

UNCLASSIFIED



**CLEARED AS AMENDED  
For Open Publication**

May 02, 2022

Department of Defense  
OFFICE OF PREPUBLICATION AND SECURITY REVIEW

---

# F-35 LIGHTNING II JOINT STRIKE FIGHTER (JSF) PROGRAM (F-35)

---

**December 2021 Selected Acquisition Report (SAR)**



DECEMBER 31, 2021  
DEPARTMENT OF THE NAVY

---

UNCLASSIFIED

## Contents

Program Manager .....	2
Mission and Description .....	2
Executive Summary .....	3
History of Significant Developments Since Program Initiation .....	4
Schedule .....	5
Schedule Events .....	5
Schedule Notes: .....	6
Deviation Explanations: .....	6
Significant Schedule Risks .....	6
Performance .....	7
Performance Notes: .....	8
Requirements Source: .....	8
Acquisition Budget Estimate .....	10
Total Acquisition Cost .....	10
Total End Item Quantity .....	10
Budget Notes: .....	10
Quantity Notes: .....	10
Risk and Sensitivity Analysis .....	10
Unit Cost .....	11
Current Baseline Compared with Current Estimate .....	11
Original Baseline Compared with Current Estimate .....	11
Unit Cost Notes: .....	11
Contracts .....	12
Technologies and Systems Engineering .....	18
Significant Technical Risks .....	18
Deliveries and Expenditures .....	19
Low Rate Initial Production .....	20
LRIP Note: .....	20
Operating and Support Costs .....	21
Total Program O&S Cost Compared with Baseline .....	21
O&S Cost Breakdown .....	21

UNCLASSIFIED

**Program Manager****Name:** Lt Gen Eric T. Fick**Date Assigned:** July 11, 2019**Address:** 200 12<sup>th</sup> St South, Arlington, VA 22202**Phone:** 703-601-5602**Email:** CAG\_Workflow@jsf.mil**Mission and Description**

The F-35 Lightning II Program will develop and field an affordable, highly common family of next-generation strike aircraft for the U.S. Navy, Air Force, Marine Corps, and allies. The F-35 is produced in three variants: F-35A; F-35B; and F-35C. The F-35A is a stealthy multi-role aircraft, intended to serve primarily in air-to-ground roles for the U.S. Air Force (USAF); replacing the F-16 and A-10, and complementing the F-22. The F-35B variant is a multi-role strike fighter aircraft, replacing the AV-8B and F/A-18A/C/D for the U.S. Marine Corps (USMC). The F-35C is also flown by the USMC, and provides the U.S. Navy (USN) a multi-role, stealthy strike fighter aircraft to complement the F/A-18E/F. The planned DoD F-35 Fleet will replace the joint services' legacy fleets. The transition from multiple type/model/series to a common platform will result in a smaller total force over time and generate operational and overall cost efficiencies.

UNCLASSIFIED



## Executive Summary

### Significant Accomplishments:

- **Capability: We are Developing, Delivering, and Sustaining 5th Generation capabilities to dominate the Joint Battlespace against near peer adversaries.**
  - Rebaselined the F-35 Lot 12-14 Air Vehicle Production Contract, stabilizing F-35 production schedules following disruption due to COVID-driven delays.
  - Delivered 142 aircraft in CY 2021, including the 700th F-35 and all 139 aircraft specified in the contract...during a global pandemic.
  - Successfully completed all Dual Capable Aircraft flight-testing, including Developmental Test, Final Aircraft Monitor and Control testing on production aircraft, and Full Weapon System Demonstration, keeping the program on track for both design certification one year earlier than originally planned and to meet NATO's CY 2024 need date.
- **Affordability: We are committed to cost reduction across the Acquisition lifecycle.**
  - Awarded the FY 2021-2023 Air Vehicle Sustainment contract to Lockheed Martin (LM). This historic agreement is the F-35's first multiple-year sustainment contract and is a positive step in securing affordable lifecycle costs for our customers. Under this contract, cost per flight hour (CPFH) across all variants will be reduced from the original projection of \$36.1k in CY 2023 to \$33.4k.
  - Fielded 32 Reliability and Maintainability Improvement Program (RMIP) projects in CY 2021; since inception RMIP has increased the baseline mission capability rate of the F-35 by more than 7.5% and reduced total lifecycle cost by more than \$9.2B.
  - Initiated 53 new F135 Component Improvement Program (CIP) tasks in CY 2021 with 24 tasks having a Life Cycle Cost benefit totaling \$4.98B.
- **Agility: Focused on adapting our business methods and tools to optimize our response to customer needs.**
  - Solidified use of digital engineering processes by completing model-based development of three new Program of Record capabilities for a pre-System Requirements Review milestone, setting the foundation for all future F-35 capabilities to be born digital.
  - Released the Systems Engineering, Integration, and Test Request for Proposal (RFP) to LM, establishing a contracting approach to reduce artificial pauses in development into an agile software factory for integration.
  - Prepared processes and procedures under the Common Reprogramming Tools program to merge systems engineering and agile software development frameworks together. This merger created a requirements decomposition and tracking process for the program, accelerating change in the reprogramming world by providing better tool sets and suites.
- **Deployability: Focused on driving improvements across the Joint and International Enterprise to ensure the warfighters can fight at the time and place of their choosing.**
  - Executed 81 deployments involving 538 Aircraft including USN's first F-35C deployment and the first joint UK/USMC F-35B deployment aboard HMS Queen Elizabeth.
  - Achieved Ready for Deployment for three ships: USS Carl Vinson; USS Abraham Lincoln; and Italy's ITS Cavour.
  - Fielded 12 Operational Data Integrated Network (ODIN) Base Kits in Jul-Dec 2021, replacing the field's oldest unclassified Squadron Operating Unit servers with state-of-the-art hardware that is 80% smaller and costs 30% less than legacy hardware.

### Significant Issues:

Deficiency correction and accreditation efforts for the Joint Simulation Environment (JSE) continue to drive the path to a Full Rate Production (FRP) decision. These issues in addition to the impacts of the COVID-19 pandemic resulted in exceeding the Defense Acquisition Executive (DAE) mandated baseline FRP Decision dates reflected in the December 2019 SAR. An Acquisition Program Baseline (APB) change proposal is currently in development to reflect updated dates. As of this SAR, the proposal has not been approved and is not included in this report."

UNCLASSIFIED

*History of Significant Developments Since Program Initiation*

History of Significant Developments Since Program Initiation	
Date	Significant Development Description
November 1996	Concept Demonstration Contracts Awarded - Contracts for development of the final two contenders for the Joint Strike Fighter (JSF) program
October 2001	Milestone B - Approval of Milestone B
October 2001	System Development and Demonstration (SDD) Contract Awarded - Award of the SDD contracts to the air vehicle and propulsion providers for the JSF
April 2007	Low Rate Initial Production (LRIP) 1 Contract Signed - Production of F-35 aircraft begins
June 2010	Nunn-McCurdy Recertification - Recertification of the program pursuant to 10 USC 2433a as required after a critical cost breach
December 2011	Creation of subprograms - Split of program to 'aircraft' and 'engine' subprograms
November 2018	Initial Operational Test & Evaluation (IOT&E) Starts
December 2019	Acquisition Decision Memorandum - Schedule breach relating to Milestone C/Full Rate Production Decision Review relating to Joint Simulation Environment (JSE) delays
February 2020	Acquisition Program Baseline change pursuant to December 2019 Acquisition Decision Memorandum (no additional changes)

UNCLASSIFIED



## Schedule

### Schedule Events

Schedule Events					
Events	Development APB Objective	Current APB Development Objective/Threshold		Current Estimate/Actual	Deviation
Concept Demonstration Contract Award	Nov 1996	Nov 1996	Nov 1996	Nov 1996	
Milestone B	Oct 2001	Oct 2001	Apr 2002	Oct 2001	
EMD Contract Award	Oct 2001	Oct 2001	Oct 2001	Oct 2001	
Preliminary Design Review	Apr 2003	Mar 2003	Mar 2003	Mar 2003	
<b>CDR</b>					
CDR (CTOL & Common)	Feb 2006	Feb 2006	Feb 2006	Feb 2006	
CDR (STOVL & Common)	Feb 2006	Feb 2006	Feb 2006	Feb 2006	
CDR (CV & Common)	Jun 2007	Jun 2007	Jun 2007	Jun 2007	
DAE (IPR 1)	Mar 2006	Mar 2006	Mar 2006	Mar 2006	
1st Flt CTOL	Dec 2006	Dec 2006	Dec 2006	Dec 2006	
DAE (IPR 2)	Apr 2007	Apr 2007	Apr 2007	Apr 2007	
1st Flt STOVL	Jun 2008	Jun 2008	Jun 2008	Jun 2008	
1st Flt CV	Jun 2010	May 2010	May 2010	May 2010	
1st Production Aircraft Delivered	May 2011	May 2011	May 2011	May 2011	
Milestone B Re-approval	Mar 2012	Nov 2011	May 2012	Mar 2012	
Block 2B Fleet Release	Mar 2015	Mar 2015	Sep 2015	Jun 2015	
USMC IOC	TBD	Jul 2015	Dec 2015	Jul 2015	
USAF IOC	TBD	Aug 2016	Dec 2016	Aug 2016	
Block 3F Fleet Release	Aug 2017	Aug 2017	Feb 2018	Aug 2017	
USN IOC	TBD	Aug 2018	Feb 2019	Feb 2019	
Completed IOT&E	Feb 2019	Sep 2020	Mar 2021	TBD	Yes
Full Rate Production Decision	Apr 2019	Sep 2020	Mar 2021	TBD	Yes
DAB Milestone C	Apr 2019	Sep 2020	Mar 2021	TBD	Yes
TR-3 CDR	N/A	Jun 2019	Jun 2019	Jun 2019	
First TR-3 Aircraft Delivery	N/A	Jan 2023	Jan 2023	TBD	Yes

UNCLASSIFIED

DCA Certification	N/A	Jan 2023	Jan 2023	Jan 2023	
-------------------	-----	----------	----------	----------	--

**Schedule Notes:**

USN Initial Operational Capability is corrected in this report to rectify a prior misstatement that did not cause a breach.

**Deviation Explanations:**

The Department is processing an APB change to correct the deviations with IOT&E, Milestone C, FRP, and TR-3 Aircraft Delivery milestones, which are not reflected in this report.

**Acronyms and Abbreviations**

CDR - Critical Design Review  
 CTOL - Conventional Takeoff and Landing  
 CV - Aircraft Carrier Suitable Variant  
 DCA - Dual Capable Aircraft  
 Flt - Flight  
 IOT&E - Initial Operational Test and Evaluation  
 IPR - Interim Progress Review  
 STOVL - Short Takeoff and Vertical Landing  
 TR - Technical Refresh  
 USAF - United States Air Force  
 USMC - United States Marine Corps  
 USN - United States Navy

***Significant Schedule Risks***

Significant Schedule Risks	
Current Estimate (December 2021)	
1.	Deficiency correction and accreditation of the JSE is the highest priority risk to the F-35 program's completion the Full Rate Production Decision.

UNCLASSIFIED



## Performance

Performance Characteristics					Deviation
Development APB Objective	Current APB Development Objective/Threshold		Demonstrated Performance (include Date of Demonstration)	Current Estimate/Actual	
STOVL Mission Performance - STO Distance Flat Deck					
With four 1000# JDAMs and two internal AIM-120s, full expendables, execute a 600 foot (450 UK STOVL) STO from LHA, LHD, and aircraft carriers (sea level, tropical day, 10 kts operational WOD) and with a combat radius of 550 nm (STOVL profile). Also must perform STOVL vertical landing with two 1000# JDAMs and two internal AIM-120s, full expendables, and fuel to fly the STOVL Recovery profile.	With four 1000# JDAMs and two internal AIM-120s, full expendables, execute a 600 foot (450 UK STOVL) STO from LHA, LHD, and aircraft carriers (sea level, tropical day, 10 kts operational WOD) and with a combat radius of 550 nm (STOVL profile). Also must perform STOVL vertical landing with two 1000# JDAMs and two internal AIM-120s, full expendables, and fuel to fly the STOVL Recovery profile.	With two 1000# JDAMs and two internal AIM-120s, full expendables, execute a 600 foot (450 UK STOVL) STO from LHA, LHD, and aircraft carriers (sea level, tropical day, 10 kts operational WOD) and with a combat radius of 450 nm (STOVL profile). Also must perform STOVL vertical landing with two 1000# JDAMs and two internal AIM-120s, full expendables, and fuel to fly the STOVL Recovery profile.	Execute 471 ft. STO with 2 JDAM (internal), 2 AIM-120 (internal), fuel to fly 450nm	Execute 471 ft. STO with 2 JDAM (internal), 2 AIM-120 (internal), fuel to fly 450nm	
Combat Radius NM -CTOL Variant					
690	690	590	669	669	
Combat Radius NM -STOVL Variant					
550	550	450	505	505	
Combat Radius NM -CV Variant					
730	730	600	670	670	
Mission Reliability - CTOL Variant					
98%	98%	93%	93%	93%	
Mission Reliability - CV Variant					
98%	98%	95%	95%	95%	
Mission Reliability - STOVL Variant					
98%	98%	95%	97%	97%	
Logistics Footprint - CTOL Variant					
Less than or equal to 6 C-17 equivalents	Less than or equal to 6 C-17 equivalents	Less than or equal to 8 C-17 equivalents	Less than or equal to 8 C-17 equivalents	Less than or equal to 8 C-17 equivalents	
Logistics Footprint - CV Variant					
Less than or equal to	Less than or equal to	Less than or equal to	Less than or	Less than or	

UNCLASSIFIED



Performance Characteristics					Deviation
Development APB Objective	Current APB Development Objective/Threshold		Demonstrated Performance (include Date of Demonstration)	Current Estimate/Actual	
34,000 cu ft., 183 ST	34,000 cu ft., 183 ST	46,000 cu ft., 243 ST	equal to 44,900 cu ft., 222 ST	equal to 44,900 cu ft., 222 ST	
<b>Logistics Footprint - STOVL Variant</b>					
Less than or equal to 4 C-17 equivalents	Less than or equal to 4 C-17 equivalents	Less than or equal to 8 C-17 equivalents	Less than or equal to 8 C-17 equivalents	Less than or equal to 8 C-17 equivalents	
<b>Logistics Footprint - STOVL Variant L-Class</b>					
Less than or equal to 15,000 cu ft, 104 ST	Less than or equal to 15,000 cu ft, 104 ST	Less than or equal to 21,000 cu ft, 136 ST	Less than or equal to 18,400 cu ft, 105 ST	Less than or equal to 18,400 cu ft, 105 ST	
<b>Sortie Generation Rates - CTOL Variant</b>					
4.0/3.0/2.0 2.5 ASD	4.0/3.0/2.0 2.5 ASD	3.0/2.0/1.0 2.5 ASD	3.4/3.0/2.0 2.5 ASD	3.4/3.0/2.0 2.5 ASD	
<b>Sortie Generation Rates - CV Variant</b>					
4.0/3.0/1.0 1.8 ASD	4.0/3.0/1.0 1.8 ASD	3.0/2.0/1.0 1.8 ASD	3.9/3.0/1.0 1.8 ASD	3.9/3.0/1.0 1.8 ASD	
<b>Sortie Generation Rates - STOVL Variant (USMC)</b>					
6.0/4.0/2.0 1.1 ASD	6.0/4.0/2.0 1.1 ASD	4.0/3.0/1.0 1.1 ASD	5.5/4.0/2.0 1.1 ASD	5.5/4.0/2.0 1.1 ASD	
<b>CV Recovery Performance (Vpa)</b>					
Maximum approach speed (Vpa) at required carrier landing weight (RCLW) of less than 140 knots.	Vpa at required carrier landing weight (RCLW) of less than 140 knots.	Vpa at required carrier landing weight (RCLW) of less than 145 knots.	Vpa at required carrier landing weight (RCLW) of less than 143 knots.	Vpa at required carrier landing weight (RCLW) of less than 143 knots.	

**Performance Notes:**

1. Classified Performance information is provided in the classified annex to this submission.
2. The Department is processing an APB change to include Continuous Capability Development and Delivery (C2D2) requirements in this section, which is not reflected in this report. These requirements, referred to as JSF Executive Steering Board Decision Memorandum #151, are DAE approved and in work. The costs involved in this activity are included in this Selected Acquisition Report.

**Requirements Source:** Operational Requirements Document (ORD) Change 3 dated August 19, 2008 as modified by Joint Requirements Oversight Council Memorandum (JROCM) 040-12 dated March 16, 2012

**Acronyms and Abbreviations**

ASD - Average Sortie Duration  
 CTOL - Conventional Takeoff and Landing  
 CU FT - Cubic Feet  
 CV - Aircraft Carrier Suitable Variant  
 JDAM - Joint Direct Attack Munitions

UNCLASSIFIED

KTS - Knots  
NM - Nautical Miles  
RCLW - Required Carrier Landing Weight  
SGR - Sortie Generation Rate  
ST - Short Tons  
STO - Short Takeoff  
STOVL - Short Takeoff and Vertical Landing  
Vpa - Max Approach Speed  
WOD - Wind Over the Deck

UNCLASSIFIED

## Acquisition Budget Estimate

### Total Acquisition Cost

Category	Base Year	Development APB	Development Change 3 (Current) (2/5/2020)		Budget Estimate PB 2023		Deviation
		Objective (BY\$)	Objective (BY\$)	Threshold (BY\$)	BY\$	TY\$	
RDT&E	2012	59677.3	70501.2	77106.1	76227.3	76256.8	
Procurement	2012	266665.8	271889.2	300541.2	248234.4	335917.9	
MILCON	2012	4168.0	4168.0	4584.8	3601.7	4022.7	
Acq. O&M	2012	0.0	0.0	0.0	0.0	0.0	
Total							
PAUC	2012	134,518	140.31	154.88	132.8	165.8	
APUC	2012	109,155	110.71	122,471	101.1	136.8	

### Total End Item Quantity

Quantity Category	Current APB Quantity	Current Estimate Quantity
Development	14	14
Procurement	2456	2456

#### Budget Notes:

This SAR reflects President's Budget (PB) 2023 and budget authority required to execute the requirements of JSF Executive Steering Board Decision Memorandum #151, which will be codified in a later change to the APB.

#### Quantity Notes:

This SAR reflects phasing changes in aircraft quantities reflected in PB2023 and accounts for U.S. aircraft only.

### Risk and Sensitivity Analysis

Risks and Sensitivity Analysis	
Current Procurement Cost (December 2021)	
1.	On-going negotiations for the Lot 15-17 production contracts and the Technical Refresh 3 cut-in have the potential to influence budget estimates in PB 2024 and throughout the FYDP.
Original Baseline Estimate (September 2018)	
1.	None
Revised Original Estimate (N/A)	
None	
Admin Baseline Estimate (Month YYYY)	
1.	None

UNCLASSIFIED



## Unit Cost

### *Current Baseline Compared with Current Estimate*

Category (\$M)	Current APB	Current Estimate	% Change	NMC Breach
<b>PAUC</b>				
Cost	346568.4	328063.4	-	-
Quantity	2470	2470	-	-
Unit Cost	140.31	132.82	-5.34	
<b>APUC</b>				
Cost	271889.2	248234.4	-	-
Quantity	2456	2456	-	-
Unit Cost	110.71	101.073	-8.71	

### *Original Baseline Compared with Current Estimate*

Category (\$M)	Current APB	Current Estimate	% Change	NMC Breach
<b>PAUC</b>				
Cost	330398.6	328063.4	-	-
Quantity	2458	2470	-	-
Unit Cost	134.42	132.82	-1.19	
<b>APUC</b>				
Cost	266666.6	248234.4	-	-
Quantity	2443	2456	-	-
Unit Cost	109.16	101.073	-7.41	

#### **Unit Cost Notes:**

The DoD average F-35 Unit Recurring Flyaway (URF) Cost consists of the Hardware (Airframe, Vehicle Systems, Mission Systems, Engine, and Engineering Change Order) costs over the life of the program.

The URF assumes the quantity benefits of 357 FMS aircraft and 547 International Partner aircraft.

F-35A (Conventional Take Off and Landing) URF - \$68.5M (BY 2012)

F-35B (Short Takeoff and Vertical Landing) URF - \$98.6M (BY 2012)

F-35C (Carrier Variant) URF - \$83.9M (BY 2012)

UNCLASSIFIED

## Contracts

Contract Data (\$TYM)		
Contract Number	N00019-17-C-0001	
Effort Number	N/A	
Modification Number	P000066	
Award Date:	28-Apr-17	
Definitization Date:	28-Oct-19	
Order Number	N/A	
CAGE Code/CAGE Legal Name	81755 / Lockheed Martin Aeronautics Co.	
Contract Title	Lot 12-14 Air Vehicle Production	
Contractor Address	P.O. Box 748, TX 76101	
Contract /Effort Price, Quantity and Performance (\$M)		
Initial Target Price	Current Target Price	
2,731.3	32,918.7	
Initial Ceiling Price	Current Ceiling Price	
N/A	N/A	
Contract's EAC	PM's EAC	
30,677.5	30,321.8	
Initial Quantity	Current Quantity	Delivered Quantity
466	466	250
BAC	BCWP	ACWP
30,046.5	21,568.3	22,094.0
BCWS	Cost Variance	Schedule Variance
22,778.2	-525.7	-1,209.9

**Contract Notes:** The difference between the Initial Contract Price and the Current Contract Price is driven by definitization of the effort. Initial Price consisted primarily of Long Lead material.

**Cost Variance:** The unfavorable net changes in the cost variance is primarily driven by steady cost performance degradation in assembly through Delivery due to ongoing staffing disruptions and inefficiencies related to COVID-19, unplanned tasks and material shortages driving assembly inefficiencies. Unfavorable performance was partially offset by steady cost performance improvement within Wing due to incorporation of definitized unit pricing for wings, negotiation gains, removal of Alternate Work Schedule hours, and incorporation of updated pricing.

**Schedule Variance:** The favorable net schedule variance is primarily driven by Lot 12 – 14 contract schedule rebaselining as authorized in contract modification P00060. Aircraft DD250 dates have been adjusted and the rebaselining of the Integrated Master Schedule is complete.

### Contract Data (\$TYM)

UNCLASSIFIED

Contract Number	N00019-17-C-0010	
Effort Number		
Modification Number	P00032	
Award Date:	28-Mar-18	
Definitization Date:	30-Sep-19	
Order Number		
CAGE Code/CAGE Legal Name	52661/PRATT & WHITNEY, A RAYTHEON TECHNOLOGIES COMPANY	
Contract Title	F135 Lot 12-14	
Contractor Address	400 Main St, East Hartford, CT 06118	
Contract /Effort Price, Quantity and Performance (\$M)		
Initial Target Price	Current Target Price	
239.7	7,750.8	
Initial Ceiling Price	Current Ceiling Price	
239.7	7,752.1	
Contract's EAC	PM's EAC	
7,033.9	6,975.5	
Initial Quantity	Current Quantity	Delivered Quantity
213	473	352
BAC	BCWP	ACWP
6743.1	5995.3	6246.9
BCWS	Cost Variance	Schedule Variance
5888.1	-251.6	107.2

**Contract Notes:** The difference between the Initial Contract Price and the Current Contract Price is driven by definitization of the Production work scope. Initial Contract Price consisted of long lead production hardware.

**Cost Variance:** The unfavorable net change in cost variance is primarily driven by higher costs for engine hardware in Controls, Externals, High and Low Pressure Turbines, Nozzle; and increased costs in engine assembly and test.

**Schedule Variance:** The unfavorable net change in schedule variance is primarily driven by burndown of favorable schedule variance from early hardware deliveries in Controls, High Pressure Compressor, Fan, High and Low Pressure Turbine and Turbine Exhaust Case.

Contract Data (\$TYM)	
<b>Contract Number</b>	N00019-19-C-0010
<b>Effort Number</b>	N/A

UNCLASSIFIED



Modification Number	PZ0059	
Award Date:	30-Sep-18	
Definitization Date:	7-Jun-19	
Order Number	N/A	
CAGE Code/CAGE Legal Name	81755 / Lockheed Martin Aeronautics Co.	
Contract Title	Follow-On Modernization Phase 2.3	
Contractor Address	P.O. Box 748, TX 76101	
Contract /Effort Price, Quantity and Performance (\$M)		
Initial Target Price	Current Target Price	
1,891.6	3,639.8	
Initial Ceiling Price	Current Ceiling Price	
N/A	N/A	
Contract's EAC	PM's EAC	
3,219.2	3,300.0	
Initial Quantity	Current Quantity	Delivered Quantity
N/A	N/A	N/A
BAC	BCWP	ACWP
3,132.2	912.3	958.0
BCWS	Cost Variance	Schedule Variance
980.5	-45.7	-68.2

**Contract Notes:** The difference between the Initial Contract Price and the Current Contract Price is driven by contract modifications adding workscope for reprogramming labs, incentive fee for dual capability aircraft software development delivery, fuselage bulkhead development, super multi-function aircraft data link workscope, additional dual capable aircraft development, and training workscope.

**Cost Variance:** The unfavorable net cost variance is primarily driven by complexity of work for electronic warfare, dual capable aircraft, radar, and video data link capability development and additional resources required to support resolution of action items found during testing.

**Schedule Variance:** The unfavorable net schedule variance is primarily driven by material delays for multifunction advanced datalink ground shelters and build-up and integration of virtual wingman stations, receiver firmware delays, hardware module design delays, systems engineering complexity, and software development delays.

<b>Contract Data (\$TYM)</b>	
<b>Contract Number</b>	N00019-14-C-0020
<b>Effort Number</b>	N/A
<b>Modification Number</b>	P00029

UNCLASSIFIED

Award Date:	24-Dec-18	
Definitization Date:	24-Dec-18	
Order Number	N00019-F-2474	
CAGE Code/CAGE Legal Name	81755 / Lockheed Martin Aeronautics Co.	
Contract Title	FOM Tech Refresh 3 Phase 3	
Contractor Address	P.O. Box 748, TX 76101	
Contract /Effort Price, Quantity and Performance (\$M)		
Initial Target Price	Current Target Price	
712.5	830.3	
Initial Ceiling Price	Current Ceiling Price	
N/A	N/A	
Contract's EAC	PM's EAC	
1,342.4	1,262.9	
Initial Quantity	Current Quantity	Delivered Quantity
N/A	N/A	N/A
BAC	BCWP	ACWP
741.9	522.3	1,014.4
BCWS	Cost Variance	Schedule Variance
600.0	-492.1	-77.7

**Contract Notes:** The difference between the Initial Contract Price and the Current Contract Price is driven by contract modifications adding workscope for data acquisition recording and telemetry development and tooling.

**Cost Variance:** The unfavorable net cost variance is primarily driven by technical complexity, design changes, and maturation driving additional engineering effort for the Integrated Core Processor (ICP), Panoramic Cockpit Display (PCD), and Aircraft Memory System (AMS) efforts.

**Schedule Variance:** The unfavorable net schedule variance is primarily driven by a supplier experiencing delays on their Integrated Core Processor (ICP), Panoramic Cockpit Display (PCD), and Aircraft Memory System (AMS) development engineering efforts for design, integration, and test activities due to technical complexity.

<b>Contract Data (\$TYM)</b>	
<b>Contract Number</b>	N00019-18-C-1004
<b>Effort Number</b>	N/A
<b>Modification Number</b>	P0039
<b>Award Date:</b>	9-Nov-17
<b>Definitization Date:</b>	9-Nov-17

UNCLASSIFIED



Order Number	N/A	
CAGE Code/CAGE Legal Name	81755 / Lockheed Martin Aeronautics Co.	
Contract Title	Follow-On Modernization Phase 2.2	
Contractor Address	P.O. Box 748, TX 76101	
Contract /Effort Price, Quantity and Performance (\$M)		
Initial Target Price	Current Target Price	
245.9	481.6	
Initial Ceiling Price	Current Ceiling Price	
N/A	N/A	
Contract's EAC	PM's EAC	
402.8	405.8	
Initial Quantity	Current Quantity	Delivered Quantity
N/A	N/A	N/A
BAC	BCWP	ACWP
411.8	391.5	380.9
BCWS	Cost Variance	Schedule Variance
400.6	10.5	-9.1

**Contract Notes:** The difference between the Initial Contract Price and the Current Contract Price is driven by contract modifications adding workscope for mission systems software, cross system shared efforts, and weapons.

**Cost Variance:** The favorable net cost variance is primarily driven by radar supplier completing tasking without using management reserve, less systems engineering support required than planned for requirements work package development, technical interchange meetings, and design reviews, fewer change requests than anticipated, and utilizing lower salary grades than planned.

**Schedule Variance:** The unfavorable net schedule variance is primarily driven by complexities with electronic warfare, hardware and software delays, and delayed supplier work.

<b>Contract Data (\$TYM)</b>	
<b>Contract Number</b>	N00019-20-C-0037
<b>Effort Number</b>	N/A
<b>Modification Number</b>	P000020
<b>Award Date:</b>	4-Mar-20
<b>Definitization Date:</b>	24-Sep-20
<b>Order Number</b>	N/A
<b>CAGE Code/CAGE Legal Name</b>	81755 / Lockheed Martin Aeronautics Co.

UNCLASSIFIED



Contract Title		Development Foundation Contract 002	
Contractor Address		P.O. Box 748, TX 76101	
Contract /Effort Price, Quantity and Performance (\$M)			
Initial Target Price	Current Target Price		
449.2	593.8		
Initial Ceiling Price	Current Ceiling Price		
N/A	N/A		
Contract's EAC	PM's EAC		
515.3	542.1		
Initial Quantity	Current Quantity	Delivered Quantity	
N/A	N/A	N/A	
BAC	BCWP	ACWP	
523.3	408.2	396.6	
BCWS	Cost Variance	Schedule Variance	
428.8	11.6	-20.6	

**Contract Notes:** This is the first time this contract is being reported. The difference between the Initial Contract Price and the Current Contract Price is driven by contract modifications adding workscope for Labs Development, Training Lab and Training Labs Infrastructure.

**Cost Variance:** The favorable cumulative cost variance is primarily driven by labor underruns at Edwards Air Force Base and Pax River. In addition, Air Vehicle Supplier Labs experienced underruns due to less than estimated lab material and staff requirements and reduced Software Development and Lab improvement efforts.

**Schedule Variance:** The unfavorable cumulative schedule variance is primarily driven by Mission Systems Integration Lab Special Tooling and Prime Mission Equipment scope being scheduled to complete within the Period of Performance (PoP) while repair material delivery is not expected until 18 months later. Also due to less support required by suppliers as well as supplier material procurement delays, infrastructure staffing delays and technical blockers issues.

UNCLASSIFIED

## Technologies and Systems Engineering

### *Significant Technical Risks*

Significant Technical Risks	
Current Estimate (December 2021)	
1.	Development and delivery of the Technical Refresh (TR)-3 capability is the highest priority risk for the program. The program is managing risk to deliver on-time into Lot 15.

UNCLASSIFIED

## Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	14	14	14	100.00%
Production	500	498	2456	20.28%
Total Program Quantity Delivered	514	512	2470	20.73%

### Expended and Appropriated (TY \$M)

Total Acquisition Cost: 416197.4

Expended to Date: 158085.9

Percent Expended: 37.9%

Total Funding Years: 51

Years Appropriated: 29

Percent Years Appropriated: 56.86%

Appropriated to Date: 180422.5

Percent Appropriated: 43.4%

The above data is current as of April 18, 2022.

UNCLASSIFIED



## Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	10/26/2001	4/29/2021
Approved Quantity	465	968
Reference	Milestone B ADM	Lot 15-17 Authorization and LRIP Quantity Increase ADM
Start Year	2006	2006
End Year	2015	2025

**Rationale if Current Total LRIP Quantity exceeds 10% of the total Procurement quantities:**

The Current Total LRIP Quantity is more than 10% of the total production quantity due to the necessity to prevent a break in production and to ramp up to FRP.

UNCLASSIFIED

## Operating and Support Costs

### Total Program O&S Cost Compared with Baseline

	Current APB Objective (BY\$)	Current APB Threshold (BY\$)	Current Estimate (BY\$)	Current Estimate (TY\$)	Deviation
Total O&S (\$Millions)	630534.5	693588.0	659800.0	1265600.0	No

### O&S Cost Breakdown

Category (BY\$ Million)	F-35
Unit-Level Manpower	142800.0
Unit Operations	85100.0
Maintenance	221700.0
Sustaining Support	93200.0
Continued System Improvements	42700.0
Other	74300.0
Total O&S	659800.0

**Cost Estimate Source:** Office of the Secretary of Defense Cost Assessment and Program Evaluation Independent Cost Estimate, June 18, 2020

### O&S Cost Notes:

- a. Disposal/Demilitarization Cost Estimate and Source of Estimate:  
The Joint Service Cost Position for the June 2020 Interim Program Review included Disposal estimates of \$262.0 (BY12\$M) / \$810.0 (TY\$M).
- b. Sustainment Strategy:
  - Design, develop, deliver and sustain a single, integrated, and global system of sustainment products, processes, and business practices. These actions will enable the F-35 Air System to achieve a high degree of effectiveness at an affordable cost.
  - Tailor the global system to meet warfighter-defined readiness and cost objectives. This action will ensure that the global system is responsive and flexible as operational needs vary over time.
  - Maintain life-cycle focus, including the reduction of costs. This action will provide critical affordability benefits and further supports a high degree of effectiveness as Air System maturity grows.
  - Create a mutually-beneficial enterprise that – with relevant metrics and incentives – operates, manages, and supports the global system. This action further improves responsiveness and enhances affordability.
  - Leverage the global resource base – government and commercial – to take advantage of stakeholder capabilities, human capital, best practices, and similar critical contributions. This action increases robustness and scalability as the F-35 fleet grows and matures.
- c. For Each Acquired System or System Variant:
  - i. Quantity to Sustain: 2,456
  - ii. First Operational Fiscal Year: 2011
  - iii. Final Operational Fiscal Year: 2081
  - iv. Note: OSD CAPE ICE as of December 2018 include operations through 2077. JPO ACE as of April 2021 extends through 2081. The latest requirements now show operations through 2088. This represents a 19% increase in number of aircraft operating years (PAA) from the APB basis. The program anticipates a need to re-baseline Objective/Threshold measures in 2022 due to changing

UNCLASSIFIED

program definition from the U.S. Services. The current measures, established in 2018, included operations through 2077.

- v. Unit Expected Service Life: 30 Years
- d. Antecedent System(s) O&S Costs:
  - i. The F-35A/B/C family of aircraft variants replace the following current aircraft: F-16C/D, A-10, F/A-18C/D, and AV-8B. Comparing the costs of the 5th generation F-35 to legacy aircraft proves challenging. Given the significant increase in military capabilities provided, DoD reasonably expects F-35A to cost more to operate and sustain than 4th generation legacy aircraft.
  - ii. An update to the F-35A and F-16C/D comparison remains in work.

UNCLASSIFIED