RCS: DD-A&T(Q&A)823-446

Common Infrared Countermeasure (CIRCM)

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
Common Infrared Countermeasure (CIRCM)

DoD Component
Army

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References

SAR Baseline (Production Estimate)

Army Acquisition Executive (AAE) Approved Acquisition Program Baseline (APB) dated November 15, 2018

Approved APB

Army Acquisition Executive (AAE) Approved Acquisition Program Baseline (APB) dated November 15, 2018

Mission and Description

The Common Infrared Countermeasure (CIRCM), an ACAT IC MDAP, is the next generation lightweight, laser-based infrared countermeasure component that will interface with both the Army's Common Missile Warning System and future missile warning systems (MWS) to defeat current and emerging missile threats to target rotary-wing, tilt-rotor and small fixed-wing aircraft across the DoD. CIRCM receives hand-off from the MWS and employs a pointing and tracking system to track incoming missiles. CIRCM jams the missile by using laser energy, thus degrading the tracking capability of the missile and causing it to miss the aircraft. CIRCM is utilizing Open Systems Architecture which allows flexibility with software and hardware refreshes to keep pace with future threats. Advanced Threat Infrared Countermeasure (ATIRCM) is the antecedent system for CIRCM.

Executive Summary

Program Highlights Since Last Report

(U) The PEO Intelligence, Electronic Warfare, and Sensors (IEW&S) certifies the CIRCM requirements are stable and funding is adequate for the program to execute within its baseline cost parameters. The PEO IEW&S reports a decrease in the CIRCM program risks since the last submission of the CIRCM SAR due to the increased availability of CIRCM hardware needed for program testing and system performance during the Initial Operational Test & Evaluation (IOT&E). The prime contractor, Northrop Grumman Systems Corporation (NGSC), has implemented manufacturing improvements with their primary suppliers to increase product quality and production levels to support a FRP capacity. Furthermore, CIRCM has met or exceeded all APB schedule dates during the FY 2019 timeframe and is on-track to meet or exceed all APB schedule milestones for FY 2020.

(U) NGSC successfully delivered LRIP 1 CIRCM B-Kits to support IOT&E activities with production representative systems. The LRIP 2 contract option was awarded with deliveries supporting initial fielding and the First Unit Equipped (FUE). Project Manager Aircraft Survivability Equipment (PM ASE) awarded the LRIP 3 contract to NGSC, procuring CIRCM Program of Record B-Kits with options to procure additional systems in accordance with the ADM to facilitate an orderly ramp to FRP and support IOC. The LRIP 3 contract also includes options for Interim Contract Logistics Support (ICLS), Engineering Services, Repair Services, and Field Service Representative (FSR) support. A second Delivery Order for CIRCM B-kits is projected to award on the LRIP 3 contract. The government executed a contract modification to incorporate obsolescence technology on Diminishing Manufacturing Sources and Material Shortages Obsolescence Requirements (DMSMS). This effort is part of a comprehensive approach to mitigate obsolescence within the CIRCM system throughout its life cycle.

(U) The CIRCM IOT&E, administered by the Army Test and Evaluation Command (ATEC) with oversight by the Director of Operational Test and Evaluation completed on schedule. The multi-pronged test comprised of Threat Hardware in the Loop testing, Initial Operational Testing (IOT) with an Army aviation unit, Reliability and Maintainability flight testing and Free-Flight Missile (FFM) testing. Additionally, the system underwent numerous cybersecurity test activities to ensure protection against potential cyber-attacks.

(U) CIRCM Threat Hardware in the Loop testing occurred at both Navy and Air Force evaluation laboratories and provided statistically relevant threat and performance data throughout thousands of modeling & simulation runs with CIRCM hardware. These state of the art laboratories incorporate the latest DoD threat models to ensure realistic system performance and probability of countermeasure.

(U) The CIRCM IOT event, conducted by the Army Operational Test Command (OTC) was completed on schedule. During this test, CIRCM accrued sufficient flight hours during relevant operational scenarios to assess system performance. Additionally, operational maintainers performed aircraft maintenance actions in support of the CIRCM Logistics Demonstration and Instructor and Key Personnel Training. These activities provided operationally relevant data for both pilot and maintainer usage in a representative environment. Lastly, the FFM test occurred at White Sands Missile Range, NM. This event showcased the CIRCM system's ability to defeat live missile threats in a realistic combat engagement.

(U) CIRCM achieved sufficient flight hours during Reliability, Availability and Maintainability (RAM) testing. Throughout IOT&E, CIRCM conducted flight testing to include cold weather, littoral, and Med/High Clutter environment testing. During this time, each aircraft sortie debrief captured all issues regarding the CIRCM system's performance. As a result of contractor quality improvements and a comprehensive Failure Reporting, Analysis and Corrective Action (FRACAS) program, the CIRCM system is on pace to achieve Army reliability and sustainment cost requirements. The government Project Manager will continue the reliability program and aggressively seek to improve RAM performance and reduce life-cycle costs.

(U) The Cooperative Vulnerability Penetration Cybersecurity Assessment (CVPA) and the Adversarial Assessment conducted by the Army Threat Systems Management Office (TSMO) was completed in support of IOT&E. These events provide independent cyber and adversarial assessments and ensure resources are focused on areas to defeat potential enemy attacks.

(U) The FRP Delta Production Readiness Review (PRR) and Physical Configuration Audit (PCA) assessed the CIRCM

production system configuration, contractor progress towards increased production output, repair capability, production facilities, and production process improvements. As a result of NGSCs demonstrated performance, a Manufacturing Readiness Level (MRL) 9 was awarded which reflects successful demonstration of product stability, maturity, and low risk for FRP. The CIRCM government Project Manager and the Defense Contract Management Agency (DCMA) continue to maintain extended oversight throughout the supply chain with expanded monitoring at the sub-component level.

(U) The FY 2020 SAC-D Appropriations Committee Report issued on September 11, 2019, marked FY 2020 RDT&E funding by $11.3M due to "Prototype manufacturing and S&T funding excess" and "Test funding carryover." Due to best case test and system performance during IOT&E, the government Project Manager is able to execute the program with remaining FY 2020 funds and does not foresee negative impact to the operational fielding timelines.

(U) There are no significant software-related issues with the program at this time.

(U) In accordance with Section 830(a)(2) of the FY 2020 National Defense Authorization Act, which requires a SAR to be submitted "in unclassified form without any designation relating to dissemination control" this SAR section has omitted information that is ~~For Official Use Only~~.

History of Significant Developments Since Program Initiation

History of Significant Developments Since Program Initiation	
Date	**Significant Development Description**
December 2011	CIRCM received an ADM approval to enter Technology Demonstration Phase at Milestone A with two vendors to foster competition and reduce risk.
July 2014	An ADM approved release of the request for proposal for CIRCM EMD and directed the Army to return for a Milestone B DAB prior to award of the EMD contract and down select to one vendor.
August 2015	The DAE signed the Milestone B ADM authorizing entry into EMD and certifying all applicable provisions of section 2366b, title 10, U.S. Code
July 2016	The DAE approved the CIRCM Development APB. The APB established program threshold and objective values for the minimum number of cost, schedule and performance attributes that describe the program over its life cycle.
November 2017	The DAE signed an ADM that delegated MDA for CIRCM to the Secretary of the Army, and designated CIRCM as an ACAT IC Program.
November 2017	The U.S.Government and Northrop Grumman completed negotiations on the contract modification for the $22.9M cost over-run and a six month contract extension.
August 2018	The JROC approved the CIRCM CPD.
August 2018	The Assistant Secretary of the Army for Financial Management and Comptroller approved the CIRCM Milestone C Army Cost Position.
September 2018	The Army Acquisition Executive approved entry into the Production and Deployment Phase/Milestone C, and LRIP up to 178 B-Kits (10 percent of the total quantity of 1,781 B-Kits).
October 2018	CIRCM completed Reliability Demonstration Testing (RDT) which demonstrated a 71% reduction in total failures from previous testing. The Army Test and Evaluation Commandfinal score of 151 hours Mean Time Between Operational Mission Failure (MTBOMF) at 50% confidence and a Mission Effecting Fix Effectiveness Factor adjusted score of 215 hours MTBOMF in the RDT environment. The Milestone C exit criteria is 150 hours MTBOMF.
November 2018	The AAE approved the Milestone C APB.
December 2018	LRIP 2 was executed December 2019 (24 CIRCM B-Kits).
July 2019	LRIP 3 was executed July 2019 (24 CIRCM B-Kits).
December 2019	Program completed Initial Operational Test & Evaluation (IOT&E).

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

Performance

Performance Characteristics				
SAR Baseline Production Estimate	**Current APB Production Objective/Threshold**		**Demonstrated Performance**	**Current Estimate**
Sustainment Materiel Availability				
88%	88%	74%	TBD	74%
Sustainment Operational Availability				
98%	98%	95%	TBD	95%

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

Requirements Reference

JROC Memorandum approved the CPD on August 20, 2018.

Change Explanations

None

Acronyms and Abbreviations

JROC - Joint Requirements Oversight Council

Track to Budget

RDT&E

Appn	BA	PE
Army 2040	05	0604270A

Project	Name	
VU8	CIRCM	(Sunk)

Appn	BA	PE
Army 2040	05	0605035A

Project	Name
EB4	CIRCM

Procurement

Appn	BA	PE
Army 2031	04	0210108A

Line Item	Name
AZ3537	CIRCM

Acq O&M

Appn	BA	PE
Army 2020	04	0702806A

Subactivity Group	Name	
435	Acquisition and Management Support: Aircraft Survivability Equipment	(Shared)

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 2018 $M			BY 2018 $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	865.9	865.9	952.7	859.2	895.5	895.5	895.5
Procurement	3042.8	3042.8	3347.2	3062.5	3767.2	3767.2	3767.1
Flyaway	--	--	--	2378.0	--	--	2954.8
Recurring	--	--	--	2315.8	--	--	2877.0
Non Recurring	--	--	--	62.2	--	--	77.8
Support	--	--	--	684.5	--	--	812.3
Other Support	--	--	--	588.3	--	--	695.8
Initial Spares	--	--	--	96.2	--	--	116.5
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	11.9	11.9	13.1	11.9	14.5	14.5	14.5
Total	3920.6	3920.6	N/A	3933.6	4677.2	4677.2	4677.1

Current APB Cost Estimate Reference

Army Cost Position dated August 28, 2018

Cost Notes

No cost estimate has been completed since the 2018 SAR.

Total Quantity			
Quantity	**SAR Baseline Production Estimate**	**Current APB Production**	**Current Estimate**
RDT&E	48	48	48
Procurement	1781	1781	1781
Total	1829	1829	1829

Quantity Notes

The CIRCM unit of measure is the B-Kit; A-Kit costs are included in Non End Item Recurring Flyaway costs. Total acquisition quantity (1,829) includes the production quantity that will be fielded/sustained (1,781) plus 48 RDT&E funded systems that are not production representative units and will not be fielded or sustained.

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	625.2	23.2	23.3	7.1	11.3	5.1	5.6	194.7	895.5
Procurement	74.0	168.8	237.5	215.5	252.5	332.4	276.5	2209.9	3767.1
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.2	0.8	0.8	0.8	0.8	0.9	0.9	9.3	14.5
PB 2021 Total	699.4	192.8	261.6	223.4	264.6	338.4	283.0	2413.9	4677.1
PB 2020 Total	699.4	204.1	262.8	223.6	264.9	338.7	293.8	2395.0	4682.3
Delta	0.0	-11.3	-1.2	-0.2	-0.3	-0.3	-10.8	18.9	-5.2

Funding Notes

This CIRCM SAR does not include Overseas Contingency Operations (OCO) funding.

Beginning in FY 2019, the Army realigned direct civilian pay costs from RDT&E and Procurement investment accounts to O&M to provide additional transparency and auditability.

The FY 2020 Draft SAC-D Appropriations Committee Report was issued on September 11, 2019 marking FY 2020 RDTE funding by $11.3M due to "Prototype manufacturing and S&T funding excess" and "Test funding carryover." Due to better than expected test and system performance during IOT&E, the PM is able to execute the program with remaining FY 2020 funds.

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	48	0	0	0	0	0	0	0	0	48
Production	0	48	81	120	101	125	125	125	1056	1781
PB 2021 Total	48	48	81	120	101	125	125	125	1056	1829
PB 2020 Total	48	48	81	120	101	125	125	125	1056	1829
Delta	0	0	0	0	0	0	0	0	0	0

Cost and Funding

Annual Funding By Appropriation

Annual Funding 2040 | RDT&E | Research, Development, Test, and Evaluation, Army							
		TY $M					
Fiscal Year	Quantity	End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2010	--	--	--	--	--	--	25.5
2011	--	--	--	--	--	--	4.6
2012	--	--	--	--	--	--	101.9
2013	--	--	--	--	--	--	39.5
2014	--	--	--	--	--	--	92.5
2015	--	--	--	--	--	--	101.3
2016	--	--	--	--	--	--	74.5
2017	--	--	--	--	--	--	79.8
2018	--	--	--	--	--	--	76.2
2019	--	--	--	--	--	--	29.4
2020	--	--	--	--	--	--	23.2
2021	--	--	--	--	--	--	23.3
2022	--	--	--	--	--	--	7.1
2023	--	--	--	--	--	--	11.3
2024	--	--	--	--	--	--	5.1
2025	--	--	--	--	--	--	5.6
2026	--	--	--	--	--	--	35.2
2027	--	--	--	--	--	--	37.7
2028	--	--	--	--	--	--	21.2
2029	--	--	--	--	--	--	20.1
2030	--	--	--	--	--	--	17.6
2031	--	--	--	--	--	--	3.1
2032	--	--	--	--	--	--	3.2
2033	--	--	--	--	--	--	3.3
2034	--	--	--	--	--	--	3.3
2035	--	--	--	--	--	--	3.4
2036	--	--	--	--	--	--	3.5
2037	--	--	--	--	--	--	3.5
2038	--	--	--	--	--	--	3.6
2039	--	--	--	--	--	--	3.7
2040	--	--	--	--	--	--	3.8
2041	--	--	--	--	--	--	3.8
2042	--	--	--	--	--	--	3.9
2043	--	--	--	--	--	--	4.0
2044	--	--	--	--	--	--	4.1

2045	--	--	--	--	--	--	4.2
2046	--	--	--	--	--	--	4.2
2047	--	--	--	--	--	--	4.3
Subtotal	48	--	--	--	--	--	895.5

Annual Funding 2040 | RDT&E | Research, Development, Test, and Evaluation, Army							
Fiscal Year	Quantity	BY 2018 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2010	--	--	--	--	--	--	28.5
2011	--	--	--	--	--	--	5.0
2012	--	--	--	--	--	--	109.9
2013	--	--	--	--	--	--	41.9
2014	--	--	--	--	--	--	96.2
2015	--	--	--	--	--	--	103.6
2016	--	--	--	--	--	--	75.5
2017	--	--	--	--	--	--	79.2
2018	--	--	--	--	--	--	74.4
2019	--	--	--	--	--	--	28.3
2020	--	--	--	--	--	--	21.8
2021	--	--	--	--	--	--	21.5
2022	--	--	--	--	--	--	6.4
2023	--	--	--	--	--	--	10.0
2024	--	--	--	--	--	--	4.4
2025	--	--	--	--	--	--	4.8
2026	--	--	--	--	--	--	29.5
2027	--	--	--	--	--	--	30.9
2028	--	--	--	--	--	--	17.1
2029	--	--	--	--	--	--	15.9
2030	--	--	--	--	--	--	13.6
2031	--	--	--	--	--	--	2.4
2032	--	--	--	--	--	--	2.4
2033	--	--	--	--	--	--	2.4
2034	--	--	--	--	--	--	2.4
2035	--	--	--	--	--	--	2.4
2036	--	--	--	--	--	--	2.4
2037	--	--	--	--	--	--	2.4
2038	--	--	--	--	--	--	2.4
2039	--	--	--	--	--	--	2.4
2040	--	--	--	--	--	--	2.4
2041	--	--	--	--	--	--	2.4
2042	--	--	--	--	--	--	2.4
2043	--	--	--	--	--	--	2.4
2044	--	--	--	--	--	--	2.4
2045	--	--	--	--	--	--	2.4
2046	--	--	--	--	--	--	2.4
2047	--	--	--	--	--	--	2.4
Subtotal	48	--	--	--	--	--	859.2

Annual Funding 2031 | Procurement | Aircraft Procurement, Army							
Fiscal Year	Quantity	TY $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2018	24	30.9	2.4	3.9	37.2	--	37.2
2019	24	11.1	7.5	--	18.6	18.2	36.8
2020	81	99.3	10.2	6.0	115.5	53.3	168.8
2021	120	136.9	19.7	--	156.6	80.9	237.5
2022	101	121.1	17.9	--	139.0	76.5	215.5
2023	125	147.3	21.7	5.4	174.4	78.1	252.5
2024	125	149.7	31.6	--	181.3	151.1	332.4
2025	125	152.3	47.7	3.7	203.7	72.8	276.5
2026	125	155.2	56.1	10.6	221.9	54.8	276.7
2027	125	157.3	54.4	3.9	215.6	43.5	259.1
2028	125	161.1	51.4	4.0	216.5	38.7	255.2
2029	125	164.1	50.6	11.2	225.9	31.0	256.9
2030	125	167.1	40.3	4.1	211.5	16.9	228.4
2031	125	170.2	40.7	4.2	215.1	20.6	235.7
2032	125	173.4	40.9	11.9	226.2	20.2	246.4
2033	125	176.7	35.4	4.4	216.5	22.6	239.1
2034	56	97.2	36.4	4.5	138.1	13.0	151.1
2035	--	--	30.0	--	30.0	11.9	41.9
2036	--	--	11.2	--	11.2	8.2	19.4
Subtotal	1781	2270.9	606.1	77.8	2954.8	812.3	3767.1

Annual Funding 2031 | Procurement | Aircraft Procurement, Army							
Fiscal Year	Quantity	BY 2018 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2018	24	29.9	2.3	3.7	35.9	--	35.9
2019	24	10.5	7.1	--	17.6	17.2	34.8
2020	81	92.1	9.5	5.6	107.2	49.3	156.5
2021	120	124.6	17.9	--	142.5	73.6	216.1
2022	101	108.0	16.0	--	124.0	68.2	192.2
2023	125	128.8	19.0	4.7	152.5	68.3	220.8
2024	125	128.3	27.1	--	155.4	129.6	285.0
2025	125	128.0	40.1	3.1	171.2	61.2	232.4
2026	125	127.9	46.2	8.7	182.8	45.2	228.0
2027	125	127.1	43.8	3.2	174.1	35.2	209.3
2028	125	127.6	40.7	3.2	171.5	30.6	202.1
2029	125	127.4	39.4	8.7	175.5	24.0	199.5
2030	125	127.2	30.7	3.1	161.0	12.9	173.9
2031	125	127.0	30.4	3.1	160.5	15.4	175.9
2032	125	126.9	29.9	8.7	165.5	14.8	180.3
2033	125	126.8	25.3	3.2	155.3	16.2	171.5
2034	56	68.4	25.6	3.2	97.2	9.1	106.3
2035	--	--	20.7	--	20.7	8.2	28.9
2036	--	--	7.6	--	7.6	5.5	13.1
Subtotal	1781	1836.5	479.3	62.2	2378.0	684.5	3062.5

The CIRCM unit of measure is the B-Kit; A-Kit costs are included in Non End Item Recurring Flyaway costs.

Annual Funding 2020 | Acq O&M | Operation and Maintenance, Army	
Fiscal Year	TY $M Total Program
2019	0.2
2020	0.8
2021	0.8
2022	0.8
2023	0.8
2024	0.9
2025	0.9
2026	0.9
2027	0.9
2028	0.9
2029	1.0
2030	1.0
2031	1.0
2032	1.0
2033	1.0
2034	0.8
2035	0.5
2036	0.3
Subtotal	14.5

Annual Funding 2020 | Acq O&M | Operation and Maintenance, Army	
Fiscal Year	**BY 2018 $M**
	Total Program
2019	0.2
2020	0.8
2021	0.7
2022	0.7
2023	0.7
2024	0.8
2025	0.8
2026	0.8
2027	0.7
2028	0.7
2029	0.8
2030	0.8
2031	0.8
2032	0.7
2033	0.7
2034	0.6
2035	0.4
2036	0.2
Subtotal	11.9

Risks

Significant Schedule and Technical Risks

Significant Schedule and Technical Risks	
Milestone B (August 2015)	
1.	Risk: If the expendable solution to the Special Operations Command Joint Urgent Operational Needs Statement is not successful or optimal, then resultant challenges may affect EMD scope, schedule and resources. Risk mitigation: Accelerate CIRCM for selected platforms.
2.	Risk: If test resources and facilities are not ready to meet EMD Test Strategy requirement timelines, then unplanned additional testing will be required before Initial Operational Test & Evaluation (IOT&E). Risk is mitigated by aggressively working with test community to de-conflict facility schedules, threat asset availability and contingency planning. Additional development of SCEPTRE (Seeker Countermeasure Effectiveness Pointer/Tracker Research & Evaluation) Lab will optimize CIRCM.
3.	Risk: If the system does not demonstrate sufficient Mean Time Between Operational Mission Failure (MTBOMF) improvement during EMD, then it may not meet the 150 hours MTBOMF interim reliability goal at IOT&E completion. Risk mitigated by incorporating corrective actions for demonstrated failures and offering vendor reliability incentives to meet objectives.
4.	Risk: If Common Missile Warning System (CMWS) Software development and integration are not synchronized and fully supportive of the CIRCM testing Design of Experiments, then the CIRCM test plan scenarios may not reflect realistic scenario data to support user requirements evaluation (e.g. testing near simultaneous engagements in the presence or absence of expendables). Risk is mitigated by aggressively integrating CMWS and CIRCM software teams to design the specific system responses to match performance, capability and requirements.
Current Estimate (December 2019)	
1.	CIRCM System Reliability - If CIRCM does not demonstrate 179 hours Mean Time Between Operational Mission Failure (MTBOMF) as a point estimate prior to Full Rate Production Decision, then CIRCM will not have achieved the Reliability KSA target for FRP. Mitigation: Conducted 1,000 hour Risk Reduction Chamber Test with failure root cause identified. Army Test and Evaluation Command's final score of 151 hours MTBOMF at 50% confidence and a Mission Effecting Fix Effectiveness Factor adjusted score of 215 hours MTBOMF in the RDT environment. Conducted risk reduction flight test with corrective actions incorporated, and incorporated corrective actions into LRIP configuration for Initial Operational Test & Evaluation (IOT&E) testing.
2.	Pointer Tracker Production Capacity - If the Leonardo production line does not display ability to meet required output, then forecasted fielding schedule may be delayed. Mitigation: Vendor yield improvement plan validated at Delta Production Readiness Review in September 2019. Forecasted production ramp (18 Line Replaceable Units per month) demonstrated during LRIPII & QRC2 programs.
3.	Cybersecurity Full Authority to Operate - If CIRCM does not receive the full ATO by January 22, 2021, then CIRCM may be denied authorization to operate in theater. Mitigation: ASE Cyber team submits Cooperative Vulnerability & Penetration Assessment (CVPA) and Adversarial Assessment (AA) reports in eMASS. ISSO submits bid for Security Controls Assessor – Validator (SCA-V) assessment via NETCOM. ASE team finalizes updates of supporting documentation to include Cybersecurity Strategy. SCA-V completes eMASS Package assessment.

Risks

Risk and Sensitivity Analysis

Risks and Sensitivity Analysis	
Current Baseline Estimate (November 2018)	
1.	The Army Cost Position (ACP) was approved as the baseline estimate for Milestone C in August 2018. The current POE is based on the ACP which reflects a 50% Confidence Level in accordance with the Army Cost Guidance. The B-Kit recurring production cost is the most significant cost driver in the estimate. The current EMD contract includes LRIP 1 and was awarded in a competitive environment. The FRP decision, which is planned for the 3rd Quarter FY 2020, will determine the production unit pricing. Factors that may impact the production unit pricing include: award outside of a competitive environment, economies of scale achieved through optimizing lot procurement and the impacts of Diminishing Manufacturing Sources. The program directed additional subcontractor cost reporting and is currently negotiating the 3rd LRIP effort to drive future cost reduction initiatives to include long-term supplier agreements and increased learning curve. Furthermore, procurement and sustainment costs are being refined based off parallel CIRCM Quick Reaction Capability (QRC) efforts. The unit of measure for the CIRCM APUC and PAUC calculation is the B-Kit. Due to the length of the production program through FY 2034 and the difficulties in accurately forecasting future inflation, there is potential for increase of TY cost.
Original Baseline Estimate (July 2016)	
1.	The OSD CAPE ICE was approved as the APB baseline estimate for Milestone B in August 2015. The OSD CAPE ICE cost model reflects a 50% Confidence Level in accordance with the Army Cost Guidance. The most significant cost driver in the CIRCM estimate is the recurring production cost for the B-Kits. LRIP was included in the current EMD contract awarded in a competitive environment. Production contract unit pricing will be determined after the FRP decision which is planned for the second quarter FY 2020. Factors that may impact the production contract unit pricing include: award outside of a competitive environment, economies of scale achieved through optimizing lot procurement and impacts of Diminishing Manufacturing Sources. The unit of measure for the CIRCM APUC and PAUC calculation is the B-Kit. There is cost risk associated with the length of the CIRCM procurement program - production is planned through FY 2032. Due to the length of the production program and the difficulties in accurately forecasting future inflation, there is potential for increased TY cost, if inflation increases at a rate greater than projected in the OSD inflation rates.
Revised Original Estimate (N/A)	
1.	N/A
Current Procurement Cost (December 2019)	
1.	The Current Procurement Cost (December 2019) equals the Current Baseline Cost (November 2018).

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	8/25/2015	9/14/2018
Approved Quantity	37	178
Reference	Milestone B ADM	Milestone C ADM
Start Year	2018	2018
End Year	2019	2020

Notes

The Milestone C ADM approved LRIP quantities up to the statutory ceiling of 10 percent of the total quantity in order to provide a gradual production ramp to FRP.

Foreign Military Sales

Notes

(U) While there are currently no FMS cases (active or in process) at this point in the program, the Defense Exportability Features (DEF) Pilot program and the Defense Systems Steering Committee provisos memo will dictate the requirements and process by which CIRCM can be potentially exported and sold via FMS in the future. Defense Infrared Countermeasures technologies are not eligible for direct commercial sales at this time.

(U) If FMS are requested before the successful completion of Initial Operational Test & Evaluation, the PM will request approval, via a Yockey Waiver, from USD(A&S), as required, prior to FMS, commitment to sell or agreement to license for export.

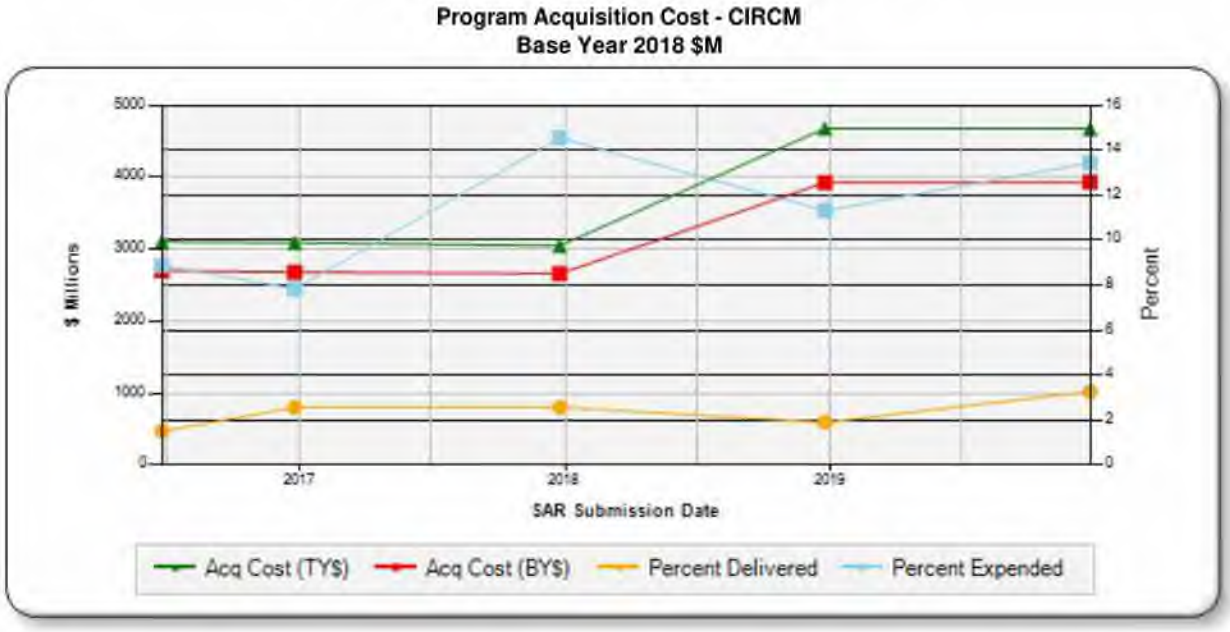
In accordance with Section 830(a)(2) of the FY 2020 National Defense Authorization Act, which requires a SAR to be submitted "in unclassified form without any designation relating to dissemination control" this SAR section has omitted information that is ~~For Official Use Only~~.

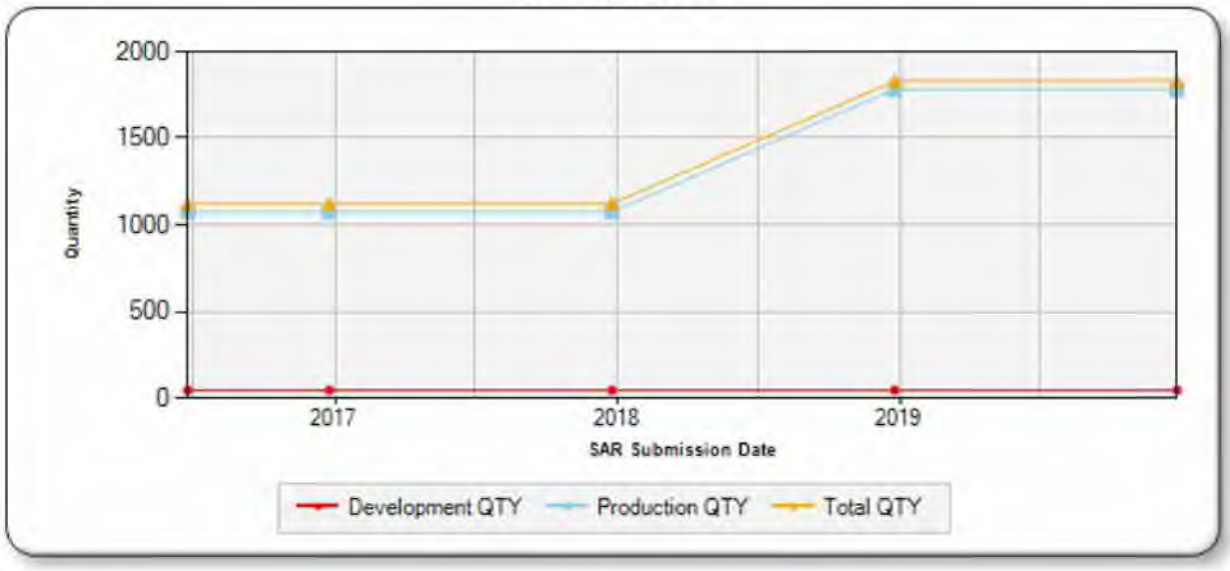
Nuclear Costs

None

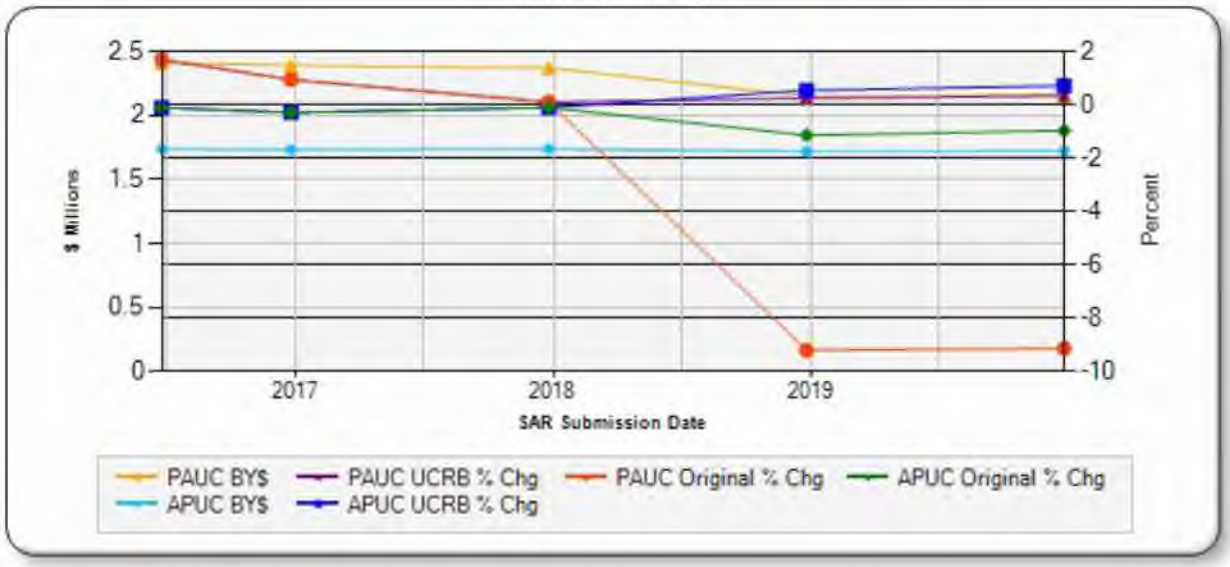
(U//FOUO) Charts

CIRCM first began SAR reporting in June 2016





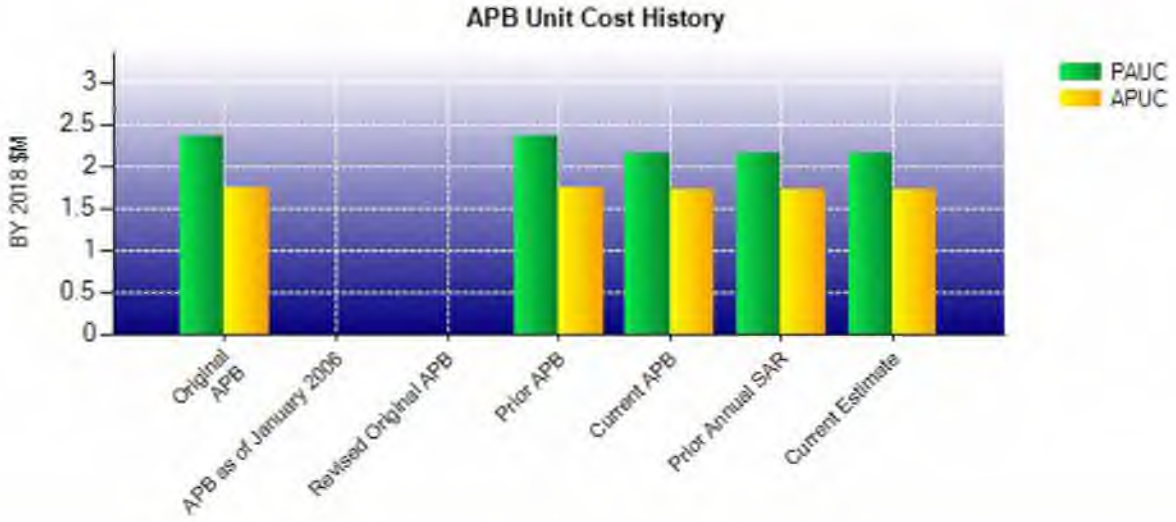
Unit Cost - CIRCM
Base Year 2018 $M



(U//FOUO) Unit Cost

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2018 $M Current UCR Baseline (Nov 2018 APB)	BY 2018 $M Current Estimate (Dec 2019 SAR)	% Change
Program Acquisition Unit Cost			
Cost	3920.6	3933.6	
Quantity	1829	1829	
Unit Cost	2.144	2.151	+0.33
Average Procurement Unit Cost			
Cost	3042.8	3062.5	
Quantity	1781	1781	
Unit Cost	1.708	1.720	+0.70

Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2018 $M Original UCR Baseline (Jul 2016 APB)	BY 2018 $M Current Estimate (Dec 2019 SAR)	% Change
Program Acquisition Unit Cost			
Cost	2660.8	3933.6	
Quantity	1124	1829	
Unit Cost	2.367	2.151	-9.13
Average Procurement Unit Cost			
Cost	1869.4	3062.5	
Quantity	1076	1781	
Unit Cost	1.737	1.720	-0.98



APB Unit Cost History					
Item	Date	BY 2018 $M		TY $M	
		PAUC	APUC	PAUC	APUC
Original APB	Jul 2016	2.367	1.737	2.725	2.103
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	Jul 2016	2.367	1.737	2.725	2.103
Current APB	Nov 2018	2.144	1.708	2.557	2.115
Prior Annual SAR	Dec 2018	2.149	1.717	2.560	2.118
Current Estimate	Dec 2019	2.151	1.720	2.557	2.115

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	
2.725	-0.006	-0.416	-0.015	0.000	-0.053	0.000	0.322	-0.168	2.557

Current SAR Baseline to Current Estimate (TY $M)									
PAUC Production Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
2.557	0.003	0.000	-0.007	0.000	0.137	0.000	-0.133	0.000	2.557

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	
2.103	-0.005	-0.181	-0.015	0.000	-0.117	0.000	0.330	0.012	2.115

Current SAR Baseline to Current Estimate (TY $M)									
APUC Production Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
2.115	0.004	0.000	-0.008	0.000	0.140	0.000	-0.137	-0.001	2.115

(U//FOUO) SAR Baseline History				
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current Estimate
Milestone A	N/A	Dec 2011	Dec 2011	Dec 2011
Milestone B	N/A	Aug 2015	Aug 2015	Aug 2015
Milestone C	N/A	Mar 2018	Sep 2018	Sep 2018
IOC	N/A	Jul 2021	Sep 2021	Sep 2021
Total Cost (TY $M)	N/A	3063.0	4677.2	4677.1
Total Quantity	N/A	1124	1829	1829
PAUC	N/A	2.725	2.557	2.557

Cost Variance

Summary TY $M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	895.5	3767.2	--	4677.2
Previous Changes				
Economic	-0.4	+13.6	--	+13.2
Quantity	--	--	--	--
Schedule	--	-13.4	--	-13.4
Engineering	--	--	--	--
Estimating	+0.4	+244.2	--	+244.6
Other	--	--	--	--
Support	--	-239.3	--	-239.3
Subtotal	--	+5.1	--	+5.1
Current Changes				
Economic	-1.0	-6.8	--	-7.8
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+1.0	+5.9	--	+6.9
Other	--	--	--	--
Support	--	-4.3	--	-4.3
Subtotal	--	-5.2	--	-5.2
Total Changes	--	-0.1	--	-0.1
Current Estimate	895.5	3767.1	--	4677.1

Summary BY 2018 $M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	865.9	3042.8	--	3920.6
Previous Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-3.9	+199.1	--	+195.2
Other	--	--	--	--
Support	--	-184.7	--	-184.7
Subtotal	-3.9	+14.4	--	+10.5
Current Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-2.8	+4.5	--	+1.7
Other	--	--	--	--
Support	--	+0.8	--	+0.8
Subtotal	-2.8	+5.3	--	+2.5
Total Changes	-6.7	+19.7	--	+13.0
Current Estimate	859.2	3062.5	--	3933.6

Previous Estimate: December 2018

RDT&E	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	-1.0
Adjustment for current and prior escalation. (Estimating)	+0.4	+0.4
Revised estimate due to changes in cost estimating methodology for A-kit development/integration and budget cuts caused delays in Fixed Wing aircraft A-kit development/integration activities. (Estimating)	-3.2	+0.6
RDT&E Subtotal	-2.8	0.0

Procurement	$M	
Current Change Explanations	Base Year	Then Year
Updated cost estimating methodology. (Estimating)	+4.3	+5.7
Increase in Other Support based on changes in funding & rephrasing to mitigate impacts. (Support)	+0.5	-4.3
Increase in Initial Spares due to updated cost estimating methodology. (Support)	+0.3	0.0
Adjustment for current and prior escalation. (Estimating)	+0.2	+0.2
Revised escalation indices. (Economic)	N/A	-6.8
Procurement Subtotal	+5.3	-5.2

Contracts

Contract Identification

Appropriation: RDT&E
Contract Name: CIRCM EMD
Contractor: Northrop Grumman Systems Corporation
Contractor Location: 600 Hicks Road
Rolling Meadows, IL 60008-1015
Contract Number: W58RGZ-15-C-0067
Contract Type: Cost Plus Fixed Fee (CPFF), Fixed Price Incentive(Firm Target) (FPIF), Firm Fixed Price (FFP)
Award Date: August 28, 2015
Definitization Date: August 28, 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
116.8	122.6	58	170.3	173.4	58	126.7	127.2

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to negotiated changes on the contract.

The Initial Contract Price was updated from the prior SAR to remove non-program of record efforts.

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (1/24/2020)	-8206.0	-701.0
Previous Cumulative Variances	-150.0	-75.0
Net Change	-8056.0	-626.0

Cost and Schedule Variance Explanations

The unfavorable net change in the cost variance is due to the internal transfer of pointer-tracker units between contracts by Northrop Grumman Systems Corporation (NGSC) to meet higher priority deliveries on another contract. Nineteen pointer-tracker units already had performance taken prior to being transferred, so performance was removed in January, and will return when the next delivery of pointer tracker units are received in February.

The unfavorable net change in the schedule variance is due to the January reduction in performance by seven System Processor Units (SPUs) that were returned to Teledyne for repairs. These SPUs are anticipated back in February. Additionally, the internal transfer of pointer-tracker units between contracts by NGSC to meet higher priority deliveries on another contract. Nineteen pointer tracker units already had performance taken prior to being transferred, so performance was removed in January, and will return when the next delivery of pointer-tracker units are received in February.

NOTE: All Variances are in $K.

Notes

(U) The EMD Contract contains Fixed Price Incentive Firm (FPIF) CLINs for the procurement of production representative hardware in support of test and integration activities. Cost-Plus Fixed Fee (CPFF) CLINs consist of all non-recurring engineering and development activities. The Firm Fixed Price (FFP) CLIN consists of the Software Technical Data Package.

(U) On September 17, 2019, EMD contract modification 36 was issued in the amount of $5,999,389.04 to provide Diminishing Manufacturing Sources and Material Shortages (DMSMS)/Obsolescence Support.

(U) On September 24, 2019, CLIN 0013, Option 7 for the Software Technical Data Package was executed in the amount of $462,906.00. This option has a six month period of performance and will assist in the transition to organic software sustainment.

(U) During this reporting period, DCMA issued to NG four level 2 Corrective Action Requests (CARs) in the areas of Billing, System Engineering/Configuration Management, Earned Value Management, and Property Management. Additionally, there were two level 3 CARs issued in the areas of Estimating and Purchasing resulting in the disapproval of the associated Business System and payment withholds. All issued CARs remain open and currently are under DCMA surveillance for implementation of an approved Corrective Action Plan.

Deliveries and Expenditures

Deliveries				
Delivered to Date	**Planned to Date**	**Actual to Date**	**Total Quantity**	**Percent Delivered**
Development	48	48	48	100.00%
Production	12	12	1781	0.67%
Total Program Quantity Delivered	60	60	1829	3.28%

Expended and Appropriated (TY $M)			
Total Acquisition Cost	4677.1	Years Appropriated	11
Expended to Date	629.2	Percent Years Appropriated	28.95%
Percent Expended	13.45%	Appropriated to Date	892.2
Total Funding Years	38	Percent Appropriated	19.08%

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

Operating and Support Cost

Cost Estimate Details

Date of Estimate:	July 31, 2018
Source of Estimate:	Service ICE
Quantity to Sustain:	1781
Unit of Measure:	B-Kit
Service Life per Unit:	15.00 Years
Fiscal Years in Service:	FY 2019 - FY 2047

The CIRCM B-Kit is the mission kit required to achieve near spherical coverage for an aircraft. The B-Kit consists of two Pointer/Trackers, two Lasers, and one System Processor Unit.

Total acquisition quantity (1,829) includes the production quantity that will be fielded/sustained (1,781) plus 48 RDT&E-funded systems that are not production representative units and will not be fielded or sustained.

Sustainment Strategy

The Interim Contractor Support (ICS) contract was awarded in the fourth quarter of FY 2019, and includes repair of CIRCM Program of Record (POR) assets. The ICS contract is sole-sourced to NGSC as the Product Support Integrator (PSI) and Product Support Provider (PSP). NGSC sub contractors, Daylight Defense (DLD) (Laser), Leonardo/DRS (Pointer-Tracker) and Teledyne (System Processor Unit) have been designated as PSPs. The ICS contract with NGSC details facilitation efforts for organic depot stand-up and Transition to Sustainment (T2S). The Analysis of Product Support Alternatives (APSA) Business Case Analysis (BCA) (Annex B) recommends the Course of Action (COA) for sustainment as a Direct-Sale Public-Private Partnership (PPP) in order to achieve sufficient Supply Availability (SA), lower cost, and anticipated results for best-value. This approach allows PM Aircraft Survivability Equipment (ASE) to engage in a contract to meet the requirements of Title 10 United States Code, Section 2464 (10 USC 2464), and allow the government more control to use metrics against the contractor to enhance performance under Performance-Based Logistics (PBL) constructs.

Antecedent Information

Advanced Threat Infrared Countermeasure (ATIRCM) is the antecedent system for CIRCM. The ATIRCM estimates are based on actual contract cost. ATIRCM completed production and fielding of 120 B-Kits.

Annual O&S Costs BY2018 $K		
Cost Element	**CIRCM Average Annual Cost Per B-Kit**	**ATIRCM (Antecedent) Average Annual Cost Per B-Kit**
Unit-Level Manpower	7.459	68.268
Unit Operations	0.133	40.862
Maintenance	18.784	40.320
Sustaining Support	11.933	99.194
Continuing System Improvements	3.917	55.995
Indirect Support	0.000	--
Other	0.000	--
Total	42.226	304.639

Item	Total O&S Cost $M			
	CIRCM			ATIRCM (Antecedent)
	Current Production APB Objective/Threshold		Current Estimate	
Base Year	1132.6	1245.9	1128.0	548.4
Then Year	1674.5	N/A	1665.6	0.0

Disposal Cost is included in the Operating and Support Cost of the current APB objective and threshold for this program.

The FY 2020 PB estimate is based on the July 31, 2018 Milestone C Army Cost Position (ACP). The ACP reflects increases in quantities from the approved CDD quantities of 1,076 B-Kits and 3,373 A-Kits to the approved CPD quantities of 1,781 B-Kits and 3,642 A-Kits. CIRCM received the official Milestone C ADM on September 14, 2018.

Equation to Translate Annual Cost to Total Cost

Total O&S Cost ($1128.0M) = number of B-Kits (1,781) x System Service Life (15 years) x Average Annual O&S Cost ($42.223K) (BY 2018$) (includes Military Personnel Cost (MPA))

O&S Cost Variance		
Category	**BY 2018 $M**	**Change Explanations**
Prior SAR Total O&S Estimates - Dec 2018 SAR	1128.0	
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	1128.0

Disposal Estimate Details

Date of Estimate:	July 31, 2018
Source of Estimate:	Service ICE
Disposal/Demilitarization Total Cost (BY 2018 $M):	7.6

Disposal cost estimate is based on cost per pound of B-Kit.