Selected Acquisition Report (SAR)

Next Generation Jammer Mid-Band (NGJ Mid-Band)

FY 2024 President's Budget

Defense Acquisition Visibility Environment (DAVE)

Table of Contents

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

Next Generation Jammer Mid-Band (NGJ-MB)

DoD Component

Navy

Responsible Office

Program Manager

Name: CAPT David J. Rueter

Phone: 301-757-7994

Email: david.j.rueter.mil@us.navy.mil

Mission and Description

The Next Generation Jammer Mid-Band (NGJ Mid-Band) program is an electronic attack system that will provide significantly improved Airborne Electronic Attack (AEA) capabilities against advanced threats in the Mid-Band frequency range through enhanced agility and precision within jamming assignments, increased interoperability and expanded broadband capacity for greater threat coverage against a wide variety of radio frequency emitters. The Effective Isotropic Radiated Power (EIRP) in the NGJ Mid-Band system will be sufficient to provide robust jamming at standoff distances from Integrated Air Defense Systems (IADS) radars, communications, and data links. The NGJ Mid-Band system will augment and then replace the legacy AN/ALQ-99 Tactical Jamming System (fielded 1971) in the mid-band frequency range for the EA-18G, providing significantly improved radar and communication jamming performance as well as improved reliability and maintainability.

The NGJ Mid-Band system will be required to engage sophisticated IADS and information operations (i.e., other electronic threat systems) in multiple areas of responsibility and across all phases of military operations. Threat operators and systems adapt and exploit available frequency ranges, employing techniques and tactics designed to confuse or otherwise defeat friendly AEA capabilities. In order to defeat these continuously evolving enemy radio frequency threats, the NGJ Mid-Band design must provide for sufficient EIRP to achieve threat systems engagement stand-off distances, support increased capacity (number of jamming assignments) as a result of increased threat density, and support agile employment by operators as well as provide a flexible system architecture that can be upgraded quickly to meet new mission demands.

Executive Summary

NGJ Mid-Band

Program Highlights Since Last Report

Since the last report, NGJ Mid-Band has continued to execute the test program on the path to start Operational Test. All EMD hardware deliveries were completed. As of March 1 2023, the first five of six System Demonstration Test Article (SDTA) shipsets were delivered. The EMD contract was extended to support extension of the flight test program and to also include a more robust and agile software development strategy in order to increase system reliability in time for IOC.

In calendar year 2022, over 2,350 hrs of chamber test (7,580 hrs total) in the Anechoic Chamber Testing at the Air Combat Environment Test and Evaluation Facility/Advanced Systems Integration Laboratory at Naval Air Station (NAS) Patuxent River, MD, the Electronic Attack Test and Evaluation System as Naval Surface Warfare Center Crane, IN, and the High-power Electronic Attack Technique Radiation (HEATR) Lab at NAS Point Mugu, CA. Developmental Flight Test executed 320 flight test hours (651 hrs total) at NAS Patuxent River and Naval Air Weapons Station China Lake, CA. Testing was focused on several disciplines, but was generally divided between Mission Systems and Aeromechanical. Aeromechanical flight test, comprising loads, noise and vibration, flying qualities, and performance, was and remains the critical path to Operational Test and IOC. Testing also included participation in several exercises, including Gray Flag, an annual exercise comprising of emerging technology across multiple platforms, which was the first time SDTA shipsets were test flown.

At the end of 2022, the program started to experience hardware failures with some of the SDTA arrays and Liquid Cooling System (LCS) pumps, driving down overall system reliability. A full investigation was initiated to determine root cause, and failed components are currently in repair. The program has seen a dramatic downturn in problem identification in concert with the software corrections implemented. A second logistics demonstration was performed in 2022, using U.S. Navy and Royal Australian Air Force personnel. Additionally, two maintenance and two aircrew training evolutions were conducted, including training for Operational Test. Maintenance procedures went through a full verification and validation period, and a fit check was performed on the FORD to exercise pod movement, loading and unloading, and maintenance while underway. Finally, the first support equipment was delivered to support Operational Test, and all maintenance technical publications were verified and validated.

Funding Status: Since the PB 2023 SAR, the following funding actions have occurred:
RDT&E
- Small Business Innovative Research (SBIR) realignments of -$5.011M from FY 2022
- FY 2023: No Congressional marks APN-5 -FY 2023 Congressional mark for ILS previously funded (-$5.617M)
- FY 2023 Congressional add for additional shipsets (+$67.200M)

In 2022, the program awarded three incentive payments in response to two successful fight tests. The first two incentives were awarded to Boeing and Raytheon as part of a shared technical incentive to execute jamming in response to a simulated threat. The third incentive payment was awarded to Raytheon in response to a successful flight test that demonstrated range and endurance, as well as consistent on-target jamming over a period of time. The program received a congressional addition for two additional shipsets starting with PB 2023. These shipsets will be added to LRIP III.

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**
Aug 2022	First flight of production representative pods in a operationally representative environment
Dec 2021	LRIP II contract option was awarded for delivery of an additional five shipsets.

Jul 2021	A 38-month sole source Fixed Price Incentive contract was awarded to The Raytheon Company for LRIP of the NGJ Mid-Band pods. This contract includes the delivery of three LRIP I shipsets.
Jun 2021	The NGJ Mid-Band program received Milestone C approval to enter LRIP with an authorized End-Item Quantity of 17 for LRIP.
Aug 2020	First flight of NGJ Mid-Band pod on an EA-18G aircraft starts Developmental Flight Test program.
May 2020	NGJ PSFD MOU signed between United States and Australia, expanding partnership between the two countries on NGJ.
Nov 2019	A modification to the EMD contract was awarded to Raytheon for 7 System Demonstration Test Article shipsets (2 pods/shipset).
Oct 2017	Australia became a cooperative partner for NGJ Mid-Band development.
Apr 2017	Program completed CDR.
Dec 2016	A sole source CPIF contract modification was awarded to The Boeing Company for the integration of the NGJ Mid-Band pod onto the EA-18G aircraft. This effort is in support of the EMD phase of the NGJ Mid-Band program and includes the design and manufacturing of 15 engineering change proposal 6472 A kits, and the integration, demonstration and test of NGJ Mid-Band pods on the EA-18G aircraft.
Apr 2016	A 56-month sole source Cost Plus Incentive Fee (CPIF) contract was awarded to The Raytheon Company for the EMD phase. During the performance of this contract, the NGJ Mid-Band program will conduct a Critical Design Review (CDR) and begin delivery of 15 Engineering Development Models that will be used for initial testing.
Apr 2016	The NGJ Mid-Band program received Milestone B approval to enter EMD.

Schedule

NGJ Mid-Band

Events	Milestone Baseline Objective	Current Baseline Objective/Threshold		Current Estimate/Actual	Deviation
Milestone A Complete	Jul 2013	Jul 2013	Jan 2014	02 Jul 2013	
Preliminary Design Review Complete	Oct 2015	Oct 2015	Apr 2016	29 Oct 2015	
Milestone B Complete	Mar 2016	Mar 2016	Sep 2016	15 Apr 2016	
Critical Design Review Complete	Mar 2017	Mar 2017	Sep 2017	27 Apr 2017	
Milestone C Complete	Jun 2021	Jun 2021	Jun 2021	08 Jun 2021	
Operational Test Readiness Review Complete	Apr 2023	Apr 2023	Oct 2023	Apr 2023	
Initial Operational Capability Complete	Sep 2023	Sep 2023	Mar 2024	Sep 2023	
Full Rate Production Decision Review Complete	Nov 2023	Nov 2023	May 2024	Nov 2023	

Notes

Deviation Explanation

Performance

NGJ Mid-Band

Performance Characteristics					
Milestone Baseline	**Current Baseline Objective/Threshold**		**Demonstrated Performance**	**Current Estimate/Actual**	**Deviation**
(KPP) - Materiel Availability					
	This data has been marked as FOUO and has been removed	This data has been marked as FOUO and has been removed		>=.90	
(KPP) - Operational Availability					
	This data has been marked as FOUO and has been removed	This data has been marked as FOUO and has been removed		>=0.36	

Requirement Reference

Capability Development Document dated November 18, 2020

Deviation Explanation

No deviations for this program/subprogram

Notes

Operational Availability decreased due to transitioning from analysis to flight test data. The calculation is based on a limited data set from System Demonstrated Test Article flights that are not statistically significant. The program has a plan in place to meet Ao threshold requirements by the FRP threshold date.

Acquisition Budget Estimate

NGJ Mid-Band

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	2016	3,899.9	3,899.9	4,289.9	3,709.9	3,956	
Procurement	2016	3,939.5	3,939.5	4,333.5	4,062.8	5,747.3	
MILCON	2016	7.1	7.1	7.8	6.7	7.9	
Acq. O&M	2016	0	0	0			
Total		7,846.5	7,846.5		7,779.4	9,711.2	
PAUC	2016	58.122	58.122	63.934	57.625	71.935	
APUC	2016	30.539	30.539	33.593	31.495	44.553	

Appropriation Category Deviation Explanations

PAUC Deviation Explanation

APUC Deviation Explanation

Budget Notes

Total End Item Quantity

Quantity Category	Current APB Quantity	Current Estimate Quantity
Development	6	6
Procurement	129	129
O&M-Acquired		

Quantity Notes

Unit Cost

NGJ Mid-Band

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Category ($M) Base Year:2016	**Current UCR Baseline**	**Current Estimate**	**% Change**
Program Acquisition Unit Cost			
Cost	7,846.5	7,779.4	
Quantity	135	135	
Unit Cost	58.122	57.625	-0.85%
Average Procurement Unit Cost			
Cost	3,939.5	4,062.8	
Quantity	129	129	
Unit Cost	30.539	31.495	3.13%

Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Category ($M) Base Year:2016	**Original UCR Baseline**	**Current Estimate**	**% Change**
Program Acquisition Unit Cost			
Cost	7,463.7	7,779.4	
Quantity	135	135	
Unit Cost	55.287	57.625	4.23%
Average Procurement Unit Cost			
Cost	4,002.6	4,062.8	
Quantity	131	129	
Unit Cost	30.554	31.495	3.08%

Cost Growth Details
Current Baseline PAUC Breach Explanation
Current Baseline APUC Breach Explanation
Original Baseline PAUC Breach Explanation
Original Baseline APUC Breach Explanation
Impacts of Schedule Changes on Unit Cost
Impacts of Performance Changes on Unit Cost
Actions Taken or Proposed to Control Future Cost Growth

Risk and Sensitivity Analysis

NGJ Mid-Band

Risk and Sensitivity Analysis
Current Procurement Cost (December 2022)
1. After review of the programmatic and technical baseline at Milestone C, the MDA directed NGJ Mid-Band to use the SCP as the funding requirement. The OSD CAPE performed an ICE, which independently validated the SCP. Despite using different methodologies, both estimates were well within the bounds of estimating error both in total and for each individual phase of the life cycle cost estimate. The production estimate was determined to be highly sensitive to the array cost. The array costs were estimated based on actual data from NGJ Mid-Band using Learn and Rate curves from historical production data. 2. During the negotiations of LRIP III contract there was a significant increase to price due to sub-vendor material cost, extended procurement times, and manpower rate increases. If price increases continue in future production lots, then NGJ-MB shipsets unit price will increase, and individual lot quantities may have to be reduced, resulting in delayed fleet fielding.
Original Baseline Estimate (April 2016)
After review of the programmatic and technical baseline at Milestone B, the MDA directed NGJ Mid-Band to use the Program Life Cycle Cost Estimate (PLCCE) as the funding requirement. The OSD CAPE performed an ICE, which independently validated the PLCCE. Despite using different methodologies, both estimates were well within the bounds of estimating error both in total and for each individual phase of the life cycle cost estimate. The production estimate was determined to be highly sensitive to the technical inputs associated with the array cost. The array costs were estimated based on actual data with program specific adjustments for complexity and then cross checked against several other DoD programs in production that have arrays. The Learn and Rate curves were based on analysis of historical production data for arrays.
Current Baseline Estimate (June 2021)
None

Schedule Risk		
Other	2023-09-01	If key Raytheon suppliers continue to realize schedule delays for components during production, then pod shipset deliveries may be late and potentially impact meeting fleet demand during IOC.
Other	2023-09-01	If test execution and envelope expansion activities are delayed, then the IOC objective date of September 2023 may be delayed.

Technical Risks		

Low Rate Initial Production

NGJ Mid-Band

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	04/05/2016	06/28/2021
Approved Quantity	30	17
Reference	NGJ Mid-Band Milestone B ADM	NGJ Mid-Band Milestone C ADM
Start Year		
End Year		

Rationale if quantity exceeds 10% of the total number of articles to be procured:

The Current Total LRIP Quantity is more than 10% of the total production quantity in order to provide production-representative NGJ Mid-Band systems in support of Initial Operational Test and Evaluation. These assets are needed to ensure adequate and efficient manufacturing capability while maintaining the industrial base. The LRIP quantity will permit an orderly increase to ramp up for full rate production and reduce risk. This will posture the current planned NGJ Mid-Band production rate maximum/optimal economic rate of 14 shipsets per year during FRP.

Notes

ADM submitted to MDA for approval increasing LRIP quantity to 19 shipsets based on FY 2023 appropriations bill providing appropriated funding for additional NGJ-MB shipsets.

Contracts & Efforts

Contract Data	
Contract Number	N00019-16-C-0002
Effort Number	1
Modification Number	P00113
Award Date	04/13/2016
Definitization Date	04/13/2016
Order Number	
CAGE Code/CAGE Legal Name	4U884/Raytheon
Contract Title	NGJ Mid-Band Engineering and Manufacturing Development
Contract Address	El Segundo, CA
Contracting Office	NAVAIR
Supported Phase	Development
Contract Strategy	FAR 15 (Negotiated)
Contract Type	Cost-Plus-Incentive-Fee
Modification Date	December 29, 2022
Work Start Date	April 13, 2016
Technical Data Rights	Unlimited Rights to Technical Data--Noncommercial Items & Software
Work Completed	97.40%

Contracts/Effort Price, Quantity, and Performance (TY$M)		
Initial Target Price	Current Target Price	
$977.2	$1,728.7	
Initial Ceiling Price	Current Ceiling Price	
$0	$0	
Contractor EAC	PM EAC	
$1,779.2	$1,797	
Initial Quantity	Current Quantity	Delivered Quantity
0	6	4
BAC	BCWP	ACWP
$1,532	$1,492.2	$1,561.5

BCWS	Cost Variance	Schedule Variance
$1,496.4	-$69.3	-$4.2

Contract Notes:

Factors Contributing to Cost Variance and Projected Effects on Program Costs

Factors Contributing to Schedule Variance and Projected Effects on Program Schedule

Contract Data	
Contract Number	N00019-21-C-0053
Effort Number	1
Modification Number	P00012
Award Date	07/02/2021
Definitization Date	07/02/2021
Order Number	
CAGE Code/CAGE Legal Name	4U884/Raytheon
Contract Title	NGJ Mid-Band LRIP I and LRIP II
Contract Address	El Segundo, CA
Contracting Office	NAVAIR
Supported Phase	Production
Contract Strategy	FAR 15 (Negotiated)
Contract Type	Multiple Types
Modification Date	December 19, 2022
Work Start Date	July 02, 2021
Technical Data Rights	Unlimited Rights to Technical Data--Noncommercial Items & Software
Work Completed	43.32%

Contracts/Effort Price, Quantity, and Performance (TY$M)		
Initial Target Price	Current Target Price	
$171.6	$419.4	
Initial Ceiling Price	Current Ceiling Price	
$179.2	$414.6	
Contractor EAC	PM EAC	
$420.2	$422.7	
Initial Quantity	Current Quantity	Delivered Quantity
3	8	0
BAC	BCWP	ACWP
$356.1	$154.3	$152.5
BCWS	Cost Variance	Schedule Variance
$111.2	$1.8	$43

Contract Notes:
Contract type: FPI- 95%, (CPFF, FFP, CP)- 5%

Factors Contributing to Cost Variance and Projected Effects on Program Costs

Factors Contributing to Schedule Variance and Projected Effects on Program Schedule

Contract Data	
Contract Number	N00019-16-C-0032
Effort Number	1
Modification Number	P00065
Award Date	04/07/2016
Definitization Date	04/07/2016
Order Number	
CAGE Code/CAGE Legal Name	76301/The Boeing Company
Contract Title	NGJ Mid-Band EMD Integration
Contract Address	St. Louis, MO
Contracting Office	NAVAIR
Supported Phase	Development
Contract Strategy	FAR 15 (Negotiated)
Contract Type	Cost-Plus-Incentive-Fee
Modification Date	January 26, 2023
Work Start Date	April 07, 2016
Technical Data Rights	Limited Rights to Technical Data--Non-Commercial Items Only
Work Completed	94%

Contracts/Effort Price, Quantity, and Performance (TY$M)		
Initial Target Price	Current Target Price	
19.9	314.37	
Initial Ceiling Price	Current Ceiling Price	
0		
Contractor EAC	PM EAC	
238.43	301.87	
Initial Quantity	Current Quantity	Delivered Quantity
0	0	
BAC	BCWP	ACWP
263.06	247.4	217.2
BCWS	Cost Variance	Schedule Variance
250.42	30.2	-3.0

Contract Notes:

Multiple categories of technical data: Limited Rights, Limited/Restricted Rights, Restricted Rights, Government Purpose Rights, Specifically Negotiated License Rights

Factors Contributing to Cost Variance and Projected Effects on Program Costs

Factors Contributing to Schedule Variance and Projected Effects on Program Schedule

External Government Activities

Activity Title		Government Entity	Supported Phase
CAGE		Work Start Date	
City		State/Province:	
Notes			

Deliveries and Expenditures

NGJ Mid-Band

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	5	5	6	83.33%
Production	0	0	129	0.00%
Total Program Quantity Delivered	5	5	135	3.70%

Expended and Appropriated (TY $M)

Years Appropriated to date: 14

Total Years Appropriated Funding (Current Baseline): 28

Percent Years Appropriated: 50.00%

Then-Year Funding Appropriated as Percentage of Total Acquisition Estimate: 51.20%

Then-Year Funding Expended as Percentage of Total Acquisition Estimate: 42.50%

Total Acquisition Cost: 9,711.23

Deliveries & Expenditures Notes:

Operating and Support Costs

NGJ Mid-Band

O&S Cost Breakdown:

Category (BY$ Million)	NGJ Mid-Band
Unit-Level Manpower	.0
Unit Operations	.0
Maintenance	759.2
Sustaining Support	287.9
Continued System Improvements	404.0
Other	.0
Total	1,451.1

Cost Estimate Source: CCP dated May 10, 2021

O&S Cost Notes:

Total Program O&S Cost Compared with Baseline					
	Current Baseline				
	Objective (BY$M)	Threshold (BY$M)	Current Estimate (BY$M)	Current Estimate (TY$M)	Deviation
Total O&S	1,431.3	1,574.4	1,451.1	2,405.0	

Note:

O&S Cost Deviation Explanation

Operating and Support Costs - Disposal and Unitized Costs

NGJ Mid-Band

Annual Unitized O&S Cost Definition and Calculation Relative to Total O&S Cost:

Sustainment Factors	System Name: Next Generation Jammer Mid-Band	Antecedent System Name: ALQ-99
Quantity to Sustain	135	
Unit of Measure	Shipset, consists of 2 pods	
Unit Expected Service Life	20	

Base Year:

Annual Unitized O&S Cost by Category Base Year $ Unit:($M)	System Name: Next Generation Jammer Mid-Band	Antecedent System Name: ALQ-99
Unit-Level Manpower	0.0	
Unit Operations	0.0	
Maintenance	0.4	
Sustaining Support	0.2	
Continued System Improvements	0.2	
Other	0.0	
Total O&S	0.8	0.0

Disposal/Demilitarization Cost Estimate

(Base Year $Millions)	System Name: Next Generation Jammer Mid-Band	Antecedent System Name: ALQ-99
Total Disposal	$2.3	

Cost Estimate Source - Disposal	
Type:	Component Cost Position
Approval Authority and Date:	DASN(APB), DASN(Budget) 05/10/2021
Note:	
Disposal Cost Notes:	
Disposal/Demilitarization costs projected to be $2.3M CY 2016$ ($4.9M TY$). Source of estimate is CCE.	
Additional O&S Estimate Assumptions:	

Sustainment Strategy:
- Contractor Logistics Support (CLS)/Interim Contractor Support (ICS) covering the total system through the EMD until four (4) years after IOC (Initial). - Product Support Strategy will consider Organizational, Intermediate, and Depot level maintenance capabilities; Organic maintenance support (future). - Sustainment Strategies for AN/ALQ-249(V)1 will consider Performance Based Agreements (PBAs) for repair support. - Unit of measure (system) is defined as a shipset, which consists of 2 pods
Antecedent Estimate Assumptions:
- Antecedent program: ALQ-99 Tactical Jamming System - The dataset used in the antecedent costs below are reported FY 2008 costs, which are most representative of steady state prior to de-commissioning EA-6B squadrons. - The dataset includes data from the ALQ-99 system, which covers a larger frequency spectrum than the NGJ Mid-Band system, and is not normalized to specific mid-band data. - Due to data limitations, the antecedent is represented in dollars per aircraft operating years based on Primary Aircraft Authorization. - Data sources: Decision Knowledge Programming for Logistics Analysis and Technical Evaluation, Naval Visibility and Management of Operating and Support Costs database, and various technical sources, including Naval Air Systems Command AIR 4.2.2, Naval Air Warfare Center Weapons Division Point Mugu, Naval Sea Systems Command Crane, and Center for Naval Aviation Technical Training.