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Department of Defense
OFFICE OF PREPUBLICATION AND SECURITY REVIEW

MQ-25 STINGRAY (MQ-25)

December 2021 Selected Acquisition Report (SAR)



DECEMBER 31, 2021
DEPARTMENT OF THE NAVY

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Common Acronyms and Abbreviations

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(A&S) - Under Secretary of Defense (Acquisition and Sustainment)
USD(AT&L) - Under Secretary of Defense (Acquisition, Technology and Logistics)

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Program Manager

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Mission and Description

The MQ-25 Stingray (MQ-25) Program rapidly develops an unmanned capability to embark on Carrier Vessels – Nuclear powered (CVNs) as part of the Carrier Air Wing (CVW) to conduct aerial refueling as a primary mission and provide Intelligence, Surveillance, Reconnaissance (ISR) capability as a secondary mission. MQ-25 extends CVW mission effectiveness range, partially mitigates the current Carrier Strike Group (CSG) organic ISR shortfall and fills the future CVW tanker gap, relieving F/A-18 E/F Strike Fighters of the tanking mission and reducing fatigue life expenditures for this mission. As the first carrier-based Group 5 Unmanned Aircraft System (UAS), MQ-25 will pioneer the integration of manned and unmanned operations, demonstrate mature complex sea-based Command, Control, Communications, Computers, and Intelligence (C4I) UAS technologies, and pave the way for future multifaceted multi-mission UAS to outpace emerging threats. MQ-25 requirements address the need for carrier-based refueling and persistent ISR capabilities. The Joint Requirements Oversight Council's (JROC's) guidance, delineated in the validated Initial Capabilities Document and subsequent JROC memoranda, established a requirement for a versatile platform that supports a myriad of organic Naval missions such as aerial refueling and ISR to support the CSG.

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Executive Summary

Significant Accomplishments:

The MQ-25 program is an ACAT IB program managed by the Program Executive Office, Unmanned Aviation & Strike

Weapons Unmanned Carrier Aviation (UCA) Program Office. Pursuant to 10 U.S.C. 2430(d)(l), the MDA is the Assistant Secretary of the Navy for Research, Development and Acquisition (ASN(RD&A)).

MQ-25 leveraged stand-up as a Maritime Accelerated Acquisition program to accelerate the introduction of needed warfighting capabilities. The MQ-25 program uses event-driven "Knowledge Points" (KPs) at key program inflection points to brief progress to stakeholders throughout the program life cycle. The MQ-25 Air System is integrating a Ground Control Station (GCS) managed by the Unmanned Carrier Aviation Mission Control System (UMCS) program within PEO(U&W). The UMCS program also integrates with multiple networks and systems both afloat and ashore. The MQ-25 and UMCS programs are synchronized to provide complete capability to the CVN.

On October 19, 2020, ASN(RD&A) signed an ADM directing the program to replace the MD-5 A/B GCSs with new ones (MD-5 C/D/E for ship/shore/embarkable) reflecting a change in requirements (OPNAV N9 letter dated September 30, 2020). The new embarkable version will be used aboard CVNs in order to reduce risk to the test program. All versions provide a multi-level security capability, and ensure alignment with Joint All Domain Command and Control networks and Project Overmatch for control of future unmanned systems. On December 29, 2020, an EMD contract modification was awarded to the Boeing Company for work associated with the new GCS. On April 16, 2021, a contract was awarded to the Lockheed Martin Corporation for the development and manufacturing of the new GCSs for test and evaluation.

In 2021, three successful aerial refueling flights were completed with the Boeing-owned T1 asset that demonstrated the program's mission tanking KPP. These flights with an F/A-18E/F in June 2021, an E-2D Advanced Hawkeye in August 2021, and an F-35C in October 2021, provided an opportunity for early learning to demonstrate flying qualities and basket stability.

In December 2021, the Navy completed an Unmanned Carrier Aviation Demonstration (UCAD) with T1 aboard the USS George H.W. Bush (CVN 77), demonstrating the program's CVN compatibility KPP. Joint Precision Approach and Landing System surrogate testing was also completed with CVN 77 in that same period. During the in-port portion of the UCAD, the functionality of the GCS was demonstrated. Once underway, T1 completed a series of test points that evaluated the functionality and capabilities of the deck handling system during both day and nighttime operations.

In total, the program has completed 36 flights and 124.5 hours of instrumented test flights using the T1 asset.

There are no significant software-related issues with this program at this time.

Significant Issues:

Delays in the build of EMD aircraft are delaying deliveries of air vehicles to test. Multiple factors have resulted in these delays:

1. The aircraft design was intentionally paused to optimize weight and strength
2. Quality issues and Notices of Escape were identified during the build process (root cause is understood, process improvements have been incorporated and corrective action is underway to address these, ensuring no structural or life limits on EMD aircraft)
3. Redesign of the lightning protection solution is under development for implementation into the design
4. The COVID-19 pandemic has impacted multiple Boeing suppliers, delaying the manufacture and delivery of parts

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History of Significant Developments Since Program Initiation

History of Significant Developments Since Program Initiation	
Date	Significant Development Description
July 2017	MQ-25 Carrier Based Unmanned Air System CDD
October 2017	Request for Proposals for EMD released
August 2018	ADM/KP-2 approved Milestone B entry into EMD
August 2018	EMD Contract Awarded
February 2019	Integrated Baseline Review
March 2019	Program Deviation Report for MILCON Breach
March 2019	Integrated Design Review 1
September 2019	First Flight of Boeing-owned Test Article (T1)
March 2020	Completion of System Design Review (Knowledge Point 3)
April 2020	System Demonstration Test Article options exercised on Boeing EMD contract
October 2020	ADM directing program to replace MD-5 A/B Ground Control Stations with new ones (MD-5 C/D/E for ship/shore/embarkable), reflecting a change in requirements
December 2020	First test of Aerial Refueling Store on T1 Test Asset
June 2021	First successful aerial refueling flight with F/A18-E/F completed with T1 Test Asset
December 2021	Unmanned Carrier Aviation Demonstration completed aboard CVN 77

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Schedule

Schedule Events

Schedule Events					
Events	Development APB Objective	Current APB Development Objective/Threshold		Current Estimate/Actual	Deviation
Milestone B	Aug 2018	Aug 2018	Oct 2018	Aug 2018	
System Design Review (SDR)	Oct 2019	Oct 2019	Apr 2020	Mar 2020	
First Flight	Sep 2021	Sep 2021	Mar 2021	Sep 2023	Y
First CVN Flight	Dec 2022	Dec 2022	Jun 2023	Dec 2024	Y
Low Rate Initial Production (LRIP)	Feb 2023	Feb 2023	Aug 2023	Aug 2023	
Initial Operational Test and Evaluation (IOT&E)	Jan 2024	Jan 2024	Jul 2024	Aug 2025	Y
Initial Operational Capability (IOC)	Aug 2024	Aug 2024	Feb 2025	Sep 2025	Y
Full Rate Production (FRP)	Apr 2026	Apr 2026	Oct 2026	Mar 2026	

Schedule Notes:

The First Flight (Initial Unmanned Carrier Aviation Mission Control System-controlled flight) current estimate changed from September 2021 to September 2023 due to delays in the build of EMD aircraft delaying deliveries of air vehicles to test. Multiple factors have resulted in these delays:

1. The aircraft design was intentionally paused to optimize weight and strength
2. Quality issues and Notices of Escape were identified during the build process (root cause is understood, process improvements have been incorporated and corrective action is underway to address these, ensuring no structural or life limits on EMD aircraft)
3. Redesign of the lightning protection solution is under development for implementation into the design
4. The COVID-19 pandemic has impacted multiple Boeing suppliers, delaying the manufacture and delivery of parts

The First CVN Flight current estimate changed from December 2022 to December 2024 due to delays in the build of EMD aircraft delaying deliveries of air vehicles to test. Multiple factors have resulted in these delays:

1. The aircraft design was intentionally paused to optimize weight and strength
2. Quality issues and Notices of Escape were identified during the build process (root cause is understood, process improvements have been incorporated and corrective action is underway to address these, ensuring no structural or life limits on EMD aircraft)
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The LRIP current estimate changed from February 2023 to August 2023 due to delays in the build of EMD aircraft delaying deliveries of air vehicles to test. Multiple factors have resulted in these delays:

1. The aircraft design was intentionally paused to optimize weight and strength

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2. Quality issues and Notices of Escape were identified during the build process (root cause is understood, process improvements have been incorporated and corrective action is underway to address these, ensuring no structural or life limits on EMD aircraft)
3. Redesign of the lightning protection solution is under development for implementation into the design
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The IOT&E current estimate changed from January 2024 to August 2025 due to delays in the build of EMD aircraft delaying deliveries of air vehicles to test. Multiple factors have resulted in these delays:

1. The aircraft design was intentionally paused to optimize weight and strength
2. Quality issues and Notices of Escape were identified during the build process (root cause is understood, process improvements have been incorporated and corrective action is underway to address these, ensuring no structural or life limits on EMD aircraft)
3. Redesign of the lightning protection solution is under development for implementation into the design
4. The COVID-19 pandemic has impacted multiple Boeing suppliers, delaying the manufacture and delivery of parts

The IOC current estimate changed from August 2024 to September 2025 and FRP changed from April 2026 to September 2026 due to delays in the build of EMD aircraft delaying deliveries of air vehicles to test. Multiple factors have resulted in these delays:

1. The aircraft design was intentionally paused to optimize weight and strength
2. Quality issues and Notices of Escape were identified during the build process (root cause is understood, process improvements have been incorporated and corrective action is underway to address these, ensuring no structural or life limits on EMD aircraft)
3. Redesign of the lightning protection solution is under development for implementation into the design
4. The COVID-19 pandemic has impacted multiple Boeing suppliers, delaying the manufacture and delivery of parts

Deviation Explanations:

The schedule breach is due to delays in the build of EMD aircraft delaying deliveries of air vehicles to test. Multiple factors have resulted in these delays:

1. The aircraft design was intentionally paused to optimize weight and strength
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A Program Deviation Report and new APB update are in routing.

Significant Schedule Risks

Significant Schedule Risks	
Current Estimate (December 2021)	
1.	Carrier Availability: Limited CVNs configured for test in planned testing windows and limited timing, number, and length of Planned Incremental Availabilities per CVN for required modifications may lead to USN caused schedule delays.

Performance

Performance Characteristics					
Development APB Objective	Current APB Development Objective/Threshold		Demonstrated Performance (include Date of Demonstration)	Current Estimate/Actual	Deviation
KPP 1: Carrier Compatability					
NIMITZ and FORD class CVNs	NIMITZ and FORD class CVNs	(T=O) NIMITZ and FORD class CVNs		NIMITZ and FORD class CVNs	
KPP 2: Air Refueling					
≥ 16K lbs of give at 500 nm from CVN	≥ 16K lbs of give at 500 nm from CVN	≥ 14K lbs of give at 500 nm from CVN		≥ 16K lbs of give at 500 nm from CVN	

Acronyms and Abbreviations

- lbs – Pounds
- K – Thousands
- nm – Nautical Mile
- O – Objective
- T – Threshold

Requirements Source: Capability Development Document (CDD) dated 21 July 2017

Acquisition Budget Estimate

Total Acquisition Cost

Category	Base Year	Development APB	APB Name (Current) (08/24/2018)		Budget Estimate PB 2023		Deviation
		Objective (BY\$)	Objective (BY\$)	Threshold (BY\$)	BY\$	TY\$	
RDT&E	2018	3489.3	3489.3	3838.2	2359.1	2648.4	
Procurement	2018	8766.1	8766.1	9642.7	8481.9	11054.2	
MILCON	2018	362.9	362.9	399.2	608.6	762.3	
Acq. O&M	2018						
Total		12,618.3	12,618.3	13,880.1	11449.6	14464.9	
PAUC	2018	166.030	166.030	182.633	150.653	190.328	
APUC	2018	121.751	121.751	139.749	122.927	160.206	

Total End Item Quantity

Quantity Category	Current APB Quantity	Current Estimate Quantity
Development	4	7
Procurement	72	69

Budget Notes:

RDT&E TY\$: \$276.3M increase from PB 2021 due to increased government and contractor costs associated with implementation of new Ground Control Station.

Procurement TY\$: \$630.4M increase from PB 2021 to Initial Spares due to turn around time assumption updates, and increased endurance period for deployed operations to align with OPNAV guidance.

Procurement TY\$: \$83.4M increase due to shifting MILCON facility outfitting from MCON to APN.

Quantity Notes:

The EMD contract has four Engineering Development Models (EDMs). Three additional System Demonstration Test Articles (SDTAs) were procured on the EMD contract to support testing. Total quantity, including EDMs and SDTAs, remains at 76.

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Risk and Sensitivity Analysis

Risks and Sensitivity Analysis	
Current Procurement Cost (December 2021)	
1.	The current procurement estimate reflects lower costs due to award of the EMD contract.
Original Baseline Estimate (August 2018)	
1.	The Original Baseline matches the Current Baseline Estimate.
Revised Original Estimate (N/A)	
None	
Current Baseline Estimate (Aug 2018)	
1.	An Independent Cost Estimate has been completed for the program in the previous year to support Knowledge Point 2. Program risks identified in the estimate include engineering changes, economic price adjustment (EPA) provisions, the program office acting as the lead system integrator, development and integration of a control system with connectivity to carriers, availability of CVN's used for testing, and the Joint Precision Approach and Landing System. The potential impacts of the risks on program cost would increase the costs above the agreed upon Fixed Price contract. Any modification to the baseline contract could result in reopening the contracts cost. If the Navy delays any delivering of government provided materials, the contract could also be opened. To mitigate these risks, the program office is working closely with the Navy to ensure there is minimal requirement creep and that all government provided materials are provided in a timely manner. Ensuring full funding of the UCA Mission Control System program is extremely important to keep MQ-25 on track.

Unit Cost

Current Baseline Compared with Current Estimate

Category (\$M)	Current APB	Current Estimate	% Change	NMC Breach
PAUC				
Cost	12618.3	11449.6	-9.26%	N/A
Quantity	76	76	N/A	N/A
Unit Cost	166.030	150.653	-9.26%	N/A
APUC				
Cost	8766.1	8481.9	-3.24%	N/A
Quantity	72	69	-4.17%	N/A
Unit Cost	121.751	122.927	0.97%	N/A

Original Baseline Compared with Current Estimate

Category (\$M)	Original APB	Current Estimate	% Change	NMC Breach
PAUC				
Cost	12618.3	11449.6	-9.26%	N/A
Quantity	76	76	N/A	N/A
Unit Cost	166.030	150.653	-9.26%	N/A
APUC				
Cost	8766.1	8481.9	-3.24%	N/A
Quantity	72	69	-4.17%	N/A
Unit Cost	121.751	122.927	0.97%	N/A

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Contracts

Contract Data (\$TYM)		
Contract Number	N00019-18-C-1012	
Effort Number	1	
Modification Number	P00044	
Award Date	August 30, 2018	
Definitization Date	August 30, 2018	
Order Number		
CAGE Code/CAGE Legal Name	76301 / The Boeing Company	
Contract Title	MQ-25 Engineering and Manufacturing Development (EMD)	
Contract Address	6200 JS McDonnell Blvd, St. Louis, MO 63166-0516	
Contracts/Effort Price, Quantity, and Performance (\$M)		
Initial Target Price	649.14	Current Target Price 835.11
Initial Ceiling Price	805.32	Current Ceiling Price 1089.4
Contract's EAC	1615.01	PM's EAC 1910.08
Initial Quantity 1	Current Quantity 1	Delivered Quantity 0
BAC	1461.89	BCWP 849.03 ACWP 1036.97
BCWS	962.92	Cost Variance -196.06 Schedule Variance -119.77

Cost Variance:

The unfavorable net change in the cost variance is due to delays in the build of EMD aircraft delaying deliveries of air vehicles to test. Multiple factors have resulted in these delays:

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Schedule Variance:

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Technologies and Systems Engineering

Significant Technical Risks

Significant Technical Risks
Current Estimate (December 2021)
1. Engine and Inlet Performance: High inlet distortion may cause unacceptable engine performance.

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Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	0	0	7	0.00%
Production	0	0	69	0.00%
Total Program Quantity Delivered	0	0	76	0.00%

Expended and Appropriated (TY \$M)

Total Acquisition Cost: 14,464.95
 Expended to Date: 1,131.55
 Percent Expended: 7.82%
 Total Funding Years: 18
 Years Appropriated: 6
 Percent Years Appropriated: 33.33%
 Appropriated to Date: 1,767.7
 Percent Appropriated: 12.24%

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

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Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	8/24/2018	11/6/2020
Approved Quantity	11	12
Reference	KP2 ADM	ASN(RDA) ADM, "MQ-25 Low-Rate Initial Production Quantity Acquisition Decision Memorandum"
Start Year	2023	2023
End Year	2025	2025

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

The Current Total LRIP Quantity is more than 10% of the total production quantity due to the establishment of an initial production base for the system and an orderly and efficient increase in the production rate.

LRIP Note:

LRIP contract award is contingent upon successfully achieving Knowledge Point 6 entry criteria identified in the MQ-25 Acquisition Strategy.

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Operating and Support Costs

Total Program O&S Cost Compared with Baseline

	Current APB Objective (BY\$)	Current APB Threshold (BY\$)	Current Estimate (BY\$)	Current Estimate (TY\$)	Deviation
Total O&S (\$Millions)	13777.6	15155.4	11335.9	19042.2	N/A

O&S Cost Breakdown

Allocate O&S estimate by each weapon system (or system variants) acquired by the program) into the CAPE Cost Categories. Add a fresh column for each variant/system.

Category (BY\$ Million)	MQ-25
Unit-Level Manpower	3.051
Unit Operations	1.216
Maintenance	4.259
Sustaining Support	0.852
Continued System Improvements	1.281
Indirect Support	1.596
Other	0.000
Total O&S	12.255

Cost Estimate Source: POE, dated Feb 2022

O&S Cost Notes:

- a. Disposal/Demilitarization Cost Estimate and Source of Estimate: \$19.8M BY 2018\$
- b. Sustainment Strategy: The contractor will provide product support through IOC and first deployment. The Life Cycle Sustainment Plan will address short and long term support activities and requirements. The Product Support Manager will investigate the possible usage of performance based agreements, contract logistics support, or performance based logistics as the program matures. The aircraft will be operated and maintained by sailors and be supported by three level maintenance based on the results of the level of repair analysis which will be performed once the final design is solidified.
- c. For Each Acquired System or System Variant:
 - i. Quantity to Sustain: 74
 - ii. First Operational Fiscal Year: 2025
 - iii. Final Operational Fiscal Year: 2057
 - iv. Unit Expected Service Life: 20 Years
- d. Antecedent System(s) O&S Costs: There is no antecedent for the MQ-25. This will be the first carrier-based unmanned aircraft in the fleet.

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