

**CLEARED
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Department of Defense
OFFICE OF PREPUBLICATION AND SECURITY REVIEW

Selected Acquisition Report (SAR)



Long Range Stand Off Weapon (LRSO)

FY 2024 President's Budget

Defense Acquisition Visibility Environment
(DAVE)

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Common Acronyms and Abbreviations

\$B - Billions of Dollars
\$K - Thousands of Dollars
\$M - Millions of Dollars
ACAT - Acquisition Category
Acq O&M - Acquisition-Related Operations and Maintenance
ADM - Acquisition Decision Memorandum
APB - Acquisition Program Baseline
APPN - Appropriation
APUC - Average Procurement Unit Cost
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
FMS - Foreign Military Sales
FOC - Full Operational Capability
FRP - Full Rate Production
FY - Fiscal Year
FYDP - Future Years Defense Program
ICE - Independent Cost Estimate
Inc - Increment
IOC - Initial Operational Capability
JROC - Joint Requirements Oversight Council
KPP - Key Performance Parameter
LRIP - Low Rate Initial Production
MDA - Milestone Decision Authority
MDAP - Major Defense Acquisition Program
MILCON - Military Construction
N/A - Not Applicable
O&M - Operations and Maintenance
O&S - Operating and Support
ORD - Operational Requirements Document
OSD - Office of the Secretary of Defense
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
U.S. - United States
UCR - Unit Cost Reporting
USD(A&S) - Under Secretary of Defense (Acquisition and Sustainment)
USD(AT&L) - Under Secretary of Defense (Acquisition, Technology and Logistics)

Program Information

Program Name

Long Range Stand Off Weapon (LRSO)

DoD Component

Air Force

Responsible Office

Program Manager

Name: Elizabeth Thorn

Date Assigned: August 2019

Address: 205 Foster Drive
Building 15129
Eglin AFB, Florida 32542

Phone: (850) 883-0671

Mission and Description

The Long Range Standoff (LRSO) Cruise Missile is a long range survivable standoff weapon capable of delivering lethal nuclear effects on strategic targets. LRSO will replace the currently fielded Air Launched Cruise Missile (ALCM) and will be integrated on both legacy and future bomber aircraft. The LRSO weapon system will be capable of penetrating and surviving advanced Integrated Air Defense Systems (IADS) from significant standoff ranges to prosecute strategic targets in support of the Air Force's global attack capability and strategic deterrence core function.

Executive Summary

LRSO

Program Highlights Since Last Report

LRSO entered Engineering, Manufacturing, and Development (EMD) on July 1, 2021 after a four-year Technology Maturation and Risk Reduction (TMRR). Current Technical Performance Measures (TPMs), engineering analysis, and test results indicate LRSO is meeting, or exceeding, all six Key Performance Parameters (KPPs) and all nine Key System Attributes (KSAs) as defined in the Capability Design Document (CDD).

LRSO is implementing a design approach to develop a Modular Open System Architecture (MOSA). The defined approach includes the software and hardware organic to LRSO, as well as the life-cycle process such as logistical support, sustainment, and technology insertion. Implementation of MOSA is focused on the following system attributes:

- Reconfigurability
- Portability
- Maintainability, and
- Technology Insertion

During CY 2022, the program successfully completed nine of 10 subsystem Critical Design Reviews (sCDRs) demonstrating design maturity of the LRSO cruise missile subsystems. Additionally, the program completed 10 of 13 sCDRs demonstrating design maturity of associated LRSO Peculiar Support Equipment (PSE).

LRSO conducted nine successful major flight tests demonstrating the LRSO's ability to: 1) safely separate from the B-52H aircraft; 2) Weapon flight surface deployment, engine operations, and flight control actuations; and 3) Capture controlled flight after employment from the B-52H aircraft. The testing in CY 2022 culminated in four successful powered-flight tests, including a Controlled Test Mission (CTM-1) that demonstrated maturity of the design, associated manufacturing processes, and the navigation system performance. CTM-1 demonstrated safe missile separation from the B-52, missile flight control deployment, engine start and extended range operation, warhead-arming flight discrimination events, collection of flight environment and fire-down sequence data for the warhead, and advanced navigation along a mission planned route using an operationally relevant Mission Data File. All test objectives were met.

LRSO is fully funded across the Future Years Defense Plan (FYDP) based on an independent cost estimate conducted by the Cost Assessment and Program Evaluation (CAPE) office within the Office of the Secretary of Defense (OSD). The program is executing on schedule to meet its Air Force Global Strike Command mandated fielding requirement as detailed in the CDD.

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
Feb - 2023	Completed the Survivability sCDR.
Dec - 2022	Completed Sensors (Altimeter & Air Data Module) sCDR.
Dec - 2022	Program completed the Annual General Accountability Office Program Review.
Nov - 2022	Completed Software sCDR.
Oct - 2022	Completed Mission Planning sCDR and Performance sCDR.
Oct - 2022	Completed Peculiar Support Equipment (PSE) Critical Design Reviews (CDR) for the following: Container; Explosive Ordnance Disposal Trainer; Missile Lift Beam; Missile Armament and Load Trainer; and, Missile Maintenance Trainer.
Oct - 2022	Executed Controlled Test Mission 1 (CTM-1), the first full-system integrated test demonstrating design, manufacturing, and navigation maturing.
Sep - 2022	Completed Propulsion sCDR.
Sep - 2022	Executed Separation and Control Test Mission 6 (SCTM-6), the second powered flight test for the LRSO cruise missile.
Aug - 2022	Conducted Subsystem Critical Design Reviews (sCDR):Automated Test Equipment (Missile Core Test Set); Airframe; and, Avionics.
Aug - 2022	Executed Separation and Control Test Mission 3 (SCTM-3) Free Flight test.
Jul - 2022	Conducted In Process Review (IPR) with Undersecretary of Defense for Acquisition and Sustainment (USD(A&S)).
Jun - 2022	Completed Peculiar Support Equipment (PSE) Critical Design Reviews (CDR):Box Two Lift Beam; Component Cover Set; Engine Lift Fixture; Heat Exchanger Plate Handle; and, Lug Rack Alignment Tool.
Jun - 2022	Executed Jettison Test Mission 5 (JTM-5).
May - 2022	Executed Jettison Test Mission 4B (JTM-4B).
Apr - 2022	Executed Jettison Test Mission 3 (JTM-3).
Feb - 2022	Executed Separation and Control Test Mission 2 (SCTM-2) and SCTM-4.

Schedule

LRSO

Events	Milestone Baseline Objective	Current Baseline Objective/Threshold		Current Estimate/Actual	Deviation
Milestone B	Jun 2021	Jun 2021	Jun 2021	Jun 2021	
Critical Design Review	Feb 2023	Feb 2023	Aug 2023	Feb 2023	
Milestone C	Apr 2027	Apr 2027	Oct 2027	Apr 2027	
Full Rate Production	Jun 2029	Jun 2029	Dec 2029	Jun 2029	
Initial Operational Capability	May 2030	May 2030	Nov 2030	This Data has been marked as CUI and has been removed	

Schedule Note

Initial Operational Capability (IOC) date is Controlled Unclassified Information (CUI). Per paragraph (i) of title 10 United States Code 4351 CUI has been removed from this Unclassified SAR.

Performance

LRSO

Performance Characteristics					
Milestone Baseline	Current Baseline Objective/Threshold	Demonstrated Performance	Current Estimate/Actual	Deviation	
(KPP) - KPP 4: Aircraft Integration					
B-21	B-21	B-52	LRSO integration has been demonstrated on the B-52 via multiple captive carry and release missions. This refinement of LRSO-to-B-52 integration will continue throughout the LRSO EMD phase. Integration is on-track to support IOC.	B-52	
(KPP) - KPP 6: Training					
The LRSO training program shall allow for the qualification and certification of missile maintenance, weapons load crew, nuclear weapons (warhead) maintenance, aircrew, mission planners, and EOD personnel to pass an INSI prior to IOC.	The LRSO training program shall allow for the qualification and certification of missile maintenance, weapons load crew, nuclear weapons (warhead) maintenance, aircrew, mission planners, and EOD personnel to pass an INSI prior to IOC.	T=O	The LRSO training program is in planning as part of the recently awarded EMD contract. It will be proven via prototype development and multiple demonstrations of support equipment. The training program is on track to support a timely INSI.	The LRSO training program shall allow for the qualification and certification of missile maintenance, weapons load crew, nuclear weapons (warhead) maintenance, aircrew, mission planners, and EOD personnel to pass an INSI prior to IOC.	

(KPP) - KPP 7: Energy

<p>The mandatory Energy KPP is not applicable to the LRSO since it is a pre-fueled, single use, expendable system that will be mated to its respective launch platform. Even when deployed, the LRSO missile in itself will not pose a burden on the energy supply chain or infrastructure.</p>	<p>The mandatory Energy KPP is not applicable to the LRSO since it is a pre-fueled, single use, expendable system that will be mated to its respective launch platform. Even when deployed, the LRSO missile in itself will not pose a burden on the energy supply chain or infrastructure.</p>	<p>T=O</p>	<p>Not Applicable</p>	<p>Not Applicable</p>	
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(KPP) - KPP 8: Force Protection

<p>The Force Protection KPP is not applicable to LRSO as it is not a manned system, nor is it a system designed to enhance personnel survivability. Carrier aircraft Force Protection KPPs are addressed in respective CDDs.</p>	<p>The Force Protection KPP is not applicable to LRSO as it is not a manned system, nor is it a system designed to enhance personnel survivability. Carrier aircraft Force Protection KPPs are addressed in respective CDDs.</p>	<p>T=O</p>	<p>Not Applicable</p>	<p>Not Applicable</p>	
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Classified Performance information is provided in the classified annex to this submission.

Requirement Reference

Capabilities Development Document (CDD), Approved by Joint Requirements Oversight Council (JROC), August 28, 2020.

Performance Note

KPP 7 and KPP 8 are a JCIDS requirement but are not required for this program per their approved CDD.

Acquisition Budget Estimate

LRSO

Total Acquisition Cost

		Milestone APB	Current Baseline		Budget Estimate PB 2024		
Category	Base Year	Objective (BY\$M)	Objective (BY\$M)	Threshold (BY\$M)	BY\$M	TY\$M	Deviation
RDT&E	2021	6,104.3	6,104.3	6,714.7	5,812.1	6,362.0	
Procurement	2021	8,006.9	8,006.9	8,807.6	7,360.7	9,767.9	
MILCON	2021	122.2	122.2	134.4	106.7	128.2	
Acq. O&M	2021						
Total		14,233.4	14,233.4		13,279.5	16,258.1	
PAUC	2021	Per paragraph (i) of title 10 United States Code 4351 CUI data has been removed from this Unclassified SAR.					
APUC	2021						

Total End Item Quantity

Quantity Category	Current APB Quantity	Current Estimate Quantity
Development	67	This Data has been marked as CUI and has been removed
Procurement	1,020	This Data has been marked as CUI and has been removed
O&M-Acquired	--	--

Quantity Note

Per paragraph (i) of title 10 United States Code 4351 CUI quantity data has been removed from this Unclassified SAR.

Unit Cost**LRSO****Current UCR Baseline and Current Estimate (Base-Year Dollars)**

Category (\$M) Base Year:2021	Current UCR Baseline	Current Estimate	% Change
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Program Acquisition Unit Cost

Cost	\$14,233.4	\$13,279.5	-6.7%
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Quantity

This Data has been marked as CUI and has been removed

Unit Cost

Average Procurement Unit Cost

Cost	\$8,006.9	\$7,360.7	-8.07%
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Quantity

This Data has been marked as CUI and has been removed

Unit Cost

Original UCR Baseline and Current Estimate (Base-Year Dollars)

Category (\$M) Base Year:2021	Original UCR Baseline	Current Estimate	% Change
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Program Acquisition Unit Cost

Cost	\$14,233.4	\$13,279.5	-6.70%
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Quantity

This Data has been marked as CUI and has been removed

Unit Cost

Average Procurement Unit Cost

Cost	\$8,006.9	\$7,360.7	-8.07%
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Quantity

This Data has been marked as CUI and has been removed

Unit Cost

Cost Growth Details**Unit Cost Note**

Per paragraph (i) of title 10 United States Code 4351 CUI has been removed from this Unclassified SAR.

Risks

LRSO

Risk and Sensitivity Analysis

Risk and Sensitivity Analysis

Current Procurement Cost (December - 2022)

1. There are no risks identified with the current estimate. At Milestone B the MDA directed the department to align the program budget with the CAPE ICE.

Original Baseline Estimate (June - 2021)

1. There are no risks identified with the baseline estimate. It was aligned with the Milestone B CAPE ICE.

Current Baseline Estimate (June - 2021)

1. The Current Baseline Estimate risks are the same as the Original Baseline Estimate.

Significant Schedule Risks

Significant Schedule Risks

Current Estimate (December - 2022)

1. There are no known risks with this program at this time.

Technologies and Systems Engineering

Significant Technical Risks

Current Estimate (December - 2022)

1. Nuclear Safety Cross Check Analysis (NSCCA) must be in place to support timely nuclear certification of LRSO software. Mitigation plan in place and on track. Projected closure: June 2023.
2. Current calculations indicate that when four or more stores are loaded on the rotary launcher, the stores clash with the fuel tank. Risk is fully mitigated and closure is pending receipt of final documentation. Projected closure: May 2023.

Low Rate Initial Production**LRSO**

Item	Initial LRIP Decision	Current Total LRIP
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Approval Date**Approved Quantity****Reference**

Per paragraph (i) of title 10 United States Code 4351 CUI has been removed from this Unclassified SAR.

Start Year**End Year****LRIP Note**

LRIP is part of the approved LRSO Acquisition Strategy. However, LRSO is in EMD and the Milestone Decision Authority (MDA) has not granted authority to enter production.

Contracts & Efforts

Contract Data	
Contract Number	21-C-0001 (Redacted due to program sensitivity)
Effort Number	
Modification Number	P00027
Award Date	07/01/2021
Definitization Date	07/01/2021
Order Number	
CAGE Code/CAGE Legal Name	15090/Raytheon Company
Contract Title	This Data has been marked as CUI and has been removed
Contract Address	Eglin AFB, FL
Contracting Office	AFNWC/NDBD
Supported Phase	Development
Contract Strategy	
Contract Type	Cost-Plus-Incentive-Fee
Modification Date	September 22, 2022
Work Start Date	July 01, 2021
Technical Data Rights	Government Purpose License Rights to Technical Data--Noncommercial Items & Software
Work Completed	21.67%

Contracts/Effort Price, Quantity, and Performance (TY\$M)

Initial Target Price	Current Target Price	
\$1,845	\$1,845	
Initial Ceiling Price	Current Ceiling Price	
N/A	N/A	
Contractor EAC	PM EAC	
\$1,865	\$1,865	
Initial Quantity	Current Quantity	Delivered Quantity
N/A	N/A	N/A
BAC	BCWP	ACWP
\$1,675	\$363	\$406

BCWS	Cost Variance	Schedule Variance
\$403	-\$43	-\$40

Contract Note:

Contract contains performance incentives. Data rights are a combination of Government and Industry rights. Earned Value Management (EVM) data are reported as of January 29, 2023. Earned Value data is for Contract Line Item (CLIN) 001, the primary CLIN for the Engineering and Manufacturing Development (EMD) contract, excluding Fixed Price CLINs.

Factors Contributing to Cost Variance:

Unfavorable cost variance is influenced by global price escalation and impacted by overruns in discrete labor tasks. Some tasks required more support than originally planned while others are a result of inefficiencies necessary to hold schedule. Corrective actions and staffing levels are being assessed through many avenues (monthly LRE review, rolling wave IBR, etc) and implemented where applicable.

Factors Contributing to Schedule Variance:

Unfavorable schedule variance is driven by non-critical path material delays of castings and structures. Residual TMRR assets in combination with delivery outlook support LRSO and B-52 critical paths.

Deliveries and Expenditures

LRSO

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	This Data has been marked as CUI and has been removed			
Production	This Data has been marked as CUI and has been removed			

Expended and Appropriated (TY \$M)

Years Appropriated to date: 11

Total Years Appropriated Funding (Current Baseline): 21

Percent Years Appropriated: .38%

Then-Year Funding Appropriated as Percentage of Total Acquisition Estimate: 0.00%

Then-Year Funding Expended as Percentage of Total Acquisition Estimate: 0.00%

Total Acquisition Cost: \$16,258.1

NOTE: Per paragraph (i) of title 10 United States Code 4351 CUI has been removed from this Unclassified SAR. LRSO is in EMD and authority to enter production has not been granted by the Milestone Decision Authority.

Operating and Support Costs

LRSO

O&S Cost Breakdown:

Category (BY2021\$ Million)	LRSO
Unit-Level Manpower	\$3,241.3
Unit Operations	\$66.8
Maintenance	\$530.5
Sustaining Support	\$2,012.9
Continued System Improvements	\$1,133.4
Other	\$50.7
Total	\$7,035.6

Cost Estimate Source: CAPE ICE dated May 24, 2021

Total Program O&S Cost Compared with Baseline					
	Current Baseline				
Base Year: 2021	Objective (BY\$M)	Threshold (BY\$M)	Current Estimate (BY\$M)	Current Estimate (TY\$M)	Deviation
Total O&S	\$7,774.9	\$8,552.4	\$7,035.6	\$13,050.0	
Disposal			\$50.7	\$93.8	

Note: Then Year O&S estimate is currently \$13,050M. System errors zero out the above data field after saving and moving to another section.

Operating and Support Costs - Disposal and Unitized Costs**LRSO****Annual Unitized O&S Cost Definition and Calculation Relative to Total O&S Cost:**

Sustainment Factors	System Name: LRSO	Antecedent System Name:
Quantity to Sustain	Per paragraph (i) of title 10 United States Code 4351 CUI data has been removed from this SAR.	
Unit of Measure	Cruise Missiles	
Unit Expected Service Life	30	

Base Year: 2021

Annual Unitized O&S Cost by Category Base Year \$ Unit:(\$M)	System Name: LRSO	Antecedent System Name:
Unit-Level Manpower	Per paragraph (i) of title 10 United States Code 4351 CUI data has been removed from this SAR.	
Unit Operations		
Maintenance		
Sustaining Support		
Continued System Improvements		
Other		
Total O&S		

Disposal/Demilitarization Cost Estimate

(BY2021\$M)	System Name: LRSO	Antecedent System Name:
Total Disposal	\$50.7	

Cost Estimate Source - Disposal

Type:	Independent Cost Estimate
Approval Authority and Date:	Cost Assessment & Program Evaluation (CAPE) 05/24/2021
Note:	
Per paragraph (i) of title 10 United States Code 4351 CUI has been removed from this Unclassified SAR (applicable to quantities and First/Final Fiscal Years Operational).	
Disposal Cost Note:	
None	
Additional O&S Estimate Assumptions:	
Not applicable	

Sustainment Strategy:
None
Antecedent Estimate Assumptions:
Antecedent System is Air Launched Cruise Missile (ALCM).