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RCS: DD-A&T(Q&A)823-602



AN/TPQ-53 Counterfire Target Acquisition Radar (AN/TPQ-53)

As of FY 2021 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

UNCLASSIFIED

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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

AN/TPQ-53 Counterfire Target Acquisition Radar (AN/TPQ-53)

DoD Component

Army

Responsible Office

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Date Assigned: August 16, 2019

References

SAR Baseline (Production Estimate)

Component Acquisition Executive (CAE) Approved Acquisition Program Baseline (APB) dated April 11, 2019

Approved APB

Component Acquisition Executive (CAE) Approved Acquisition Program Baseline (APB) dated April 11, 2019

Mission and Description

The AN/TPQ-53 Counterfire Target Acquisition Radar is a highly mobile radar set that automatically detects, classifies, tracks, and locates the point of origin of projectiles from rocket, artillery, and mortar systems with sufficient accuracy to achieve first round fire for effect. The system sends a grid coordinate to friendly artillery for counter fire mission while simultaneously identifying incoming round impact locations to warn friendly forces to seek protection.

The AN/TPQ-53 replaces legacy AN/TPQ-36 and AN/TPQ-37 Firefinder Radars. The AN/TPQ-53 provides increased range and accuracy throughout 90- and 360-degree coverage, a sense and warn capability, as well as continuous and responsive counter-battery target acquisition capabilities for all types of military operations. The system mitigates close combat radar coverage gaps and interoperates with mission command systems to provide the maneuver commander increased counterfire radar flexibility. The AN/TPQ-53 is organic to brigade combat teams, field artillery brigades, and division artilleries.

Executive Summary

Program Highlights Since Last Report

The AN/TPQ-53 requirements are stable and funding is adequate to meet cost, schedule, and performance objectives established in the current approved APB. Risk did not increase since the previous SAR.

The program fielded 115 out of 189 systems as of February 2020. Delivery of the last production system takes place in FY 2021 and the last system fielding takes place in FY 2022. The program transitions to sustainment phase in FY 2022.

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

History of Significant Developments Since Program Initiation	
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History of Significant Developments Since Program Initiation	
Date	Significant Development Description
February 2012	In an ADM dated February 29, 2012, the PEO Intelligence, Electronic Warfare and Sensors (IEW&S) approved a LRIP Quantity of 38 systems for the AN/TPQ-53 program.
October 2012	On August 20, 2012, the Army Acquisition Executive directed the transition of PM Radars from PEO IEW&S to PEO Missiles and Space (M&S). With an effective date of October 1, 2012, PEO M&S assumed management responsibilities for PM Radars to include the ACAT II AN/TPQ-53 program.
December 2015	On December 22, 2015, the PEO M&S as the MDA approved entry into FRP for the AN/TPQ-53 program.
February 2018	On February 27, 2018, the DAE reclassified the AN/TPQ-53 Counterfire Target Acquisition Radar System program as an ACAT IC with the Secretary of the Army delegated MDA.

Threshold Breaches

APB Breaches

Schedule		<input type="checkbox"/>
Performance		<input type="checkbox"/>
Cost	RDT&E	<input type="checkbox"/>
	Procurement	<input type="checkbox"/>
	MILCON	<input type="checkbox"/>
	Acq O&M	<input type="checkbox"/>
O&S Cost		<input type="checkbox"/>
Unit Cost	PAUC	<input type="checkbox"/>
	APUC	<input type="checkbox"/>

Nunn-McCurdy Breaches

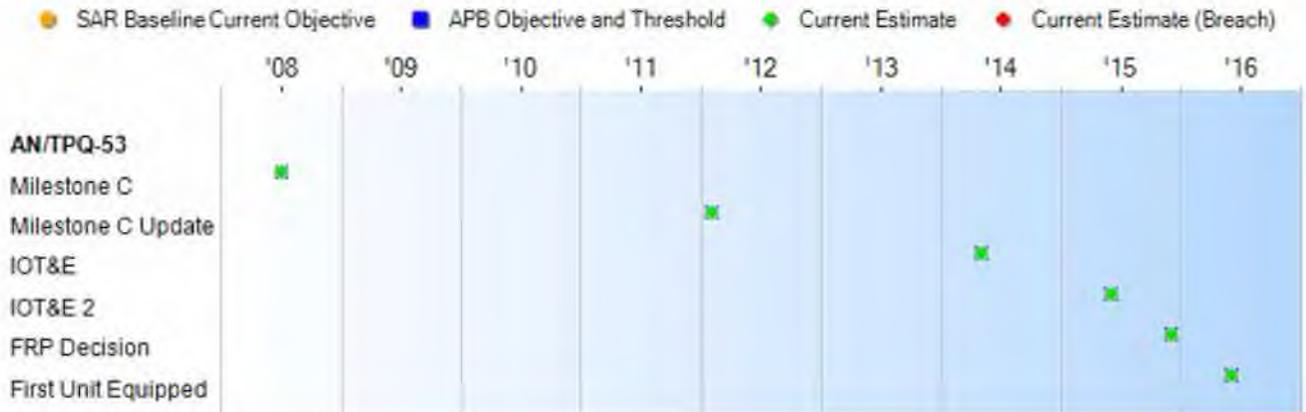
Current UCR Baseline

PAUC	None
APUC	None

Original UCR Baseline

PAUC	None
APUC	None

Schedule



Schedule Events				
Events	SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Current Estimate
Milestone C	Jul 2008	Jul 2008	Jul 2008	Jul 2008
Milestone C Update	Feb 2012	Feb 2012	Feb 2012	Feb 2012
IOT&E	May 2014	May 2014	May 2014	May 2014
IOT&E 2	Jun 2015	Jun 2015	Jun 2015	Jun 2015
FRP Decision	Dec 2015	Dec 2015	Dec 2015	Dec 2015
First Unit Equipped	Jun 2016	Jun 2016	Jun 2016	Jun 2016

Change Explanations

None

Acronyms and Abbreviations

IOT&E - Initial Operational Test and Evaluation

Performance

Performance Characteristics				
SAR Baseline Production Estimate	Current APB Production Objective/Threshold	Demonstrated Performance	Current Estimate	
Range and Location Accuracy - 360 degree Coverage				
Mortar Light (60mm): Range (km) 0.5-12; Accuracy (m) 35 Mortar Medium (81mm): Range (km) 0.5-14; Accuracy (m) 35 Mortar Heavy (120mm): Range (km) 0.5-18; Accuracy (m) 35 Artillery Light (105mm): Range (km) 3-18; Accuracy (m) 75 Artillery Medium (155mm): Range (km) 3-20; Accuracy (m) 75 Artillery Heavy (8in): Range (km) 3-20; Accuracy (m) 75 Rocket Light (107mm): Range (km) 4-20; Accuracy (m) 75 Rocket Medium (122mm): Range (km) 7-20; Accuracy (m) 75	Mortar Light (60mm): Range (km) 0.5-12; Accuracy (m) 35 Mortar Medium (81mm): Range (km) 0.5-14; Accuracy (m) 35 Mortar Heavy (120mm): Range (km) 0.5-18; Accuracy (m) 35 Artillery Light (105mm): Range (km) 3-18; Accuracy (m) 75 Artillery Medium (155mm): Range (km) 3-20; Accuracy (m) 75 Artillery Heavy (8in): Range (km) 3-20; Accuracy (m) 75 Rocket Light (107mm): Range (km) 4-20; Accuracy (m) 75 Rocket Medium (122mm): Range (km) 7-20; Accuracy (m) 75	Mortar Light (60mm): Range (km) 3-10; Accuracy (m) 50 or 0.5% Mortar Medium (81mm): Range (km) 3-12; Accuracy (m) 50 or 0.5% Mortar Heavy (120mm): Range (km) 3-15; Accuracy (m) 50 or 0.5% Artillery Light (105mm): Range (km) 5-18; Accuracy (m) 75 or 1% Artillery Medium (155mm): Range (km) 5-20; Accuracy (m) 75 or 1% Artillery Heavy (8in): Range (km) 5-20; Accuracy (m) 75 or 1% Rocket Light (107mm): Range (km) 5-20; Accuracy (m) 75 or 1% Rocket Medium (122mm): Range (km) 8-20; Accuracy (m) 75 or 1%	Threshold requirement met	Mortar Light (60mm): Range (km) 3-10; Accuracy (m) 50 or 0.5% Mortar Medium (81mm): Range (km) 3-12; Accuracy (m) 50 or 0.5% Mortar Heavy (120mm): Range (km) 3-15; Accuracy (m) 50 or 0.5% Artillery Light (105mm): Range (km) 5-18; Accuracy (m) 75 or 1% Artillery Medium (155mm): Range (km) 5-20; Accuracy (m) 75 or 1% Artillery Heavy (8in): Range (km) 5-20; Accuracy (m) 75 or 1% Rocket Light (107mm): Range (km) 5-20; Accuracy (m) 75 or 1% Rocket Medium (122mm): Range (km) 8-20; Accuracy (m) 75 or 1%
Range and Location Accuracy - 90 degree Coverage				
Mortar Light (60mm): Range (km) 0.5-20; Accuracy (m) 20 or 0.2% Mortar Medium (81mm): Range (km) 0.5-20; Accuracy (m) 20 or 0.2% Mortar Heavy (120mm): Range (km) 0.5-30; Accuracy (m) 20 or 0.2% Artillery Light (105mm): Range (km) 0.5-40; Accuracy (m) 20 or 0.2% Artillery Medium (155mm): Range (km) 0.5-40; Accuracy (m) 20 or 0.2%	Mortar Light (60mm): Range (km) 0.5-20; Accuracy (m) 20 or 0.2% Mortar Medium (81mm): Range (km) 0.5-20; Accuracy (m) 20 or 0.2% Mortar Heavy (120mm): Range (km) 0.5-30; Accuracy (m) 20 or 0.2% Artillery Light (105mm): Range (km) 0.5-40; Accuracy (m) 20 or 0.2% Artillery Medium (155mm): Range (km) 0.5-40; Accuracy (m) 20 or 0.2%	Mortar Light (60mm): Range (km) 0.5-15; Accuracy (m) 30 or 0.3% Mortar Medium (81mm): Range (km) 0.5-18; Accuracy (m) 30 or 0.3% Mortar Heavy (120mm): Range (km) 0.5-20; Accuracy (m) 30 or 0.3% Artillery Light (105mm): Range (km) 3-30; Accuracy (m) 30 or 0.3% Artillery Medium (155mm): Range (km) 3-32; Accuracy (m) 30 or 0.3%	Threshold requirement met	Mortar Light (60mm): Range (km) 0.5-15; Accuracy (m) 30 or 0.3% Mortar Medium (81mm): Range (km) 0.5-18; Accuracy (m) 30 or 0.3% Mortar Heavy (120mm): Range (km) 0.5-20; Accuracy (m) 30 or 0.3% Artillery Light (105mm): Range (km) 3-30; Accuracy (m) 30 or 0.3% Artillery Medium (155mm): Range (km) 3-32; Accuracy (m) 30 or 0.3%

0.2% Artillery Heavy (8in): Range (km) 0.5-50; Accuracy (m) 20 or 0.2% Rocket Light (80mm): Range (km) 5-35; Accuracy (m) 20 or 0.2% Rocket Light (107mm): Range (km) 6-60; Accuracy (m) 20 or 0.2% Rocket Medium (122mm): Range (km) 6-60; Accuracy (m) 20 or 0.2% Rocket Heavy (240mm): Range (km) 12-100; Accuracy (m) 20 or 0.2%	0.2% Artillery Heavy (8in): Range (km) 0.5-50; Accuracy (m) 20 or 0.2% Rocket Light (80mm): Range (km) 5-35; Accuracy (m) 20 or 0.2% Rocket Light (107mm): Range (km) 6-60; Accuracy (m) 20 or 0.2% Rocket Medium (122mm): Range (km) 6-60; Accuracy (m) 20 or 0.2% Rocket Heavy (240mm): Range (km) 12-100; Accuracy (m) 20 or 0.2%	0.3% Artillery Heavy (8in): Range (km) 3-34; Accuracy (m) 30 or 0.3% Rocket Light (80mm): Range (km) 5-15; Accuracy (m) 30 or 0.3% Rocket Light (107mm): Range (km) 8-50; Accuracy (m) 30 or 0.3% Rocket Medium (122mm): Range (km) 8-50; Accuracy (m) 30 or 0.3% Rocket Heavy (240mm): Range (km) 15-60; Accuracy (m) 30 or 0.3%	0.3% Artillery Heavy (8in): Range (km) 3-34; Accuracy (m) 30 or 0.3% Rocket Light (80mm): Range (km) 5-15; Accuracy (m) 30 or 0.3% Rocket Light (107mm): Range (km) 8-50; Accuracy (m) 30 or 0.3% Rocket Medium (122mm): Range (km) 8-50; Accuracy (m) 30 or 0.3% Rocket Heavy (240mm): Range (km) 15-60; Accuracy (m) 30 or 0.3%
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Force Protection

Prime mover shall be equipped with armor to provide protection to the crew from ballistic non-nuclear, indirect artillery, IEDs, and small arms fire comparable to similar elements of the BCT, which operate in the same area of the battlefield. Army Standard Wheeled Vehicle shall have an IAP to allow it to accept B, C, and D armor kits or LTAS armored cab (depending on vehicle type for full armor protection). This requirement shall not drive the weight of the vehicle beyond its gross vehicle weight limits.	Prime mover shall be equipped with armor to provide protection to the crew from ballistic non-nuclear, indirect artillery, IEDs, and small arms fire comparable to similar elements of the BCT, which operate in the same area of the battlefield. Army Standard Wheeled Vehicle shall have an IAP to allow it to accept B, C, and D armor kits or LTAS armored cab (depending on vehicle type for full armor protection). This requirement shall not drive the weight of the vehicle beyond its gross vehicle weight limits.	(T=O) Prime mover shall be equipped with armor to provide protection to the crew from ballistic non-nuclear, indirect artillery, IEDs, and small arms fire comparable to similar elements of the BCT, which operate in the same area of the battlefield. Army Standard Wheeled Vehicle shall have an IAP to allow it to accept B, C, and D armor kits or LTAS armored cab (depending on vehicle type for full armor protection). This requirement shall not drive the weight of the vehicle beyond its gross vehicle weight limits.	Threshold requirement met	Prime mover shall be equipped with armor to provide protection to the crew from ballistic non-nuclear, indirect artillery, IEDs, and small arms fire comparable to similar elements of the BCT, which operate in the same area of the battlefield. Army Standard Wheeled Vehicle shall have an IAP to allow it to accept B, C, and D armor kits or LTAS armored cab (depending on vehicle type for full armor protection). This requirement shall not drive the weight of the vehicle beyond its gross vehicle weight limits.
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System Training

The RCDU shall have the capability to provide operator training based upon a training scenario that can be downloaded	The RCDU shall have the capability to provide operator training based upon a training scenario that can be downloaded	(T=O) The RCDU shall have the capability to provide operator training based upon a training scenario that can be	Threshold requirement met	The RCDU shall have the capability to provide operator training based upon a training scenario that can be downloaded
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<p>from external sources. Additionally, the RCDU shall be capable of accepting target data injected via an external source or input manually by a user. An interactive emerging technology resident in the RCDU shall be provided to maintain operator proficiency. The training shall cover operational procedures for the Q-53 System and emulate typical operational scenarios to be encountered by the operator in the field (hostile weapons location, friendly fire registration, zone coverage, jams strobe, etc.).</p>	<p>from external sources. Additionally, the RCDU shall be capable of accepting target data injected via an external source or input manually by a user. An interactive emerging technology resident in the RCDU shall be provided to maintain operator proficiency. The training shall cover operational procedures for the Q-53 System and emulate typical operational scenarios to be encountered by the operator in the field (hostile weapons location, friendly fire registration, zone coverage, jams strobe, etc.).</p>	<p>downloaded from external sources. Additionally, the RCDU shall be capable of accepting target data injected via an external source or input manually by a user. An interactive emerging technology resident in the RCDU shall be provided to maintain operator proficiency. The training shall cover operational procedures for the Q-53 System and emulate typical operational scenarios to be encountered by the operator in the field (hostile weapons location, friendly fire registration, zone coverage, jams strobe, etc.).</p>	<p>from external sources. Additionally, the RCDU shall be capable of accepting target data injected via an external source or input manually by a user. An interactive emerging technology resident in the RCDU shall be provided to maintain operator proficiency. The training shall cover operational procedures for the Q-53 System and emulate typical operational scenarios to be encountered by the operator in the field (hostile weapons location, friendly fire registration, zone coverage, jams strobe, etc.).</p>
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Survivability

<p>The Q-53 shall have reduced thermal, visual, acoustic, and radar signatures. The system shall provide for improved capability against threat growth in direction finding systems. The Q-53 shall be able to react to radar lock-on by an Anti-Radiation Missile. Any solution must be capable of execution in a timely manner to prevent the radar from being destroyed. Chemical, Biological, Radiological, and Nuclear Survivability is required for this system; however, it does not warrant KPP consideration.</p>	<p>The Q-53 shall have reduced thermal, visual, acoustic, and radar signatures. The system shall provide for improved capability against threat growth in direction finding systems. The Q-53 shall be able to react to radar lock-on by an Anti-Radiation Missile. Any solution must be capable of execution in a timely manner to prevent the radar from being destroyed. Chemical, Biological, Radiological, and Nuclear Survivability is required for this system; however, it does not warrant KPP consideration.</p>	<p>The survivability of the system against artillery will be achieved primarily by a combination of deployment capabilities, rapid displacement, emission control, side lobe signature reduction, and reduced signatures. The acoustic signature of the system while operating (including the power source) shall be minimized. The system shall have capability of graceful degradation to reduce the system's vulnerability to hostile fire. The Q-53 shall operate IAW Army</p>	<p>Threshold requirement met</p>	<p>The survivability of the system against artillery will be achieved primarily by a combination of deployment capabilities, rapid displacement, emission control, side lobe signature reduction, and reduced signatures. The acoustic signature of the system while operating (including the power source) shall be minimized. The system shall have capability of graceful degradation to reduce the system's vulnerability to hostile fire. The Q-53 shall operate IAW Army</p>
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		standards for blackout operations.		standards for blackout operations.
Materiel Reliability				
The Q-53 radar system must have a 70% probability that either 1 of 2 systems operate over a 72-hour mission pulse without incurring a system abort failure, MTBSA=91	The Q-53 radar system must have a 70% probability that either 1 of 2 systems operate over a 72-hour mission pulse without incurring a system abort failure, MTBSA=91	(T=O) The Q-53 radar system must have a 70% probability that either 1 of 2 systems operate over a 72-hour mission pulse without incurring a system abort failure, MTBSA=91	Threshold requirement met	The Q-53 radar system must have a 70% probability that either 1 of 2 systems operate over a 72-hour mission pulse without incurring a system abort failure, MTBSA=91
Maintainability				
The Q-53 radar operators must perform 75% of all unscheduled maintenance	The Q-53 radar operators must perform 75% of all unscheduled maintenance	(T=O) The Q-53 radar operators must perform 75% of all unscheduled maintenance	Threshold requirement met	The Q-53 radar operators must perform 75% of all unscheduled maintenance.
Field Maintenance Ratio				
The Q-53 radar system will have a Field Maintenance Ratio not to exceed 0.05 Maintenance Man-Hours/Operating Hour.	The Q-53 radar system will have a Field Maintenance Ratio not to exceed 0.05 Maintenance Man-Hours/Operating Hour.	(T=O) The Q-53 radar system will have a Field Maintenance Ratio not to exceed 0.05 Maintenance Man-Hours/Operating Hour.	Threshold requirement met	The Q-53 radar system will have a Field Maintenance Ratio not to exceed 0.05 Maintenance Man-Hours/Operating Hour.
MaxTTR at Field Level				
The Q-53 radar system MaxTTR requirement encompasses only the disassembly, interchange, and reassembly procedures and will not exceed 30 minutes for 90% of the maintenance tasks performed at the operator level.	The Q-53 radar system MaxTTR requirement encompasses only the disassembly, interchange, and reassembly procedures and will not exceed 30 minutes for 90% of the maintenance tasks performed at the operator level.	(T=O) The Q-53 radar system MaxTTR requirement encompasses only the disassembly, interchange, and reassembly procedures and will not exceed 30 minutes for 90% of the maintenance tasks performed at the operator level.	Threshold requirement met	The Q-53 radar system MaxTTR requirement encompasses only the disassembly, interchange, and reassembly procedures and will not exceed 30 minutes for 90% of the maintenance tasks performed at the operator level.
Operational Availability				
The Q-53 radar system will have a 95% average, Operational Availability.	The Q-53 radar system will have a 95% average, Operational Availability.	The Q-53 radar system will have a 90% average, Operational Availability.	Threshold requirement met	The Q-53 radar system will have a 90% average, Operational Availability.

Requirements Reference

AN/TPQ-53 Counterfire Target Acquisition Radar System CPD dated October 11, 2016.

Change Explanations

None

Acronyms and Abbreviations

% - Percent

BCT - Brigade Combat Team

IAP - Integrated Armor Package

IAW - in accordance with

IED - Improvised Explosive Devices

in - inch

km - kilometer

LTAS - Long-Term Armor Strategy Compliant

m - meter

MaxTTR - Maximum Time to Repair

mm - millimeter

MTBSA - Mean Time Between System Abort

Q-53 - AN/TPQ-53

RCDU - Remote Control/Display Unit

Track to Budget

RDT&E

Appn	BA	PE
Army	2040 05	0604823A

Project	Name
L88	FIREFINDER

Notes

The parent RDT&E PE contains two additional projects:

- Project L86: Lightweight Counter Mortar Radar, managed by PEO Missiles and Space
- Project L87: Hypervelocity Armament System, managed by PEO Ground Combat Systems

Procurement

Appn	BA	PE
Army	2035 02	0210600A

Line Item	Name
BA5500	Counterfire Radars

Acq O&M

Appn	BA	PE
Army	2020 04	0702806A

Subactivity Group	Name
435	Acquisition & Management Support: AN/TPQ-53

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 2019 \$M			BY 2019 \$M	TY \$M		
	SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Current Estimate	SAR Baseline Production Estimate	Current APB Production Objective	Current Estimate
RDT&E	340.7	340.7	374.8	340.4	300.4	300.4	300.4
Procurement	3299.2	3299.2	3629.1	3296.9	3130.4	3130.4	3130.4
Flyaway	--	--	--	2792.6	--	--	2642.7
Recurring	--	--	--	2149.0	--	--	2064.1
Non Recurring	--	--	--	643.6	--	--	578.6
Support	--	--	--	504.3	--	--	487.7
Other Support	--	--	--	396.0	--	--	381.7
Initial Spares	--	--	--	108.3	--	--	106.0
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	18.4	18.4	20.2	18.4	23.2	23.2	23.2
Total	3658.3	3658.3	N/A	3655.7	3454.0	3454.0	3454.0

Current APB Cost Estimate Reference

Army Cost Position for AN/TPQ-53 dated April 03, 2019

Cost Notes

CAPE Cost Risks: With FRP buys complete and 115 radars fielded, the base AN/TPQ-53 program has low cost, schedule, and technical risks. Delivery of the first gallium nitride (GaN)-based radars (FRP Lot 2) begins in the second quarter of fiscal year (FY) 2020. No delays or additional costs are expected from the implementation of gallium arsenide (GaAs) to GaN in the AN/TPQ-53 production process. Transitioning hardware and software sustainment to Army organic activities is underway and not expected to present any unusual challenges.

There are modest technical, cost, schedule, and funding risks in developing, procuring, and fielding all of the modifications in the product office's field modifications program after radar fielding. The product office will manage costs and schedule by deciding how many radars receive each mod and when—recognizing, however, that pure fleeting all 189 radars to a single end-item hardware and software configuration is advantageous to the warfighter.

The basis of the Current Estimate is the Army Cost Position (ACP) developed by the Office of the Deputy Assistant Secretary of the Army for Cost and Economics and approved in April 2019.

Total Quantity			
Quantity	SAR Baseline Production Estimate	Current APB Production	Current Estimate
RDT&E	4	4	4
Procurement	189	189	189
Total	193	193	193

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	289.2	11.2	0.0	0.0	0.0	0.0	0.0	0.0	300.4
Procurement	3025.3	51.2	29.7	24.2	0.0	0.0	0.0	0.0	3130.4
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	1.0	1.0	1.1	1.1	1.1	1.1	16.8	23.2
PB 2021 Total	3314.5	63.4	30.7	25.3	1.1	1.1	1.1	16.8	3454.0
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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	4	0	0	0	0	0	0	0	0	4
Production	0	189	0	0	0	0	0	0	0	189
PB 2021 Total	4	189	0	0	0	0	0	0	0	193
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Cost and Funding

Annual Funding By Appropriation

Annual Funding							
2040 RDT&E Research, Development, Test, and Evaluation, Army							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2006	--	--	--	--	--	--	21.0
2007	--	--	--	--	--	--	47.0
2008	--	--	--	--	--	--	74.9
2009	--	--	--	--	--	--	45.6
2010	--	--	--	--	--	--	15.8
2011	--	--	--	--	--	--	9.7
2012	--	--	--	--	--	--	5.3
2013	--	--	--	--	--	--	14.1
2014	--	--	--	--	--	--	17.7
2015	--	--	--	--	--	--	22.6
2016	--	--	--	--	--	--	--
2017	--	--	--	--	--	--	3.1
2018	--	--	--	--	--	--	7.0
2019	--	--	--	--	--	--	5.4
2020	--	--	--	--	--	--	11.2
Subtotal	4	--	--	--	--	--	300.4

Annual Funding 2040 RDT&E Research, Development, Test, and Evaluation, Army							
Fiscal Year	Quantity	BY 2019 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2006	--	--	--	--	--	--	25.6
2007	--	--	--	--	--	--	56.1
2008	--	--	--	--	--	--	87.7
2009	--	--	--	--	--	--	52.7
2010	--	--	--	--	--	--	18.0
2011	--	--	--	--	--	--	10.8
2012	--	--	--	--	--	--	5.8
2013	--	--	--	--	--	--	15.2
2014	--	--	--	--	--	--	18.8
2015	--	--	--	--	--	--	23.6
2016	--	--	--	--	--	--	--
2017	--	--	--	--	--	--	3.1
2018	--	--	--	--	--	--	7.0
2019	--	--	--	--	--	--	5.3
2020	--	--	--	--	--	--	10.7
Subtotal	4	--	--	--	--	--	340.4

Annual Funding 2035 Procurement Other Procurement, Army							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2008	12	7.3	--	152.2	159.5	0.6	160.1
2009	4	41.8	--	48.5	90.3	10.7	101.0
2010	13	34.6	--	170.9	205.5	13.8	219.3
2011	17	197.8	--	38.3	236.1	47.1	283.2
2012	23	288.8	--	--	288.8	48.0	336.8
2013	15	190.1	--	62.3	252.4	42.2	294.6
2014	20	269.3	--	11.8	281.1	67.4	348.5
2015	7	91.9	--	0.2	92.1	34.2	126.3
2016	14	166.0	--	18.0	184.0	14.3	198.3
2017	17	179.9	--	58.2	238.1	59.5	297.6
2018	32	331.3	--	13.7	345.0	55.4	400.4
2019	15	228.8	--	3.3	232.1	27.1	259.2
2020	--	11.1	--	1.2	12.3	38.9	51.2
2021	--	12.5	--	--	12.5	17.2	29.7
2022	--	12.9	--	--	12.9	11.3	24.2
Subtotal	189	2064.1	--	578.6	2642.7	487.7	3130.4

Annual Funding 2035 Procurement Other Procurement, Army							
Fiscal Year	Quantity	BY 2019 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2008	12	8.5	--	177.6	186.1	0.7	186.8
2009	4	48.1	--	55.9	104.0	12.3	116.3
2010	13	39.1	--	193.3	232.4	15.6	248.0
2011	17	219.8	--	42.6	262.4	52.3	314.7
2012	23	316.1	--	--	316.1	52.6	368.7
2013	15	204.0	--	66.8	270.8	45.3	316.1
2014	20	284.1	--	12.4	296.5	71.2	367.7
2015	7	95.6	--	0.2	95.8	35.6	131.4
2016	14	170.4	--	18.5	188.9	14.6	203.5
2017	17	181.0	--	58.5	239.5	59.9	299.4
2018	32	327.0	--	13.5	340.5	54.7	395.2
2019	15	221.4	--	3.2	224.6	26.2	250.8
2020	--	10.5	--	1.1	11.6	37.0	48.6
2021	--	11.6	--	--	11.6	16.0	27.6
2022	--	11.8	--	--	11.8	10.3	22.1
Subtotal	189	2149.0	--	643.6	2792.6	504.3	3296.9

Cost Quantity Information		
2035 Procurement Other Procurement, Army		
Fiscal Year	Quantity	End Item Recurring Flyaway (Aligned With Quantity) BY 2019 \$M
2008	12	8.5
2009	4	48.1
2010	13	39.1
2011	17	219.8
2012	23	316.1
2013	15	204.0
2014	20	284.1
2015	7	95.6
2016	14	170.4
2017	17	181.0
2018	32	327.0
2019	15	255.3
2020	--	--
2021	--	--
2022	--	--
Subtotal	189	2149.0

Annual Funding		
2020 Acq O&M	Operation and Maintenance, Army	
Fiscal Year	TY \$M	
	Total Program	
2020		1.0
2021		1.0
2022		1.1
2023		1.1
2024		1.1
2025		1.1
2026		1.1
2027		1.2
2028		1.2
2029		1.2
2030		1.2
2031		1.3
2032		1.1
2033		1.1
2034		1.1
2035		1.1
2036		1.2
2037		0.9
2038		0.9
2039		0.7
2040		0.7
2041		0.8
Subtotal		23.2

Annual Funding	
2020 Acq O&M Operation and Maintenance, Army	
Fiscal Year	BY 2019 \$M
	Total Program
2020	1.0
2021	0.9
2022	1.0
2023	1.0
2024	1.0
2025	1.0
2026	0.9
2027	1.0
2028	1.0
2029	1.0
2030	0.9
2031	1.0
2032	0.8
2033	0.8
2034	0.8
2035	0.8
2036	0.8
2037	0.6
2038	0.6
2039	0.5
2040	0.5
2041	0.5
Subtotal	18.4

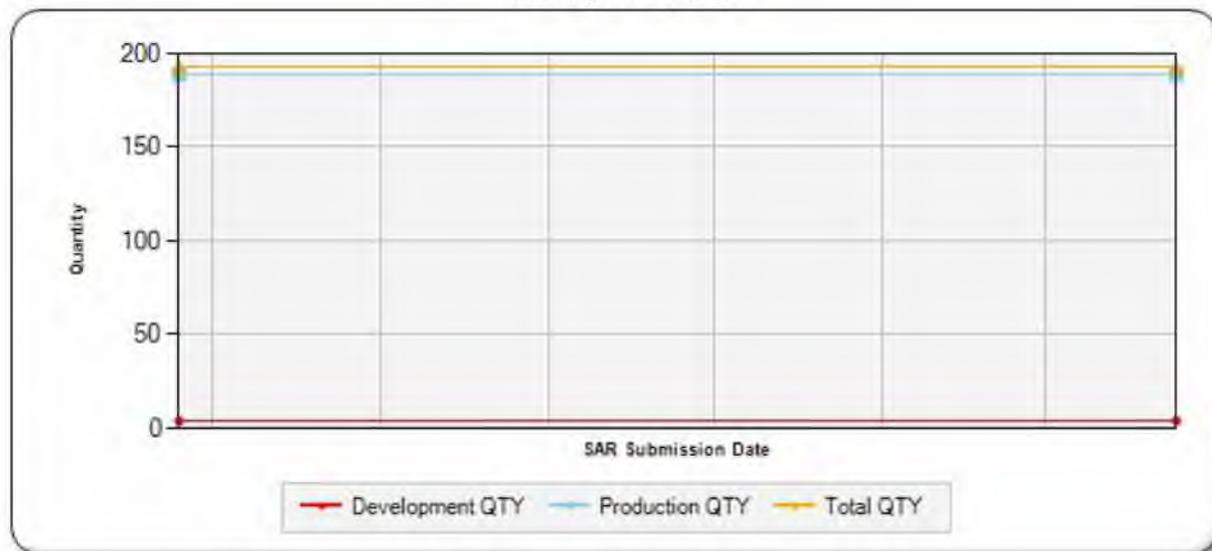
Charts

AN/TPQ-53 first began SAR reporting in June 2019

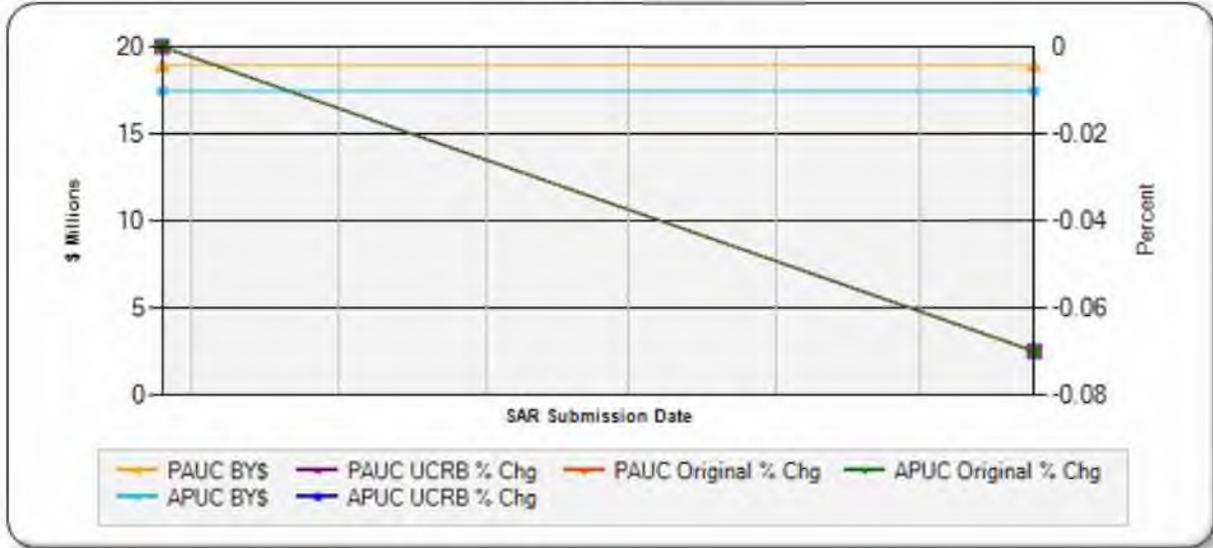
Program Acquisition Cost - AN/TPQ-53
Base Year 2019 \$M



Quantity - AN/TPQ-53



Unit Cost - AN/TPQ-53
Base Year 2019 \$M



Risks

Significant Schedule and Technical Risks

Significant Schedule and Technical Risks	
Current Estimate (December 2019)	
1.	<p>Gallium arsenide (GaAs) to gallium nitride (GaN) Obsolescence - The Gallium Arsenide (GaAs) mitigates obsolescence issues by adoption of Gallium Nitride (GaN) technologies. The risk posed by GaAs obsolescence is consequentially significant but low likelihood. Ignoring this risk will delay the planned transition to sustainment and adversely affect fleet readiness while burdening the program with additional unfunded costs. The plan to mitigate this risk encompasses four steps. First, the GaN design will progress in an iterative fashion, incorporating comprehensive design reviews at the appropriate stages. Second, the OEM will conduct extended burn-in testing at the component, module, array and system level to establish material robustness and validation of the manufacturing processes. Thirdly, the OEM and government will jointly conduct live-fire engineering tests to assess hardware and software performance. Fourth and lastly, the OEM and government will collaboratively conduct Army Test and Evaluation Center (ATEC) - witnessed electromagnetic environmental effects (E3) and MIL-STD-810G environmental testing on production-representative hardware to confirm suitability for full-rate production.</p>
2.	<p>Signal data processor (SDP) Obsolescence - The Signal Data Processor (SDP) tech refresh mitigates obsolescence through the development of a new SDP designed to meet requirements and provide growth for the future. The risk posed by legacy SDP obsolescence is consequentially significant but low likelihood. Ignoring this risk will delay the planned transition to sustainment and adversely affect fleet readiness while burdening the program with additional unfunded costs. The plan to mitigate this risk encompasses five steps. First, the SDP design will progress in a parallel iterative fashion, through the construction and simultaneous testing of multiple prototypes. Second, the OEM will conduct early line replaceable unit (LRU) environmental testing to establish material robustness and validation of the manufacturing processes. Thirdly, the OEM and government will jointly conduct concurrent development and testing of software, which allows for flexibility during troubleshooting. Fourth, the OEM and government will jointly conduct live-fire engineering tests to assess hardware and software performance. Fifth and lastly, the OEM and government will collaboratively conduct Army Test and Evaluation Center (ATEC) - witnessed electromagnetic environmental effects (E3) and MIL-STD-810G environmental testing on production-representative hardware to confirm suitability for full-rate production.</p>

Risks

Risk and Sensitivity Analysis

Risks and Sensitivity Analysis	
Current Baseline Estimate (April 2019)	
1.	With FRP buys complete and 110 radars fielded, the base AN/TPQ-53 program has low cost, schedule, and technical risks. Delivery of the first gallium nitride (GaN) -based radars (FRP Lot 2) begins in the second quarter of fiscal year (FY) 2020. No delays or additional costs are expected from the implementation of gallium arsenide (GaAs) to GaN in the AN/TPQ-53 production process. Transitioning hardware and software sustainment to Army organic activities is underway and not expected to present any unusual challenges. There are modest technical, cost, schedule, and funding risks in developing, procuring, and fielding all of the modification in the Product Office's field modifications program after radar fielding. To a degree, the Product Office will manage the costs and schedule by deciding how many radars receive each modification and when—recognizing, however, that "pure fleeting" all 189 radars to a single end-item hardware and software configuration is advantageous to the warfighter.
Original Baseline Estimate (April 2019)	
1.	The Original Baseline Estimate equals the Current Baseline Estimate.
Revised Original Estimate (N/A)	
None	
Current Procurement Cost (December 2019)	
1.	The Current Procurement Cost equals the Current Baseline Estimate.

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	2/29/2012	9/11/2015
Approved Quantity	38	72
Reference	ADM	ADM
Start Year	2012	2012
End Year	2013	2015

The Current Total LRIP Quantity is more than 10% of the total production quantity due to risk mitigation efforts. The MDA exceeded 10% LRIP procurement threshold in 2012 (Lots 1, 2, and 3) to mitigate the following risks:

- Mean Time Between System Abort / Reliability
- Training Transition at Fires Center of Excellence
- Funding Profile
- Test & Evaluation Schedule Risk

In order to mitigate a break in production and meet user demands, the MDA approved the procurement of up to 13 LRIP Lot 4 and seven LRIP Lot 5 assets, associated initial spares, depot spares, and engineering support. This maintained the production line in anticipation of a successful FRP decision.

Notes

Initial LRIP ADM approved up to 38 systems; the program procured 33 systems on Lots 1 and 2.

Foreign Military Sales

Country	Date of Sale	Quantity	Total Cost \$M	Description
Singapore	4/13/2017	6	77.2	Procures six trailer-mounted AN/TPQ-53 Counter Fire Target Acquisition Radar variants, spare/repair parts, interim contractor support of fielded systems, repair and return services, training services, engineering support, logistics support, program management and data. This acquisition is in support of Foreign Military Sales (FMS) Case SN-B-VFN for the Government of Singapore.

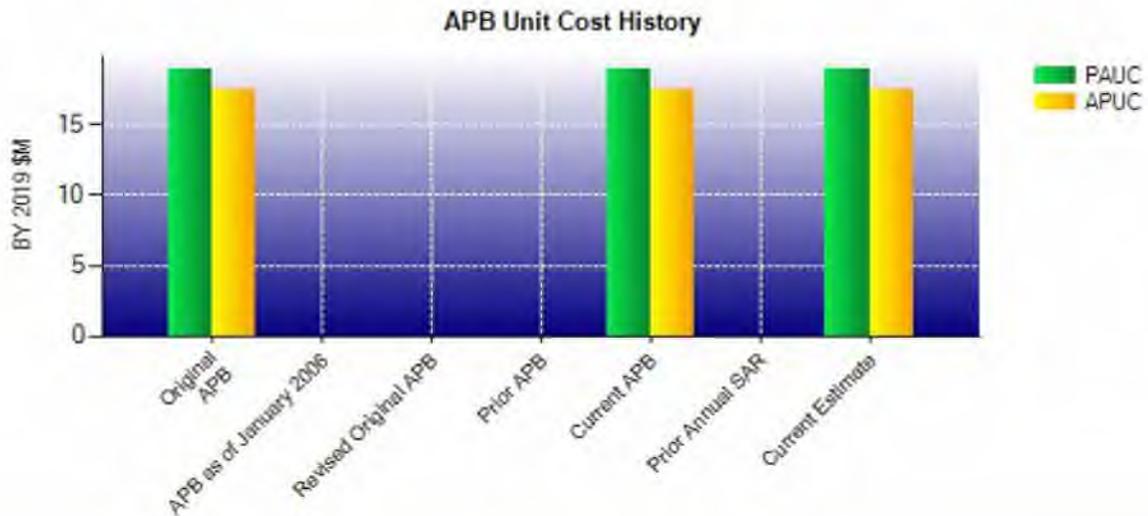
Notes

Nuclear Costs

None

Unit Cost

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2019 \$M	BY 2019 \$M	% Change
	Current UCR Baseline (Apr 2019 APB)	Current Estimate (Dec 2019 SAR)	
Program Acquisition Unit Cost			
Cost	3658.3	3655.7	
Quantity	193	193	
Unit Cost	18.955	18.941	-0.07
Average Procurement Unit Cost			
Cost	3299.2	3296.9	
Quantity	189	189	
Unit Cost	17.456	17.444	-0.07
Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2019 \$M	BY 2019 \$M	% Change
	Original UCR Baseline (Apr 2019 APB)	Current Estimate (Dec 2019 SAR)	
Program Acquisition Unit Cost			
Cost	3658.3	3655.7	
Quantity	193	193	
Unit Cost	18.955	18.941	-0.07
Average Procurement Unit Cost			
Cost	3299.2	3296.9	
Quantity	189	189	
Unit Cost	17.456	17.444	-0.07



APB Unit Cost History					
Item	Date	BY 2019 \$M		TY \$M	
		PAUC	APUC	PAUC	APUC
Original APB	Apr 2019	18.955	17.456	17.896	16.563
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	N/A	N/A	N/A	N/A	N/A
Current APB	Apr 2019	18.955	17.456	17.896	16.563
Prior Annual SAR	N/A	N/A	N/A	N/A	N/A
Current Estimate	Dec 2019	18.941	17.444	17.896	16.563

SAR Unit Cost History

Current SAR Baseline to Current Estimate (TY \$M)									
PAUC Production Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
17.896	0.013	0.000	0.000	0.000	-0.012	0.000	-0.001	0.000	17.896

Current SAR Baseline to Current Estimate (TY \$M)									
Initial APUC Production Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
16.563	0.012	0.000	0.000	0.000	-0.012	0.000	-0.001	-0.001	16.563

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	N/A	N/A	N/A
Milestone C	N/A	N/A	Jul 2008	Jul 2008
IOC	N/A	N/A	N/A	N/A
Total Cost (TY \$M)	N/A	N/A	3454.0	3454.0
Total Quantity	N/A	N/A	193	193
PAUC	N/A	N/A	17.896	17.896

Cost Variance

Summary TY \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	300.4	3130.4	--	3454.0
Previous Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	--	--	--	--
Current Changes				
Economic	+0.3	+2.3	--	+2.6
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-0.3	-2.2	--	-2.5
Other	--	--	--	--
Support	--	-0.1	--	-0.1
Subtotal	--	--	--	--
Total Changes	--	--	--	--
Current Estimate	300.4	3130.4	--	3454.0

Summary BY 2019 \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	340.7	3299.2	--	3658.3
Previous Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	--	--	--	--
Other	--	--	--	--
Support	--	--	--	--
Subtotal	--	--	--	--
Current Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	-0.3	-2.3	--	-2.6
Other	--	--	--	--
Support	--	--	--	--
Subtotal	-0.3	-2.3	--	-2.6
Total Changes	-0.3	-2.3	--	-2.6
Current Estimate	340.4	3296.9	--	3655.7

Previous Estimate: June 2019

RDT&E	\$M	
	Base Year	Then Year
Current Change Explanations		
Revised escalation indices. (Economic)	N/A	+0.3
Adjustment for current and prior escalation. (Estimating)	-0.3	-0.3
RDT&E Subtotal	-0.3	0.0

Procurement	\$M	
	Base Year	Then Year
Current Change Explanations		
Revised escalation indices. (Economic)	N/A	+2.3
Adjustment for current and prior escalation. (Estimating)	-2.3	-2.1
Adjustment for current and prior escalation. (Estimating)	0.0	-0.1
Adjustment for current and prior escalation. (Support)	0.0	-0.2
Adjustment for current and prior escalation. (Support)	0.0	+0.1
Procurement Subtotal	-2.3	0.0

Contracts

Contract Identification

Appropriation: Procurement
Contract Name: Q-53 LRIP Lot 2
Contractor: LOCKHEED MARTIN CORPORATION
Contractor Location: MS2 RADAR SYSTEMS
 497 ELECTRONICS PKWY BLDG 5
 LIVERPOOL, NY 13088
Contract Number: W15P7T-12-C-C015/2
Contract Type: Firm Fixed Price (FFP)
Award Date: March 29, 2012
Definitization Date: March 29, 2012

Contract Price								
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)		
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager	
398.2	N/A	21	398.2	N/A	21	398.2	398.2	

Cost and Schedule Variance Explanations

Cost and Schedule Variance reporting is not required on this (FFP) contract.

Notes

Contract price includes contractor support services.

Contract Identification

Appropriation: Procurement
Contract Name: Q-53 LRIP Lot 3
Contractor: LOCKHEED MARTIN CORPORATION
Contractor Location: MS2 RADAR SYSTEMS
 497 ELECTRONICS PKWY BLDG 5
 LIVERPOOL, NY 13088
Contract Number: W15P7T-12-C-C015/10
Contract Type: Firm Fixed Price (FFP)
Award Date: June 26, 2013
Definitization Date: June 26, 2013

Contract Price								
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)		
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager	
206.9	N/A	19	206.9	N/A	19	206.9	206.9	

Cost and Schedule Variance Explanations

Cost and Schedule Variance reporting is not required on this (FFP) contract.

Notes

Contract price includes contractor support services.

Contract Identification

Appropriation: Procurement
Contract Name: Q-53 LRIP Lot 4
Contractor: LOCKHEED MARTIN CORPORATION
Contractor Location: MS2 RADAR SYSTEMS
 497 ELECTRONICS PKWY BLDG 5
 LIVERPOOL, NY 13088
Contract Number: W15P7T-12-C-C015/22
Contract Type: Firm Fixed Price (FFP)
Award Date: March 27, 2014
Definitization Date: March 27, 2014

Contract Price								
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)		
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager	
145.9	N/A	13	145.9	N/A	13	145.9	145.9	

Cost and Schedule Variance Explanations

Cost and Schedule Variance reporting is not required on this (FFP) contract.

Notes

Contract price includes contractor support services.

Contract Identification

Appropriation: Procurement
Contract Name: Q-53 FRP Lot 1
Contractor: LOCKHEED MARTIN CORPORATION
Contractor Location: MS2 RADAR SYSTEMS
 497 ELECTRONICS PKWY BLDG 5
 LIVERPOOL, NY 13088
Contract Number: W56KGY-17-D-0005/1
Contract Type: Fixed Price Incentive(Firm Target) (FPIF), Firm Fixed Price (FFP)
Award Date: March 30, 2017
Definitization Date: March 30, 2017

Contract Price							
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
338.1	338.1	33	382.3	382.3	38	243.3	242.6

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to a modification to the contract to procure an additional five systems.

Contract Variance			
Item	Cost Variance		Schedule Variance
Cumulative Variances To Date (12/14/2019)	+37.8		-1.2
Previous Cumulative Variances	+34.9		-5.4
Net Change	+2.9		+4.2

Cost and Schedule Variance Explanations

The favorable net change in the cost variance is due to a positive labor performance and positive material performance. The positive labor performance is primarily due to the implementation of manufacturing flowlines in the Circuit Card Assembly (CCA) work cells, which increased productivity, efficiencies and performance. The process improvements and dedicated flow lines allowed all the work to be completed in one work cell area vs. moving the work to various work cell areas of manufacturing as we did during LRIP production. As well, the large volume of CCAs moving through the work area enabled the same TPQ 53 production operators to stay on the program and focus on reducing HPUs and defects. The positive material performance is driven by DC Tile , Xmitter Pwr Supply Control, Xmitter Pwr Supply IMS, RCM, MEG Cables, and SOG Cables, which offsets the negative material performance on the OCM and CLW Build Support. The positive material performance is due to actual lower material costs than originally planned/baselined. The main contributor to the negative material performance of the OCM is the capacitors coming in 8% over the target cost.

The favorable net change in the schedule variance is due to a negative labor schedule performance of and positive material schedule performance.

The labor schedule performance is comprised of Box Pack and Ship, Calibration, CS, Modkit, Paint, MFG Support, Tooling and Maintenance, the TAS. The TAS labor efficiency is driven by improved processes that resulted in less time being spent that what was budgeted.

Contract Identification

Appropriation: Procurement
Contract Name: Q-53 FRP Lot 2
Contractor: LOCKHEED MARTIN CORPORATION
Contractor Location: MS2 RADAR SYSTEMS
 497 ELECTRONICS PKWY BLDG5
 LIVERPOOL, NY 13088
Contract Number: W56KGY-17-D-0005/13
Contract Type: Fixed Price Incentive(Firm Target) (FPIF), Firm Fixed Price (FFP)
Award Date: March 30, 2018
Definitization Date: March 30, 2018

Contract Price							
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
243.7	243.7	24	304.7	304.7	32	199.7	188.1

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to the additional procurement of eight systems, bringing the total quantity of the contract to 32. The period of performance on the contract was extended by three months to avoid a break in production.

Contract Variance			
Item	Cost Variance		Schedule Variance
Cumulative Variances To Date (12/12/2019)	+12.4		-2.7
Previous Cumulative Variances	+3.4		+0.3
Net Change	+9.0		-3.0

Cost and Schedule Variance Explanations

The favorable net change in the cost variance is due to a positive labor performance and positive material performance. Cumulative Cost Variance is primarily driven by labor performance due to volumen. The volumen labor variance is driven by expending lower hours than originally baselined for MFG Support (LOE) and touche labor due to the implementation of manufacturing flowlines in the Circuit Card Assembly (CCA) work cells, which increases productivity, efficiencies and performance. These process improvements and dedicated flow lines allow all the work to be completed in one work cell area vs. moving the work to various work cell areas of manufacturing, as well, the large volume of CCAs and cables moving through the work area enable the same TPQ 53 production operators to stay on the program and focus on reducing HPUs and defects.

The material variance for consumed material, which is mostly due to favorable negotiations post-baseline with the Vendors/Suppliers.

The unfavorable net change in the schedule variance is due to late receipts of INU = Inertial Navigation Unit, (INUs), enhanced Monitor Feedback Assembly (eMFA), and fans of the Antenna. The Transmitter Receiver (TR) Module negative schedule is due to late receipts of Driver Monolithic Microwave Integrated Circuit (MMIC), module packages, Limiters, and Common Leg Circuit (CLC) MMICs. The Octopack negative schedule is due to releases of Octopack build material based on the need for TR Modules to start scheduled builds. Direct Current (DC) Tiles negative schedule is due to late releases based on late Circuit Card Assembly (CCA) deliveries.

Contract Identification

Appropriation: Procurement
Contract Name: Q-53 FRP Lot 3
Contractor: LOCKHEED MARTIN CORPORATION
Contractor Location: MS2 RADAR SYSTEMS
 497ELECTRONICS PKWY BLDG 5
 LIVERPOOL, NY 13088
Contract Number: W56KGY-17-D-0005
Contract Type: Fixed Price Incentive(Firm Target) (FPIF), Firm Fixed Price (FFP)
Award Date: April 17, 2019
Definitization Date: April 17, 2019

Contract Price							
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
164.5	164.5	15	164.5	164.5	15	107.9	53.4

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/12/2019)	+0.4	+0.1
Previous Cumulative Variances	--	--
Net Change	+0.4	+0.1

Cost and Schedule Variance Explanations

The favorable cumulative cost variance is due to LOE support efficiencies.

The favorable cumulative schedule variance is due to Machined Parts & OnBoard Spares.

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	4	4	4	100.00%
Production	149	149	189	78.84%
Total Program Quantity Delivered	153	153	193	79.27%

Expended and Appropriated (TY \$M)			
Total Acquisition Cost	3454.0	Years Appropriated	15
Expended to Date	2723.7	Percent Years Appropriated	41.67%
Percent Expended	78.86%	Appropriated to Date	3377.9
Total Funding Years	36	Percent Appropriated	97.80%

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

Operating and Support Cost

Cost Estimate Details

Date of Estimate:	April 03, 2019
Source of Estimate:	SCP
Quantity to Sustain:	189
Unit of Measure:	System
Service Life per Unit:	20.00 Years
Fiscal Years in Service:	FY 2016 - FY 2041

An AN/TPQ-53 system is defined as the Mission Essential Group (MEG), the Sustained Operational Group (SOG), and the Power Group. There are 189 systems to sustain, which include ten sustainment floats, six test assets, and ten training assets. The four RDT&E-funded systems are prototypes and are not sustained.

Sustainment Strategy

The AN/TPQ-53 will be maintained and supported utilizing the Army's two-level maintenance concept which consists of field level and sustainment level maintenance. Field level maintenance will consist of on or near system repair, replacement, adjustment, alignment, service, failure diagnosis, and return-to-user tasks. The line replaceable units (LRUs) (including cables, etc.), will either be returned to the sustainment level of maintenance for repair or will be discarded. All field level maintenance actions required to bring an inoperable system to a fully mission capable (FMC) condition will be accomplished by the organic AN/TPQ-53 crew or maintenance personnel in military units assigned support responsibilities for the AN/TPQ-53. Any future engineering change proposals (ECPs) and modification work orders (MWOs) will consider supportability requirements. Implementation will be IAW AR 750-10 the Army's Modification Program. For sustainment, there is a combination of contractor and Government services for sustainment/depot-level maintenance. All maintenance planning complies with applicable section 2460 of title 10, U.S. Code, Core Depot statutes.

Antecedent Information

The AN/TPQ-53 replaces the AN/TPQ-36 and AN/TPQ-37 legacy Firefinder radars; however, insufficient historical data is available to provide reliable O&S cost metrics.

Cost Element	Annual O&S Costs BY2019 \$K	
	AN/TPQ-53 Average Annual Cost Per System	No Antecedent
Unit-Level Manpower	390.000	--
Unit Operations	11.000	--
Maintenance	159.000	--
Sustaining Support	86.000	--
Continuing System Improvements	142.000	--
Indirect Support	--	--
Other	--	--
Total	788.000	--

Item	Total O&S Cost \$M			
	AN/TPQ-53			No Antecedent
	Current Production APB Objective/Threshold		Current Estimate	
Base Year	2978.2	3276.0	2978.2	N/A
Then Year	3741.4	N/A	3741.1	0.0

Equation to Translate Annual Cost to Total Cost

Total System O&S = \$0.788M (Average Annual O&S Cost per System) x 189 (number of systems) x 20 (service life per system) = \$2,978M (BY\$2019)

O&S Cost Variance		
Category	BY 2019 \$M	Change Explanations
Prior SAR Total O&S Estimates - Jun 2019 SAR	2978.2	
Programmatic/Planning Factors	0.0	
Cost Estimating Methodology	0.0	
Cost Data Update	0.0	
Labor Rate	0.0	
Energy Rate	0.0	
Technical Input	0.0	
Other	0.0	
Total Changes	0.0	
Current Estimate	2978.2	

Disposal Estimate Details

Date of Estimate: April 03, 2019
Source of Estimate: SCP
Disposal/Demilitarization Total Cost (BY 2019 \$M): 6.8