RCS: DD-A&T(Q&A)823-449

Offensive Anti-Surface Warfare Increment 1 (Long Range Anti-Ship Missile) (OASuW Inc 1 (LRASM))

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
Offensive Anti-Surface Warfare Increment 1 (Long Range Anti-Ship Missile) (OASuW Inc 1 (LRASM))

DoD Component

Responsible Office

CAPT John Dougherty, IV
47123 Buse Road
Patuxent River, MD 20670

john.dougherty@navy.mil

Phone: 301-757-7477
Fax: 301-757-7435
DSN Phone:
DSN Fax:
Date Assigned: March 23, 2016

References

SAR Baseline (Development Estimate)

Assistant Secretary of the Navy (Research, Development & Acquisition) (ASN(RDA)) Approved Acquisition Program Baseline (APB) dated June 30, 2016

Approved APB

Assistant Secretary of the Navy (Research, Development & Acquisition) (ASN(RDA)) Approved Acquisition Program Baseline (APB) dated February 7, 2019

Mission and Description

The U.S. Navy is leveraging Defense Advanced Research Projects Agency (DARPA) demonstration efforts to deliver an air-launched Offensive Anti-Surface Warfare (OASuW) Inc 1 weapon as an early operational capability (EOC) in the required timeframe. OASuW Inc 1 will deliver the Long Range Anti-Ship Missile (LRASM) developed in the demonstration program as an EOC to meet the most urgent air-launched requirement, significantly reducing Joint Force warfighting risks and positioning the DoD to address evolving surface warfare threats. LRASM will remain a viable interim capability pending the determination of the long-term OASuW solution by evolving capability necessary to outpace a dynamic threat.

Based on the February 3, 2014 ADM, the OASuW Inc 1/LRASM program is structured using an accelerated model because of the urgency of need. The program leverages DoDI 5000.02 Model 4 to structure the acquisition approach which includes a highly integrated developmental and operational test program in order to meet EOC objectives. Additionally, the ADM directed establishment of a DARPA/Navy/Air Force LRASM Deployment Office (LDO) to manage the OASuW Inc 1 program. LDO, later renamed the Effects Deployment Office (FXDO), uses Knowledge Point decision meetings with an Executive Steering Board chaired by the Service Acquisition Executive to provide focused support and oversight to address the risk of technical or acquisition inefficiencies in order to achieve the fielded capability by the required date. A sole-source contract for Integration and Test was awarded in April 2016 to Lockheed Martin, the prime integrator for the LRASM demonstration and the legacy Joint Air-to-Surface Standoff Missile-Extended Range system, for development and delivery of the LRASM EOC. The urgency of the requirement is the basis for the streamlined approach to accelerate the process.

The LRASM weapon system is the force application component of the Anti-Surface Warfare (ASuW) capability servicing threat capital ships. LRASM is integral to realizing the National Defense Strategy of combat-credible military forces to deter war, protect the security of our nation and to enable the Joint Force to win should deterrence fail. The development and acquisition of LRASM has been structured to be fielded at a pace relevant to maintain overmatch against long-term strategic competition. Specifically, LRASM directly contributes to building a more lethal force and is a critical enabler for joint lethality in contested environments; deterring adversaries from aggression; ensuring common domains remain open and maintaining favorable regional balances of power.

LRASM will conduct pre-planned and variable strikes against heavily defended surface combatants.

Executive Summary

Program Highlights Since Last Report

The OASuW Inc 1/LRASM program was established as a DoD 5000.02 Model 4 accelerated acquisition program with the goal of delivering a credible, lethal threat against advanced surface combatants by 2018 for the B-1 and 2019 for the F/A-18E/F. The program successfully met Early Operational Capability (EOC) on the B-1 in December 2018, which was 10 months ahead of schedule threshold. The program successfully met EOC on the F/A-18E/F in November 2019, 11 months ahead of schedule threshold.

The program shifted focus from EOC capability to development of the new LRASM 1.1 configuration in late 2019. LRASM 1.1 ensures continued tactical dominance against capital ships focusing primarily on increased range, improved communication capabilities, increased survivability and obsolescence upgrades. LRASM will conduct a series of technical reviews assessing the maturity of the LRASM 1.1 configuration. The next LRASM milestone event is approval for awarding Lots 4 and 5 missile production which incorporate LRASM 1.1. Award is anticipated in first quarter FY 2021.

The program experienced two FY 2020 Congressional adjustments: 1) A $50M increase in RDT&E to support LRASM 1.1 and 2) a $70.7M reduction in procurement which resulted in a quantity reduction which led to the decision to combine the award of Lots 4 and 5 in FY 2021.

In FY 2021 PB, U.S Air Force procurement quantities increased from 50 to 179 resulting in a procurement breach and increased O&S costs above the current APB thresholds.

Below are the program achievements since the last SAR:

April 2019 - Knowledge Point 7: Aircraft carrier suitability assessment and Lot 3 procurement approval (Contract award is anticipated March 2020)

July 2019 - LRASM 1.1 development activities commenced

August 2019 - Quick Reaction Assessment report

September 2019 - F/A-18E/F Flight test completion

October 2019 - Knowledge Point 8: EOC Recommendation for USN (F/A-18E/F)

November 2019 - Received F/A-18E/F EOC declaration letter by N98

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**
February 2014	Joint Memorandum from Office of the USD(AT&L) delegated MDA for the OASuW/ Inc 1 a pre-MDAP effort for the Navy. Program was structured as Model 4 accelerated acquisition.
June 2014	Original Acquisition Strategy approved at Knowledge Point (KP) 1.
February 2016	KP 3 was held satisfying Milestone B certification and approved update to the Acquisition Strategy.
April 2016	Contract awarded for Integration and Test.
June 2016	Assistant Secretary of the Navy for Research, Development and Acquisition Joint Memorandum for USD(AT&L) certified as required by section 2366b(a)(3)(L) of title 10, United States Code concurring with cost, schedule, technical feasibility, and performance trade-offs have been made with regard to LRASM.
December 2016	KP 4 satisfying Production Readiness Review requirements and authorizing procurement of Lot 1 Early Operational Capability units.
March 2018	KP 5 was approved, authorizing the contract award of Lot 2 Early Operational Capability (EOC) weapons production contract.
September 2018	KP 6 was approved as a result of meeting the weapon system EOC fielding threshold. The entrance criteria for KP 7 and 8 were also approved.
December 2018	B-1B EOC was achieved.
November 2019	F/A-18E/F EOC was achieved.

Threshold Breaches

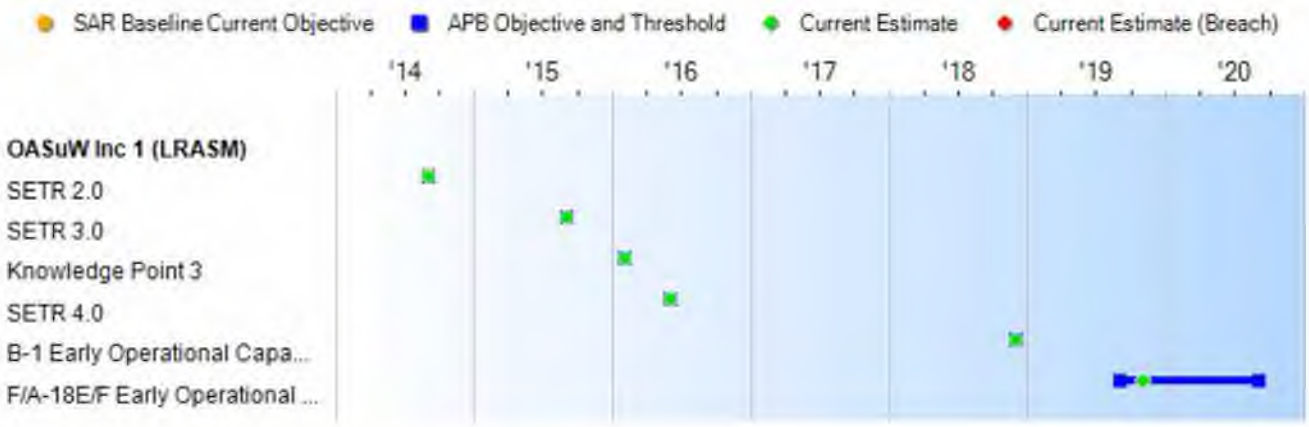
APB Breaches		
Schedule		☐
Performance		☐
Cost	RDT&E	☐
	Procurement	☑
	MILCON	☐
	Acq O&M	☐
O&S Cost		☑
Unit Cost	PAUC	☐
	APUC	☐

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

Explanation of Breach

The program is experiencing a procurement breach and increased O&S costs due to an increase in Air Force quantities in FY 2021 PB. U.S. Air Force quantities increased from 50 to 179. The program will notify the MDA via the Executive Steering Board, and a program deviation report has been delivered.

Schedule



Schedule Events					
Events	SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Current Estimate	
SETR 2.0	Sep 2014	Sep 2014	Sep 2014	Sep 2014	
SETR 3.0	Sep 2015	Sep 2015	Sep 2015	Sep 2015	
Knowledge Point 3	Feb 2016	Feb 2016	Feb 2016	Feb 2016	
SETR 4.0	Jun 2016	Jun 2016	Jun 2016	Jun 2016	
B-1 Early Operational Capability	Sep 2018	Dec 2018	Dec 2018	Dec 2018	
F/A-18E/F Early Operational Capability	Sep 2019	Sep 2019	Sep 2020	Nov 2019	(Ch-1)

Change Explanations

(Ch-1) F/A-18E/F Early Operational Capability current estimate changed from September 2019 to November 2019 to reflect actual date of achievement.

Acronyms and Abbreviations

SETR - System Engineering Technical Review

Performance

Performance Characteristics					
SAR Baseline Development Estimate	**Current APB Development Objective/Threshold**		**Demonstrated Performance**	**Current Estimate**	
Key Cost Parameter					
USG Only	USG Only	(T=O) USG Only	TBD	USG Only	
Material Availability					
more than or equal to 90% availability	more than or equal to 90% availability	More than or equal to 80% availability	TBD	more than or equal to 90% availability	
Operational Availability					
more than or equal to 98% availability	more than or equal to 98% availability	more than or equal to 90% availability	TBD	more than or equal to 98% availability	
Weapon System Reliability					
greater than or equal to 190 hrs	greater than or equal to 190 hrs	more than or equal to 30 hrs	TBD	greater than or equal to 190 hrs	
Key Schedule Parameter (B-1 / F/A-18E/F)					
4th Quarter FY 2018/2019	4th Quarter FY 2018/2019	4th Quarter FY 2019/2020	Dec 2018/ Nov 2019	Dec 2018/ Nov 2019	(Ch-1)
Operations and Support (O&S) Cost					
Threshold = Objective	Less than or equal to $413M	(T=O) Less than or equal to $413M	TBD	Threshold = Objective	
Service Life					
30 years	30 years	15 years	TBD	15 years	(Ch-2)
Weapon Load-Out (B-1/F/A-18 E-F)					
Threshold = Objective	24/4	(T=O) 24/4	TBD	Threshold = Objective	

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

Requirements Reference

CDD for OASuW Weapon System Increment approved by JROCM 033-15 March 25, 2015

Change Explanations

(Ch-1) F/A-18E/F EOC achieved November 2019.
(Ch-2) The Service Life current estimate changed from 30 years to 15 years to correct an error in the December 2018 SAR.

Acronyms and Abbreviations

EOC - Early Operational Capability
USG - United States Government

Track to Budget

RDT&E

Appn		BA	PE	
Navy	1319	04	0604786N	
	Project		**Name**	
	3337		Offensive Anti-Surface Warfare (OASuW) Weapon	
	9999		Operational Test Requirement for Additional Capabilities	(Sunk)
		Notes:	FY19 Congressional Add (C455)	
	9999		LRASM 1.1 capability improvements	
		Notes:	FY20 Congressional Add (C552)	

Procurement

Appn		BA	PE
Navy	1507	02	0204167N
	Line Item		**Name**
	2291		LRASM
Air Force	3020	02	0207325F
	Line Item		**Name**
	LRASM0		LRASM

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 2014 $M			BY 2014 $M	TY $M		
	SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Current Estimate	SAR Baseline Development Estimate	Current APB Development Objective	Current Estimate
RDT&E	1175.0	1364.3	1500.7	1394.7	1238.0	1442.1	1482.5
Procurement	292.3	1227.1	1349.8	1475.0[1]	327.7	1411.3	1747.0
Flyaway	--	--	--	1466.6	--	--	1737.2
Recurring	--	--	--	1457.6	--	--	1726.8
Non Recurring	--	--	--	9.0	--	--	10.4
Support	--	--	--	8.4	--	--	9.8
Other Support	--	--	--	8.4	--	--	9.8
Initial Spares	--	--	--	0.0	--	--	0.0
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	1467.3	2591.4	N/A	2869.7	1565.7	2853.4	3229.5

[1] *APB Breach*

Current APB Cost Estimate Reference

Joint Component Cost Estimate in support of KP-3 dated February 19, 2016, updated with Lot 1 and 2 actuals.

Cost Notes

CAPE Cost Risks: A LRASM program office estimate was updated in January 2019 in support of a revised APB.

Below are the following program risks, potential impacts and approaches to mitigating the risks:

1. The $70.7M FY 2020 Congressional mark to procurement reduced the total LRASM program quantities. Subsequently, the reduction in quantity may result in higher unit costs. The program plans to mitigate this risk by combining production Lots 4 and 5 which will enable a quantity of 17 to be procured with FY 2020 funding due to economies of scale.

2. The LRASM 1.1 Undefinitized Contract Action (UCA) definitization is currently in negotiations. While the Government cost estimate fits within the current budget, the negotiated costs could exceed the budget requiring additional funding. The program office, by executing LRASM 1.1 via a UCA, will continue to negotiate to mitigate cost risk.

Total Quantity			
Quantity	SAR Baseline Development Estimate	Current APB Development	Current Estimate
RDT&E	14	16	16
Procurement	110	374	488
Total	124	390	504

Quantity Notes

The total quantity of LRASM weapons required has increased to 488 All Up Rounds (309 USN and 179 USAF). Due to the increase in Air Force quantities, the program is experiencing a procurement breach and increased O&S costs.

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	1301.5	115.4	35.8	29.8	0.0	0.0	0.0	0.0	1482.5
Procurement	486.6	72.5	188.6	164.9	329.5	343.5	161.4	0.0	1747.0
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	1788.1	187.9	224.4	194.7	329.5	343.5	161.4	0.0	3229.5
PB 2020 Total	1762.7	208.6	184.4	168.6	144.0	144.0	0.0	0.0	2612.3
Delta	25.4	-20.7	40.0	26.1	185.5	199.5	161.4	0.0	617.2

Funding Notes

The program experienced two FY 2020 Congressional adjustments: 1) A $50M increase in RDT&E to support LRASM 1.1 and 2) a $70.7M reduction in procurement which resulted in a quantity reduction from 41 to 17. The program plans to combine the FY 2020/2021 procurements which will enable a quantity of 17 to be procured with FY 2020 funding due to economies of scale.

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	16	0	0	0	0	0	0	0	0	16
Production	0	132	17	53	48	92	100	46	0	488
PB 2021 Total	16	132	17	53	48	92	100	46	0	504
PB 2020 Total	16	134	48	48	48	48	48	0	0	390
Delta	0	-2	-31	5	0	44	52	46	0	114

Cost and Funding

Annual Funding By Appropriation

Annual Funding 1319 | RDT&E | Research, Development, Test, and Evaluation, Navy							
Fiscal Year	Quantity	TY $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2013	--	--	--	--	--	--	77.6
2014	--	--	--	--	--	--	86.7
2015	--	--	--	--	--	--	181.7
2016	--	--	--	--	--	--	348.7
2017	--	--	--	--	--	--	301.6
2018	--	--	--	--	--	--	163.8
2019	--	--	--	--	--	--	141.4
2020	--	--	--	--	--	--	115.4
2021	--	--	--	--	--	--	35.8
2022	--	--	--	--	--	--	29.8
Subtotal	16	--	--	--	--	--	1482.5

Annual Funding 1319 | RDT&E | Research, Development, Test, and Evaluation, Navy							
Fiscal Year	Quantity	BY 2014 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2013	--	--	--	--	--	--	77.7
2014	--	--	--	--	--	--	85.6
2015	--	--	--	--	--	--	177.2
2016	--	--	--	--	--	--	334.1
2017	--	--	--	--	--	--	283.8
2018	--	--	--	--	--	--	150.6
2019	--	--	--	--	--	--	127.4
2020	--	--	--	--	--	--	102.0
2021	--	--	--	--	--	--	31.0
2022	--	--	--	--	--	--	25.3
Subtotal	16	--	--	--	--	--	1394.7

Annual Funding 1507 | Procurement | Weapons Procurement, Navy							
Fiscal Year	Quantity	TY $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2017	15	56.8	--	--	56.8	0.2	57.0
2018	34	121.6	--	0.3	121.9	0.3	122.2
2019	33	119.0	--	--	119.0	0.8	119.8
2020	17	61.5	--	10.1	71.6	0.9	72.5
2021	48	167.9	--	--	167.9	0.9	168.8
2022	48	163.9	--	--	163.9	1.0	164.9
2023	48	163.7	--	--	163.7	1.0	164.7
2024	48	159.7	--	--	159.7	1.0	160.7
2025	18	59.5	--	--	59.5	1.0	60.5
Subtotal	309	1073.6	--	10.4	1084.0	7.1	1091.1

Annual Funding 1507 | Procurement | Weapons Procurement, Navy							
Fiscal Year	Quantity	BY 2014 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2017	15	52.6	--	--	52.6	0.2	52.8
2018	34	110.1	--	0.2	110.3	0.3	110.6
2019	33	105.6	--	--	105.6	0.7	106.3
2020	17	53.5	--	8.8	62.3	0.8	63.1
2021	48	143.3	--	--	143.3	0.7	144.0
2022	48	137.1	--	--	137.1	0.8	137.9
2023	48	134.2	--	--	134.2	0.9	135.1
2024	48	128.4	--	--	128.4	0.8	129.2
2025	18	46.9	--	--	46.9	0.8	47.7
Subtotal	309	911.7	--	9.0	920.7	6.0	926.7

The total quantity of 324 decreased to 309 due to Congressional budget marks.

Annual Funding 3020 | Procurement | Missile 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
2017	19	71.4	--	--	71.4	--	71.4
2018	16	59.1	--	--	59.1	2.7	61.8
2019	15	54.4	--	--	54.4	--	54.4
2020	--	--	--	--	--	--	--
2021	5	19.8	--	--	19.8	--	19.8
2022	--	--	--	--	--	--	--
2023	44	164.8	--	--	164.8	--	164.8
2024	52	182.8	--	--	182.8	--	182.8
2025	28	100.9	--	--	100.9	--	100.9
Subtotal	179	653.2	--	--	653.2	2.7	655.9

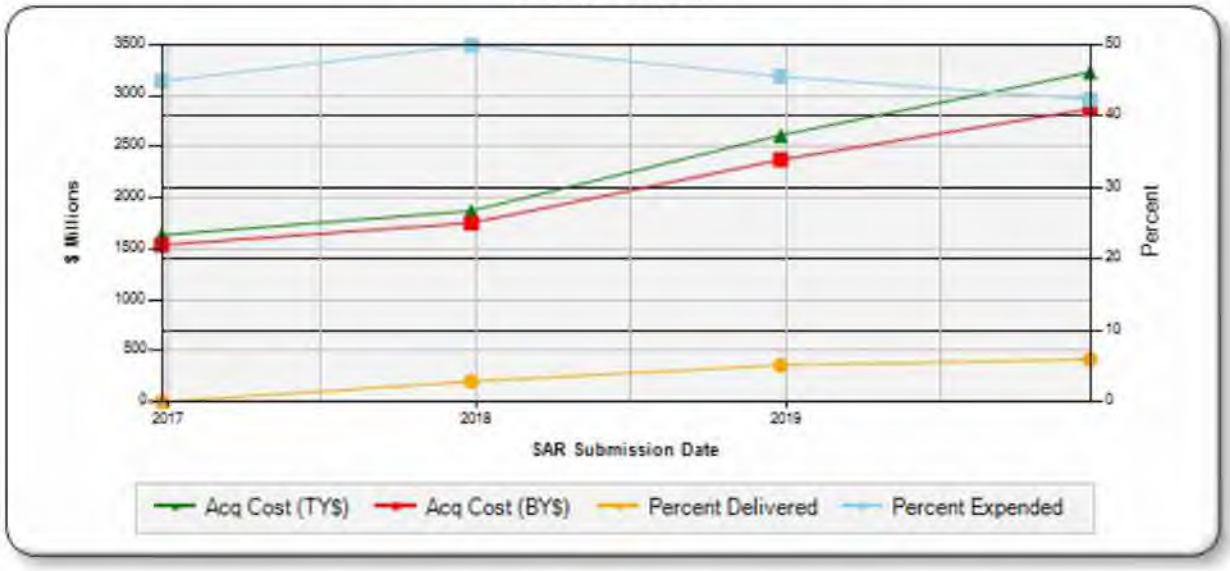
Annual Funding 3020 | Procurement | Missile Procurement, Air Force							
Fiscal Year	Quantity	BY 2014 $M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2017	19	65.9	--	--	65.9	--	65.9
2018	16	53.5	--	--	53.5	2.4	55.9
2019	15	48.3	--	--	48.3	--	48.3
2020	--	--	--	--	--	--	--
2021	5	16.9	--	--	16.9	--	16.9
2022	--	--	--	--	--	--	--
2023	44	135.0	--	--	135.0	--	135.0
2024	52	146.8	--	--	146.8	--	146.8
2025	28	79.5	--	--	79.5	--	79.5
Subtotal	179	545.9	--	--	545.9	2.4	548.3

The above table reflects the Air Force FY 2021 PB which reflects an increase from 50 LRASM All-Up Rounds to 179.

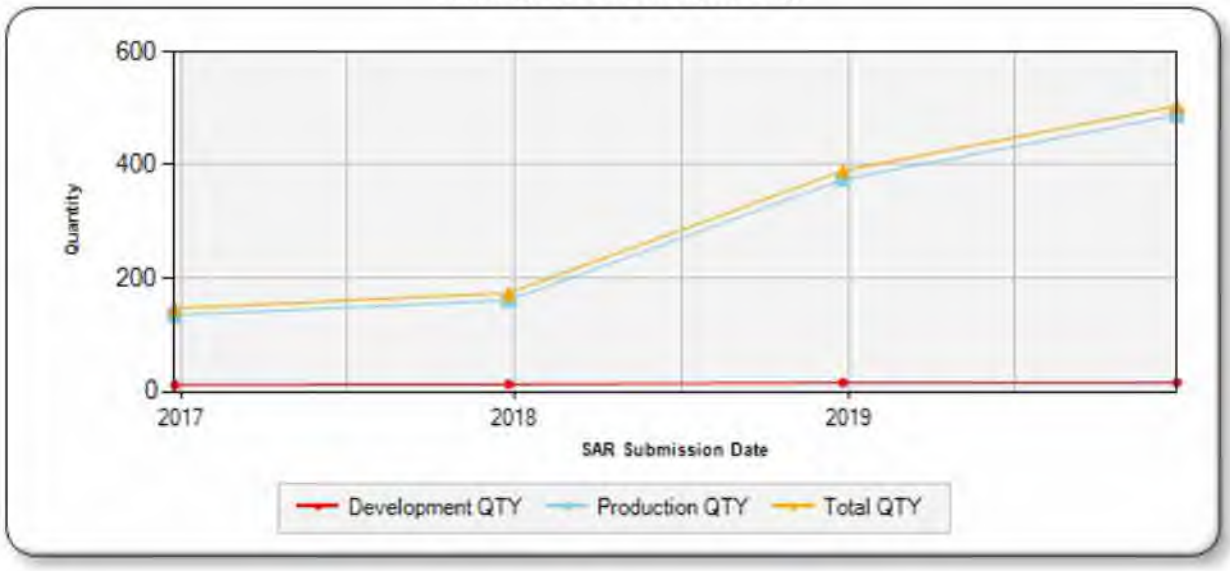
Charts

OASuW Inc 1 (LRASM) first began SAR reporting in December 2016

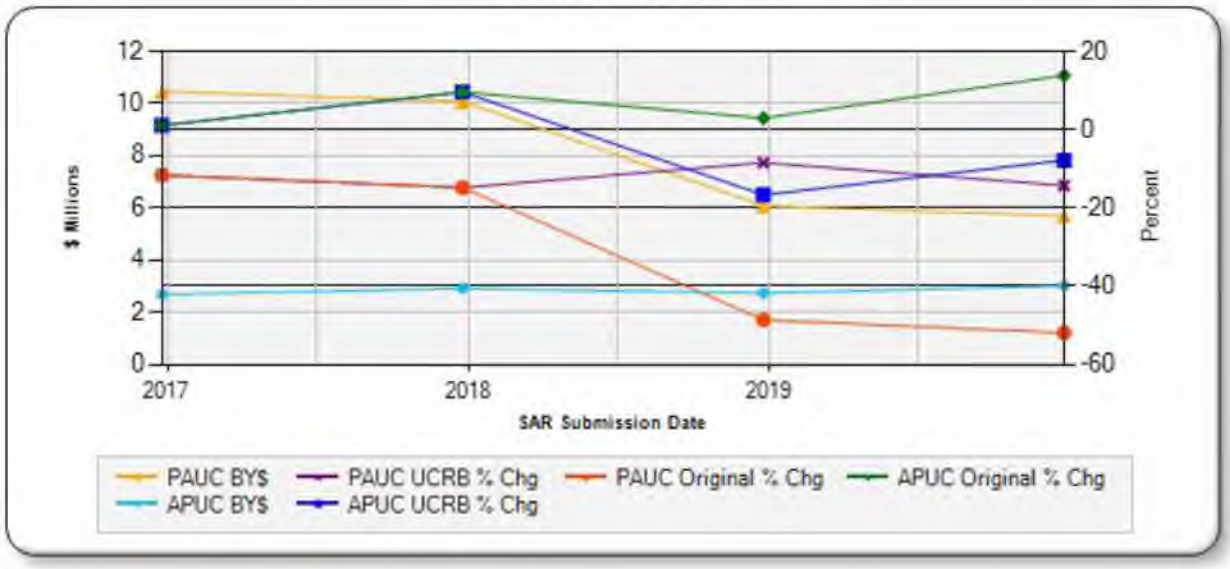
Program Acquisition Cost - OASuW Inc 1 (LRASM)
Base Year 2014 $M



Quantity - OASuW Inc 1 (LRASM)



Unit Cost - OASuW Inc 1 (LRASM)
Base Year 2014 $M



Risks

Significant Schedule and Technical Risks

Significant Schedule and Technical Risks	
Milestone B (February 2016)	
1.	Main risks at Milestone B are classified.
Current Estimate (December 2019)	
1.	The highest program technical or schedule risk is classified. All program risks are moderate or lower.

Risks

Risk and Sensitivity Analysis

Risks and Sensitivity Analysis	
Current Baseline Estimate (February 2019)	
1.	Although cost risks are identified in the cost note of this report, there are no unit cost risks.
Original Baseline Estimate (June 2016)	
1.	A Joint Component Cost Estimate was completed to support Knowledge Point 3 dated February 19, 2016 and was completed at the 50% confidence level. There are no known cost risks at this time.
Revised Original Estimate (N/A)	
None	
Current Procurement Cost (December 2019)	
1.	In FY 2021 PB, U.S Air Force procurement quantities increased from 50 to 179 resulting in a procurement breach and increasing O&S costs above the current APB threshold.

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	3/31/2016	1/3/2020
Approved Quantity	110	488
Reference	OASuW Increment 1 Knowledge Point # 3, ADM	PB 2021 Budget Exhibit
Start Year	2017	2017
End Year	2019	2025

The Current Total LRIP Quantity is more than 10% of the total production quantity because LRASM continues to be an interim solution pending determination of the long-term OASuW/Inc. 2 solution.

As a result of FY 2021 PB, adjustments have been made to the program increasing the required quantity to 488 All Up Rounds (309 USN and 179 USAF).

Notes

Foreign Military Sales

Country	Date of Sale	Quantity	Total Cost $M	Description
Australia	2/6/2019		1.5	Case Number AT-P-FAL was established to procure technical support services.

Notes

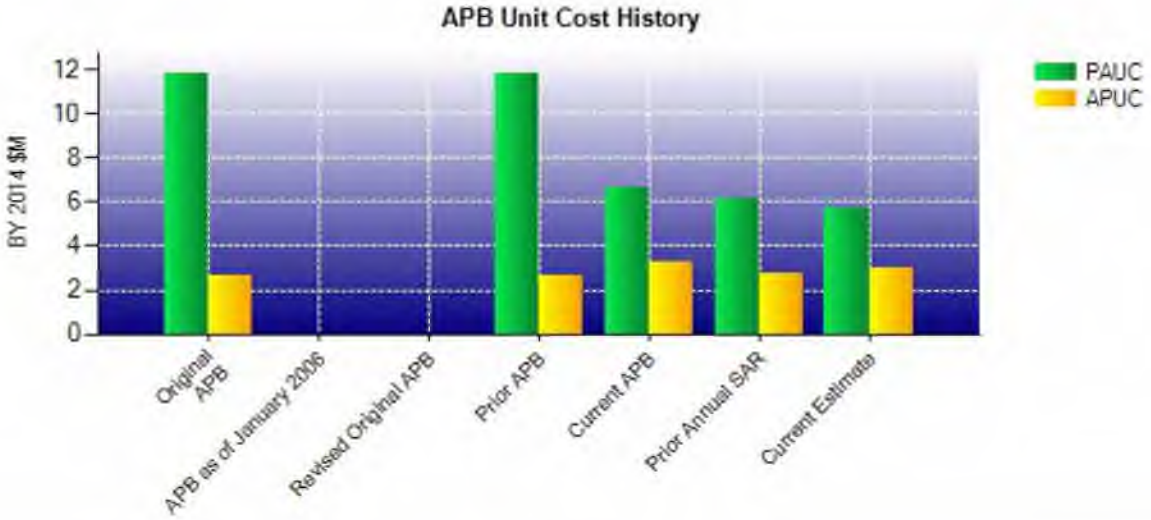
Nuclear Costs

None

Unit Cost

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2014 $M Current UCR Baseline (Feb 2019 APB)	BY 2014 $M Current Estimate (Dec 2019 SAR)	% Change
Program Acquisition Unit Cost			
Cost	2591.4	2869.7	
Quantity	390	504	
Unit Cost	6.645	5.694	-14.31
Average Procurement Unit Cost			
Cost	1227.1	1475.0	
Quantity	374	488	
Unit Cost	3.281	3.023	-7.86

Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2014 $M Original UCR Baseline (Jun 2016 APB)	BY 2014 $M Current Estimate (Dec 2019 SAR)	% Change
Program Acquisition Unit Cost			
Cost	1467.3	2869.7	
Quantity	124	504	
Unit Cost	11.833	5.694	-51.88
Average Procurement Unit Cost			
Cost	292.3	1475.0	
Quantity	110	488	
Unit Cost	2.657	3.023	+13.77



APB Unit Cost History					
Item	Date	BY 2014 $M		TY $M	
		PAUC	APUC	PAUC	APUC
Original APB	Jun 2016	11.833	2.657	12.627	2.979
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 2016	11.833	2.657	12.627	2.979
Current APB	Feb 2019	6.645	3.281	7.316	3.774
Prior Annual SAR	Dec 2018	6.081	2.733	6.698	3.162
Current Estimate	Dec 2019	5.694	3.023	6.408	3.580

SAR Unit Cost History

Current SAR Baseline to Current Estimate (TY $M)									
PAUC Development Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
12.627	-0.013	-6.948	0.065	0.669	-0.012	0.000	0.020	-6.219	6.408

Current SAR Baseline to Current Estimate (TY $M)									
Initial APUC Development Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
2.979	-0.005	0.340	0.067	0.172	0.007	0.000	0.020	0.601	3.580

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	Feb 2016	N/A	Feb 2016
Milestone C	N/A	N/A	N/A	N/A
IOC	N/A	N/A	N/A	N/A
Total Cost (TY $M)	N/A	1565.7	N/A	3229.5
Total Quantity	N/A	124	N/A	504
PAUC	N/A	12.627	N/A	6.408

Cost Variance

Summary TY $M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Development Estimate)	1238.0	327.7	--	1565.7
Previous Changes				
Economic	-5.3	-3.4	--	-8.7
Quantity	+5.0	+853.7	--	+858.7
Schedule	--	+6.9	--	+6.9
Engineering	+203.1	--	--	+203.1
Estimating	-11.0	-11.5	--	-22.5
Other	--	--	--	--
Support	--	+9.1	--	+9.1
Subtotal	+191.8	+854.8	--	+1046.6
Current Changes				
Economic	+1.1	+1.2	--	+2.3
Quantity	--	+437.8	--	+437.8
Schedule	--	+26.0	--	+26.0
Engineering	+50.0	+84.0	--	+134.0
Estimating	+1.6	+14.7	--	+16.3
Other	--	--	--	--
Support	--	+0.8	--	+0.8
Subtotal	+52.7	+564.5	--	+617.2
Total Changes	+244.5	+1419.3	--	+1663.8
Current Estimate	1482.5	1747.0	--	3229.5

Summary BY 2014 $M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Development Estimate)	1175.0	292.3	--	1467.3
Previous Changes				
Economic	--	--	--	--
Quantity	+4.5	+724.4	--	+728.9
Schedule	--	+6.9	--	+6.9
Engineering	+180.7	--	--	+180.7
Estimating	-10.8	-9.5	--	-20.3
Other	--	--	--	--
Support	--	+7.9	--	+7.9
Subtotal	+174.4	+729.7	--	+904.1
Current Changes				
Economic	--	--	--	--
Quantity	--	+354.6	--	+354.6
Schedule	--	+14.8	--	+14.8
Engineering	+44.2	+69.8	--	+114.0
Estimating	+1.1	+13.3	--	+14.4
Other	--	--	--	--
Support	--	+0.5	--	+0.5
Subtotal	+45.3	+453.0	--	+498.3
Total Changes	+219.7	+1182.7	--	+1402.4
Current Estimate	1394.7	1475.0	--	2869.7

Previous Estimate: December 2018

RDT&E	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+1.1
Additional funding for LRASM v1.1 capability improvements. (Engineering)	+44.2	+50.0
Execution-related funding realignments in FY 2019 - FY 2022. (Estimating)	+2.0	+2.5
Adjustment for current and prior escalation. (Estimating)	-0.9	-0.9
RDT&E Subtotal	+45.3	+52.7

Procurement	$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+1.2
Quantity variance resulting from a decrease of 15 All-Up-Rounds (AURs) from 324 to 309 (Navy). (Quantity)	-36.0	-44.8
Additional Quantity variance resulting from a decrease of 15 AURs from 324 to 309 (Navy). (Quantity)	+12.6	+14.2
Quantity variance resulting from an increase of 129 AURs from 50 to 179 (Air Force). (Quantity)	+309.3	+383.2
Additional Quantity variance resulting from an increase of 129 AURs from 50 to 179 (Air Force). (Quantity)	+68.7	+85.2
Schedule variance resulting from procurement buy profile rephasing between FY 2020 and FY 2025 (Navy). (Schedule)	0.0	+8.5
Additional Schedule variance resulting from procurement buy profile rephasing between FY 2020 and FY 2025 (Navy). (Schedule)	+14.8	+17.5
Additional funding for LRASM v1.1 capability improvements between FY 2020 and FY 2025. (Engineering)	+69.8	+84.0
Revised estimate to account for realized contractor costs between FY 2017 and FY 2019. (Estimating)	+13.7	+15.2
Adjustment for current and prior escalation. (Estimating)	-0.4	-0.5
Adjustment for current and prior escalation. (Support)	-0.1	0.0
Increase in Other Support due to refinement of estimates (Navy). (Support)	+0.6	+0.8
Procurement Subtotal	+453.0	+564.5

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	10	10	16	62.50%
Production	20	20	488	4.10%
Total Program Quantity Delivered	30	30	504	5.95%

Expended and Appropriated (TY $M)			
Total Acquisition Cost	3229.5	Years Appropriated	8
Expended to Date	1366.7	Percent Years Appropriated	61.54%
Percent Expended	42.32%	Appropriated to Date	1976.0
Total Funding Years	13	Percent Appropriated	61.19%

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

Operating and Support Cost

Cost Estimate Details

Date of Estimate:	January 15, 2020
Source of Estimate:	POE
Quantity to Sustain:	488
Unit of Measure:	Missile
Service Life per Unit:	15.00 Years
Fiscal Years in Service:	FY 2018 - FY 2040

The O&S Costs reported in this report are reflective of a total of 488 units. There is no intention of sustaining the 16 developmental units.

LRASM is a war-reserved weapon with limited Operational and Intermediate level maintenance, and it is anticipated that the weapon will not be captive carried. Should any system failures occur, the weapon will be shipped back to the Original Equipment Manufacturer (OEM) for repairs.

Cost analysis assumes a unit repair costs as follows: Joint Air-to-Surface Standoff Missile (JASSM) historical repair hours per repair were used, adjusted with a complexity factor from U.S. Air Force subject matter experts and Lockheed Martin labor rates. Depot Material Cost (not Replenishment Spares) are based on JASSM historical repair data.

Cost analysis assumes a depot replenishment spare cost as follows: JASSM historical repair data and LRASM production estimate costs were used to estimate cost of Replenishment Spares per repair.

For failure rates, the cost analysis assumes failures based on expected Operational Availability (Ao) percent applied to population undergoing biannual Built-in Test (BIT) check. This will drive a high depot repair rate. Failures are based on expected Storage Mean Time Between Failures (MTBF) and metrics from Reliability and Maintainability engineers. The estimate used Benign Storage MTBF for U.S. Air Force weapons. The estimate used Benign Storage with Vibe MTBF for Navy weapons (ships have vibration when underway). Metrics are similar to JASSM historical experience, and yield far fewer expected failures than applying Ao to every BIT check cycle.

Sustainment Strategy

The LRASM is a war-reserved asset and does not require periodic or scheduled depot maintenance. The initial JASSM product support strategy was to employ a warranty for the life of the weapon. The current JASSM/JASSM-Extended Range (ER) product support strategy has no warranty and a two-level maintenance concept will address parts, labor, failure analysis and correction, disposal of failed missiles or components, and all transportation within the continental United States. Organic depot repair capability does not exist within DoD, and the assets' specialized coating can only be repaired by the manufacturer.

Leveraging off of the current JASSM/JASSM-ER strategy, the weapon system will be maintained under a two-level maintenance concept defined above: organizational and depot levels. Qualified maintenance personnel perform pre-flight and post-flight inspections in accordance with verified manuals and checklists. Missiles are maintained in a serviceable condition at the organizational level through storage monitoring inspections, returned munitions inspections and limited corrective maintenance. Organizational corrective repair actions are limited to minor repairs such as container desiccant replacement, missile surface paint touch up, container latch replacement, and initiation of BIT and missile software reprogramming using the Common Munitions BIT Reprogramming Equipment, AN-GYQ/79 test set with Ethernet. Limited provisioning will be conducted to include container parts and several external components on the missile. All deficiencies beyond the scope of technical manuals will be reported through All Weapons Information System for Navy

and the Tactical Munitions Reporting System for the Air Force. Final disposition instructions will be provided by the Program Office.

Under the anticipated sustainment strategy, unplanned depot level maintenance of LRASM will be performed by the contractor as necessary. The service life requirement is 15 years. The LRASM Deployment Office will determine the most efficient way to handle supportability after the 15-year expires. The requirement to conduct periodic BIT (every 24 months) will be performed in the field and reported to the program office for reliability assessment purposes.

Antecedent Information

No Antecedent. JASSM is not considered to be an Antecedent to LRASM as the internal components are substantially different.

Annual O&S Costs BY2014 $M		
Cost Element	**OASuW Inc 1 (LRASM) Average Annual Cost Per Missile**	**NA (Antecedent) NA**
Unit-Level Manpower	0.000	--
Unit Operations	0.000	--
Maintenance	0.007	--
Sustaining Support	0.028	--
Continuing System Improvements	0.007	--
Indirect Support	0.002	--
Other	--	--
Total	0.044	--

Item	Total O&S Cost $M			
	OASuW Inc 1 (LRASM)			NA (Antecedent)
	Current Development APB Objective/Threshold		Current Estimate	
Base Year	270.2	297.2	318.2[1]	N/A
Then Year	352.6	N/A	417.0	N/A

[1] *APB O&S Cost Breach*

Equation to Translate Annual Cost to Total Cost

Average Annual Cost Per Missile = Total O&S Cost / Inventory Service Life / Quantity

$43.470K = $318.198M / 15 / 488

The unitized costs shown above are the Base Year O&S totals shown above, divided by the expected 15 years of inventory service life (FY 2018 - FY 2040).

O&S Cost Variance

Category	BY 2014 $M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2018 SAR	261.0	
Programmatic/Planning Factors	57.2	The O&S Cost variance results from an increase of 114 All-Up-Rounds from 374 to 488.
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	57.2	
Current Estimate	318.2	

Disposal Estimate Details

Date of Estimate: January 15, 2020
Source of Estimate: POE
Disposal/Demilitarization Total Cost (BY 2014 $M): 12.9

The assumption for Disposal/Demilitarization costs is that no missiles have been expended/fired through the life of the program. Therefore, all 488 units will be disposed.