Advance Procurement for Production in the amount of $3.4M. The current total of $248.7M includes Full Rate Production award made on September 25, 2018 for the remaining 72 kits.

Cost and Schedule Variance Explanations

Cost and Schedule Variance reporting is not required on this (FFP) contract.

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	9	9	9	100.00%
Production	32	24	143	16.78%
Total Program Quantity Delivered	41	33	152	21.71%

Expended and Appropriated (TY $M)			
Total Acquisition Cost	1409.1	Years Appropriated	17
Expended to Date	1175.6	Percent Years Appropriated	94.44%
Percent Expended	83.43%	Appropriated to Date	1403.2
Total Funding Years	18	Percent Appropriated	99.58%

The above data is current as of February 10, 2020.

Notes

Total funding years reflect development executed in support of the F-22 Inc 3.2B Mod program. Beginning in FY 2011 the program was rescoped into smaller increments of capability (e.g. 3.2A, 3.2B) to adjust to financial constraints, facilitate improved baseline control/management, and meet capability delivery needs. F-22 Inc 3.2B Mod officially started in FY 2013 with approval of Milestone B.

LRIP I deliveries began in April 2019 for retrofit that began May 2019.

Operating and Support Cost

Cost Estimate Details

Date of Estimate: August 08, 2019
Source of Estimate: SCP
Quantity to Sustain: 149
Unit of Measure: Modified Aircraft
Service Life per Unit: 33.00 Years
Fiscal Years in Service: FY 2018 - FY 2051

The F-22 Inc 3.2B Mod is a capability upgrade modification program. The program will modify 152 F-22A aircraft (9 RDT&E and 143 Procurement). Of the 152 aircraft, 3 are development test assets, and 149 will be sustained with O&S funds.

Sustainment Strategy

Given the low hardware risk of the F-22 Inc 3.2B Mod upgrade, sustainment requirements will be managed within the baseline F-22 sustainment concept with minimal impact on O&S cost estimates or achievement of materiel availability goals. The F-22 sustainment strategy is to sustain F-22 readiness and availability at the lowest cost over the life of the weapon system. The F-22 sustainment strategy employs Performance-Based Logistics contracts with Public/Private Partnering for depot repair capabilities to meet Air Force Core requirements.

Antecedent Information

No Antecedent

Annual O&S Costs BY2016 $K		
Cost Element	**F-22 Inc 3.2B Mod Average Annual Cost Per Modified Aircraft**	**No Antecedent (Antecedent)**
Unit-Level Manpower	0.000	0.000
Unit Operations	0.000	0.000
Maintenance	7.100	0.000
Sustaining Support	0.000	0.000
Continuing System Improvements	26.400	0.000
Indirect Support	0.000	0.000
Other	0.000	0.000
Total	33.500	--

Average Primary Aircraft Assigned (PAA): 163 (entire F-22 fleet)

Item	Total O&S Cost $M			
	F-22 Inc 3.2B Mod			No Antecedent (Antecedent)
	Current Production APB Objective/Threshold		Current Estimate	
Base Year	180.0	198.0	180.0	N/A
Then Year	260.9	N/A	N/A	0.0

The F-22 Inc 3.2B Mod O&S costs will not be tracked separately as directed by the June 26, 2013 ADM.
F-22A Modernization Increment 3.2B O&S cost estimate from the Milestone C SCP is $180M (BY 2016), $260.9M (TY). The total life cycle cost estimate for the F-22A system is $96.3B (BY 2016$). The service life of the F-22 system was increased from 15 years to 33 years per modified aircraft.

The Air Force expects F-22 Inc 3.2B Mod O&S costs to be budgeted in the baseline F-22 PE (27138F) and expended along with baseline program O&S funds, so the PAA value used in the calculation includes all F-22s, not just the aircraft receiving the Inc 3.2B modification.

Costs are applied for the years 2018 (1st modified aircraft is fielded) through 2051 (33 years).

Equation to Translate Annual Cost to Total Cost

Unitized cost estimate is calculated:
Total O&S / estimated service life / Average PAA; ($180.0M/33/163) = $33.5K
The average annual cost per modified aircraft represents the additional O&S cost of the 149 modified aircraft spread over the entire fleet of F-22 aircraft (163 PAA). This is necessary since the modified aircraft will be reported as part of the overall F-22 baseline program.

O&S Cost Variance		
Category	BY 2016 $M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2018 SAR	180.0	
Programmatic/Planning Factors	0.0	
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	0.0	
Current Estimate	180.0	

Disposal Estimate Details

Date of Estimate:

Source of Estimate:

Disposal/Demilitarization Total Cost (BY 2016 $M):

Disposal costs for this modification are included in the F-22 platform.