

UNCLASSIFIED



## Selected Acquisition Report (SAR)

RCS: DD-A&T(Q&A)823-212



### V-22 Osprey Joint Services Advanced Vertical Lift Aircraft (V-22)

As of FY 2020 President's Budget

Defense Acquisition Management  
Information Retrieval  
(DAMIR)

---

UNCLASSIFIED

## Table of Contents

Sensitivity Originator .....	3
Common Acronyms and Abbreviations for MDAP Programs .....	4
Program Information .....	6
Responsible Office .....	6
References .....	7
Mission and Description .....	8
Executive Summary .....	9
Threshold Breaches .....	13
Schedule .....	14
Performance .....	18
Track to Budget .....	22
Cost and Funding .....	23
Low Rate Initial Production .....	51
Foreign Military Sales .....	52
Nuclear Costs .....	52
Unit Cost .....	53
Cost Variance .....	56
Contracts .....	60
Deliveries and Expenditures .....	66
Operating and Support Cost .....	67

**Sensitivity Originator**

No originator information is available at this time.

## 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**

V-22 Osprey Joint Services Advanced Vertical Lift Aircraft (V-22)

**DoD Component**

Navy

**Joint Participants**

United States Marine Corps; United States Navy; United States Special Operations Command; United States Air Force

## Responsible Office

Col Matthew Kelly  
PMA-275 (V-22 Osprey Joint Services Advanced Vertical  
Lift Aircraft (V-22))  
Program Executive Office - Air, Anti-Submarine Warfare,  
Assault & Special Mission Programs  
47123 Buse Road Bldg 2272  
Patuxent River, MD 20670-1547

**Phone:** 301-757-5161  
**Fax:** 301-757-7558  
**DSN Phone:** 757-5161  
**DSN Fax:** 757-7558  
**Date Assigned:** July 2, 2017

[matthew.g.kelly@navy.mil](mailto:matthew.g.kelly@navy.mil)

## References

**SAR Baseline (Production Estimate)**

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated September 28, 2005

**Approved APB**

Air Force Acquisition Executive (AFAE) Approved Acquisition Program Baseline (APB) dated December 17, 2018

## Mission and Description

The V-22 Osprey Joint Services Advanced Vertical Lift Aircraft (V-22) Program was established by the DoD to develop, test, evaluate, procure, field and support a tilt rotor, Vertical/Short Takeoff and Landing aircraft for Joint Service application. The Navy was designated the Executive Agent with support from the United States Air Force (USAF) in the V-22 Joint Program Office located at the Naval Air Systems Command Headquarters, Naval Air Station Patuxent River, MD. The V-22 Program is designed to provide an aircraft to meet the amphibious/vertical assault needs of the United States Marine Corps (USMC), the Carrier-On Board Delivery/fleet logistics needs of the Navy, and the special operations needs of the USAF and United States Special Operations Command (USSOCOM). The MV-22 variant replaces the CH-46E and CH-53D in the USMC. The CV-22 variant replaces the MH-53-J/M, but also provides a new capability and augments the MC-130 in the USAF/USSOCOM inventory for special operations infiltration, exfiltration, and resupply missions. The Navy CMV-22 will be replacing the C-2A in the Navy inventory. The V-22 is capable of flying over 2,100 nautical miles with a single refueling, giving the Services the advantage of a Vertical/Short Takeoff and Landing aircraft able to rapidly self-deploy to any location in the world.

Block Descriptions: V-22 capability is being increased and fielded over time via a Block upgrade acquisition strategy. MV-22 Block A provides a "Safe and Operational Test and Training Asset" configuration that supports developmental and operational flight tests, as well as fleet training. MV-22 Block B provides for correction of previously identified deficiencies and suitability improvements. MV-22 Block C provides mission enhancements and continued Reliability and Maintainability (R&M) improvements. Block 0/10 is a CV-unique configuration including radar and electronic countermeasures upgrades. Block 20 provides an enhanced CV-unique configuration with communications and aircraft system performance upgrades and continued R&M improvements. The Navy CMV-22 is an MV-22 Block C configuration with enhancements including extended range fuel tanks, high frequency radio and a cabin intercom system.

## Executive Summary

### Program Highlights Since Last Report

The V-22 Program focus is on improving aircraft readiness, sustaining Fleet aircraft, executing the third Multi-Year Procurement (MYP) contract, reducing operating costs, and expanding our business base, both domestically and internationally. Both the MV-22 and CV-22 continue to meet all KPPs.

As of January 24, 2019, 382 (325 MV/52 CV/5 Japan V-22) aircraft have been delivered. To support program affordability, a third MYP (FY 2018 - FY 2022) contract was awarded to the Bell-Boeing Joint Project Office on June 29, 2018 for \$4.2B. The MYP3 Contract is currently procuring 63 aircraft (42 CMV-22/16 MV-22/1 CV-22/4 Japan V-22s) with a Variation-In-Quantity clause to cover additional aircraft.

The program continues to pursue FMS partnerships. The Government of Japan (GOJ) approved the Letter of Offer and Acceptance on August 8, 2018 for Japan FMS Case JA-P-SCP to procure continued Phase III Non-Recurring Engineering (NRE), full funding for four V-22 aircraft, and logistics elements at a cost of \$633.9M. GOJ has contracted a total of 17 production aircraft (13 awarded on the MYP2 contract and four awarded on the MYP3 contract).

The Common Configuration-Readiness and Modernization (CC-RAM) effort will upgrade 129 MV-22 Block B aircraft to a Block C configuration over a ten-year period. The CC-RAM NRE and the first three aircraft modifications are underway. All three aircraft have been inducted and the modifications are planned to be completed by third quarter FY 2020. A contract modification for CC-RAM Option Years 2-4, which adds modifications for another 22 aircraft, is on track to award in second quarter FY 2019. The Nacelle Improvements (NI) NRE contract was awarded for \$47.4M with Bell-Boeing on June 4, 2018 to develop, install, and test readiness improvements, including an improved wiring design. The NI recurring contract award is planned for second quarter FY 2020.

A revision to the V-22 APB was approved on December 17, 2018 to incorporate Program of Record quantity changes for CV-22, add new KPPs and Program Milestones for the CMV-22, and address RDT&E and MILCON cost breaches from previous years.

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
December 1981	The V-22 Program began as a joint program, under U.S. Army leadership, between the Army, Navy, and Air Force, to satisfy a medium lift aircraft requirement.
December 1982	V-22 completed Milestone I, Executive Leadership transferred to Department of Navy and was established as the Joint Services Advanced Vertical Lift (JVX) Program.
April 1983	Preliminary Design Contract awarded to the Bell-Boeing Joint Venture.
April 1986	Milestone II Decision was approved for V-22 Full Scale Development (FSD) as an ACAT 1D Program.
May 1986	The FSD contract was competitively awarded to the Bell-Boeing team.
May 1988	The Army withdrew from the V-22 Joint Program citing the need to focus budget on higher Army priorities
March 1989	JVX-22 first flight was completed.
April 1989	SECDEF cancelled planned JVX production due to affordability issues; however Congress included RDT&E funding in approved budgets to continue development efforts through FY 1993.
October 1992	Unable to meet the joint program requirements, the Program was restructured to support the USMC Medium Lift Replacement Operational Requirements Document (ORD). The JVX FSD contract was terminated and the Engineering and Manufacturing Development (EMD) contract for the MV-22 Marine Corp variant was awarded to Bell-Boeing.
April 1994	MV-22 Preliminary Design Review (PDR) completed.
December 1994	The U.S. Air Force and U.S. Special Operations Command (USSOCOM) decided to procure the CV-22, which was an MV-22 with Special Operations Forces (SOF) peculiar modifications to meet their Joint Service Advanced Vertical Lift requirement.
December 1994	MV-22 Incremental Critical Design Review (CDR) completed.
February 1995	An ADM was issued approving CV-22 EMD, along with the restructured program baseline.
August 1995	CV-22 development was added to the EMD contract.
June 1996	LRIP for the MV-22 began, and future production decisions were delegated to the Navy Component Acquisition Executive (CAE), with the program re-designated as an ACAT IC program.
April 1997	A program deviation was reported for a schedule breach due to delay in the planned CV-22 PDR and CDR dates resulting in an APB Revision.
November 1997	A program deviation was reported for a cost breach to the MILCON Cost threshold due to additional funding to cover CV-22 facility requirements resulting in an APB Revision.
December 1997	CV-22 PDR was completed.
December 1998	CV-22 CDR was completed.
June 2000	A program deviation was reported for a schedule breach due to a delay in the planned Operational Evaluation (OPEVAL) date resulting in an APB Revision.
July 2000	MV-22 OPEVAL was completed.
December 2000	After two mishaps in a 12-month period, the Marine fleet of eight MV-22 aircraft was grounded and the program was directed to continue EMD and LRIP, delaying Full Rate Production until issues were resolved. A Blue Ribbon Panel was established to review the mishaps and the feasibility of continuing the program.
May 2001	Based on recommendations from the Blue Ribbon Panel, the program was re-designated as an ACAT

	ID program, returning to USD(AT&L) oversight and was directed to pursue a program rebaseline.
May 2002	An ADM was issued by USD(AT&L) approving a revised APB and Acquisition Strategy for the rebaseline of the program.
January 2004	A program deviation was reported for a schedule breach because of changes to the definitions of the MV-22 IOC and Government Support Dates, resulting in an APB Revision.
June 2004	A program deviation was reported for a schedule breach because of delays in the CV-22 Developmental Test (DT) and Initial Operational Test and Evaluation (IOT&E) dates resulting in an APB Revision.
June 2005	MV-22 OPEVAL Phase II was completed.
October 2005	MV-22 Milestone III was completed and the program was approved to proceed with FRP.
April 2007	The first V-22 MYP Contract was awarded with Bell-Boeing to procure a total of 176 V-22 aircraft from FY 2007 - FY 2011.
June 2007	IOC was declared for the MV-22.
June 2008	CV-22 OPEVAL was completed.
March 2009	CV-22 IOC was declared.
June 2010	A program deviation was reported for an O&S cost threshold breach due to increases to Aviation Depot Level Repairable (AVDLR) and Consumable costs, resulting in an APB Revision.
December 2011	The second V-22 MYP Contract was awarded with Bell-Boeing to procure a total of 115 V-22 aircraft from FY 2012 - FY 2016.
July 2012	V-22 Program was re-designated from an ACAT 1D to ACAT 1C Program.
February 2015	An ADM was issued by ASN(RDA) approving the Navy recommendation for the V-22 to fulfill the Carrier On-Board Delivery mission and replace the C-2A aircraft.
May 2015	An ADM was approved by USD(AT&L) for the V-22 Osprey program to proceed with a Navy variant to meet the Carrier On-Board Delivery requirements of the Navy to replace the C-2A aircraft, and continue as an ACAT 1C program.
June 2015	The Government of Japan issued their first FMS Case for procurement of five MV-22 aircraft including Japan-specific modifications to the communications suite (with a plan to procure a total of 17 aircraft).
July 2016	Navy CMV-22B Airborne Resupply/Logistics for Seabasing (AR/LSB) CPD was approved.
April 2017	Capabilities Requirements Change (CRC) memorandum was approved to increase the CV-22 aircraft Program of Record (POR) quantities to support their revised FOC requirements.
August 2017	Based upon recommendations from the Osprey Independent Readiness Review, the Common Configuration-Readiness and Modernization (CC-RAM) effort began, which will upgrade 129 MV-22 Block B aircraft to a Block C configuration over a ten-year period. The Non-Recurring Engineering (NRE) and first three aircraft modifications were awarded to Bell-Boeing.
November 2017	A program deviation was reported for an RDT&E cost threshold breach due to increases in RDT&E funding to support technology insertion development efforts for enhancing survivability, software and hardware modularity and maturation of aircraft interfaces to support interoperability, resulting in an APB Revision.
June 2018	The Nacelle Improvement NRE contract was awarded to Bell-Boeing to develop, install, and test readiness improvements, including a new nacelle structure and improved wiring design.
June 2018	The third V-22 MYP Contract was awarded with Bell-Boeing to procure a total of 59 V-22 aircraft from FY 2017 - FY 2022.
August 2018	A program deviation was reported for a cost breach to the MILCON Cost threshold due to funding increases to cover CMV-22 requirements, resulting in an APB Revision.
December 2018	A revision to the V-22 APB was approved to incorporate POR quantity changes for CV-22, add new

KPPs and Program Milestones for the CMV-22, and address RDT&E and MILCON cost breaches from previous years.

## Threshold Breaches

### APB Breaches

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

### Nunn-McCurdy Breaches

#### Current UCR Baseline

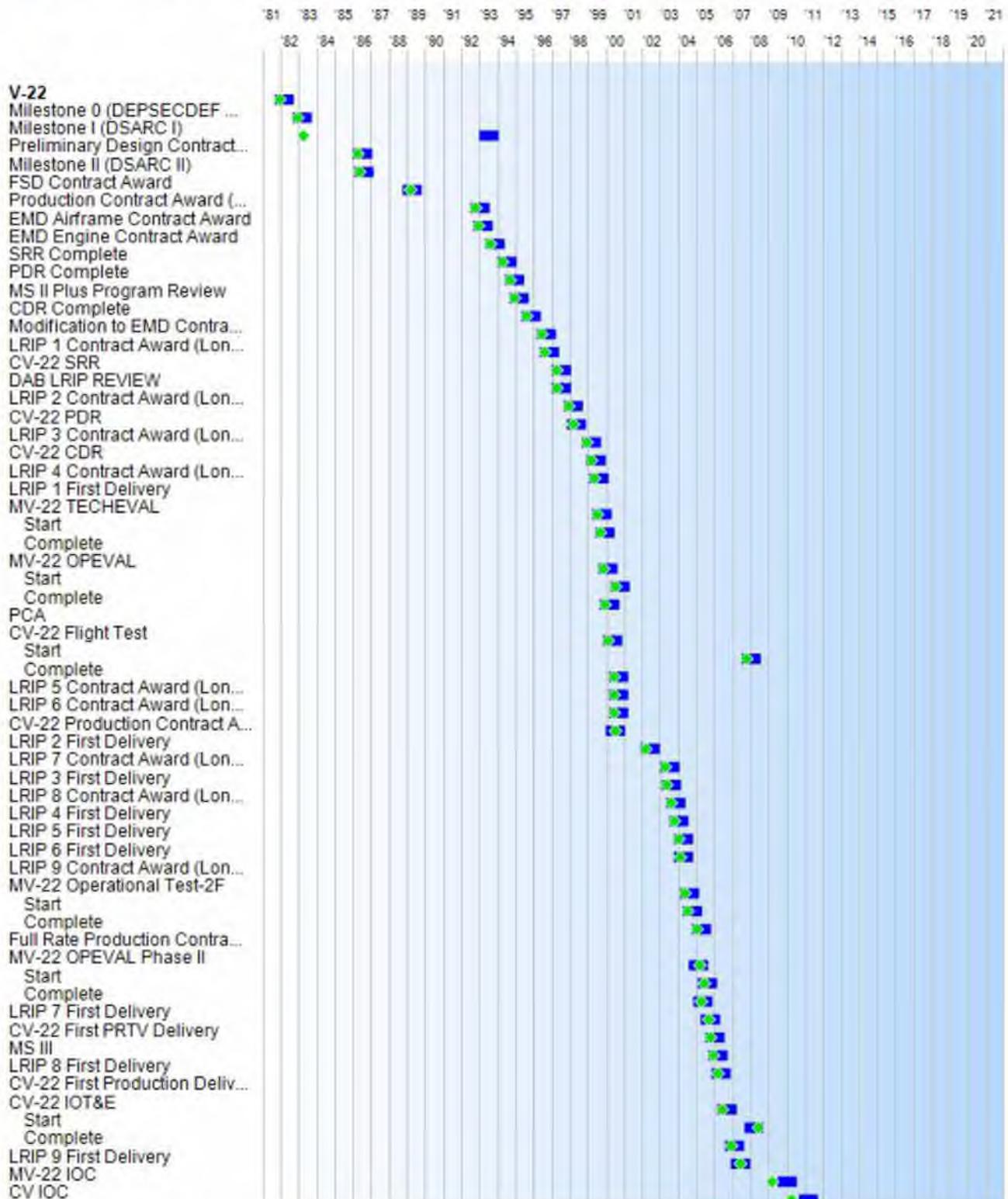
PAUC	None
APUC	None

#### Original UCR Baseline

PAUC	None
APUC	None

# Schedule

● SAR Baseline Current Objective   
 ■ APB Objective and Threshold   
 ● Current Estimate   
 ● Current Estimate (Breach)



GSD  
CMV-22B IOC

Schedule Events				
Events	SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Current Estimate
Milestone 0 (DEPSECDEF MEMO)	Dec 1981	Dec 1981	Jun 1982	Dec 1981
Milestone I (DSARC I)	Dec 1982	Dec 1982	Jun 1983	Dec 1982
Preliminary Design Contract Award	Apr 1993	Apr 1993	Oct 1993	Apr 1983
Milestone II (DSARC II)	Apr 1986	Apr 1986	Oct 1986	Apr 1986
FSD Contract Award	May 1986	May 1986	Nov 1986	May 1986
Production Contract Award (Long Lead AAC)	Jan 1989	Jan 1989	Jul 1989	Mar 1989
EMD Airframe Contract Award	Oct 1992	Oct 1992	Apr 1993	Oct 1992
EMD Engine Contract Award	Dec 1992	Dec 1992	Jun 1993	Dec 1992
SRR Complete	Aug 1993	Aug 1993	Feb 1994	Aug 1993
PDR Complete	Apr 1994	Apr 1994	Oct 1994	Apr 1994
MS II Plus Program Review	Sep 1994	Sep 1994	Mar 1995	Sep 1994
CDR Complete	Dec 1994	Dec 1994	Jun 1995	Dec 1994
Modification to EMD Contract to Include CV-22 Efforts	Aug 1995	Aug 1995	Feb 1996	Aug 1995
LRIP 1 Contract Award (Long lead \$)	Jun 1996	Jun 1996	Dec 1996	Jun 1996
CV-22 SRR	Aug 1996	Aug 1996	Feb 1997	Aug 1996
DAB LRIP REVIEW	Apr 1997	Apr 1997	Oct 1997	Apr 1997
LRIP 2 Contract Award (Long lead \$)	Apr 1997	Apr 1997	Oct 1997	Apr 1997
CV-22 PDR	Dec 1997	Dec 1997	Jun 1998	Dec 1997
LRIP 3 Contract Award (Long Lead \$)	Feb 1998	Feb 1998	Aug 1998	Mar 1998
CV-22 CDR	Dec 1998	Dec 1998	Jun 1999	Dec 1998
LRIP 4 Contract Award (Long Lead \$)	Mar 1999	Mar 1999	Sep 1999	Mar 1999
LRIP 1 First Delivery	May 1999	May 1999	Nov 1999	May 1999
<b>MV-22 TECHEVAL</b>				
Start	Jul 1999	Jul 1999	Jan 2000	Jul 1999
Complete	Sep 1999	Sep 1999	Mar 2000	Sep 1999
<b>MV-22 OPEVAL</b>				
Start	Nov 1999	Nov 1999	May 2000	Nov 1999
Complete	Jul 2000	Jul 2000	Jan 2001	Jul 2000
PCA	Dec 1999	Dec 1999	Jun 2000	Dec 1999
<b>CV-22 Flight Test</b>				
Start	Feb 2000	Feb 2000	Aug 2000	Feb 2000
Complete	Oct 2007	Oct 2007	Apr 2008	Oct 2007

LRIP 5 Contract Award (Long Lead \$)	Jun 2000	Jun 2000	Dec 2000	Jun 2000
LRIP 6 Contract Award (Long Lead \$)	Jun 2000	Jun 2000	Dec 2000	Jun 2000
CV-22 Production Contract Award (Long lead \$)	Jun 2000	Jun 2000	Dec 2000	Jun 2000
LRIP 2 First Delivery	Apr 2000	Apr 2000	Oct 2000	Jul 2000
LRIP 7 Contract Award (Long Lead \$)	Mar 2002	Mar 2002	Sep 2002	Mar 2002
LRIP 3 First Delivery	Apr 2003	Apr 2003	Oct 2003	Apr 2003
LRIP 8 Contract Award (Long Lead \$)	May 2003	May 2003	Nov 2003	May 2003
LRIP 4 First Delivery	Aug 2003	Aug 2003	Feb 2004	Aug 2003
LRIP 5 First Delivery	Oct 2003	Oct 2003	Apr 2004	Oct 2003
LRIP 6 First Delivery	Jan 2004	Jan 2004	Jul 2004	Jan 2004
LRIP 9 Contract Award (Long Lead \$)	Jan 2004	Jan 2004	Jul 2004	Feb 2004
<b>MV-22 Operational Test-2F</b>				
Start	May 2004	May 2004	Nov 2004	May 2004
Complete	Jul 2004	Jul 2004	Jan 2005	Jul 2004
Full Rate Production Contract Award (Long lead \$)	Jan 2005	Jan 2005	Jul 2005	Jan 2005
<b>MV-22 OPEVAL Phase II</b>				
Start	Nov 2004	Nov 2004	May 2005	Mar 2005
Complete	May 2005	May 2005	Nov 2005	Jun 2005
LRIP 7 First Delivery	Feb 2005	Feb 2005	Aug 2005	Apr 2005
CV-22 First PRTV Delivery	Jul 2005	Jul 2005	Jan 2006	Sep 2005
MS III	Oct 2005	Oct 2005	Apr 2006	Oct 2005
LRIP 8 First Delivery	Dec 2005	Dec 2005	Jun 2006	Dec 2005
CV-22 First Production Delivery	Feb 2006	Feb 2006	Aug 2006	Mar 2006
<b>CV-22 IOT&amp;E</b>				
Start	Jun 2006	Jun 2006	Dec 2006	Jun 2006
Complete	Dec 2007	Dec 2007	Jun 2008	Jun 2008
LRIP 9 First Delivery	Nov 2006	Nov 2006	May 2007	Dec 2006
MV-22 IOC	Mar 2007	Mar 2007	Sep 2007	Jun 2007
CV IOC	Oct 2009	Oct 2009	Apr 2010	Mar 2009
GSD	Dec 2010	Dec 2010	Jun 2011	Apr 2010
CMV-22B IOC	N/A	Jun 2021	Dec 2021	Jun 2021

(Ch-1)

### Change Explanations

(Ch-1) CMV-22B IOC is a new Schedule Milestone added with APB Revision Change 4 approved on December 17, 2018.

**Acronyms and Abbreviations**

AAC - Advanced Acquisition Contract  
CDR - Critical Design Review  
DEPSECDEF - Deputy Secretary of Defense  
DSARC - Defense Systems Acquisition Review Council  
FSD - Full Scale Development  
GSD - Government Support Date  
IOT&E - Initial Operational Test and Evaluation  
MS - Milestone  
OPEVAL - Operational Evaluation  
PCA - Physical Configuration Audit  
PDR - Preliminary Design Review  
PRTV - Production Representative Test Vehicle  
SRR - System Requirements Review  
TECHEVAL - Technical Evaluation

## Performance

Performance Characteristics				
SAR Baseline Production Estimate	Current APB Production Objective/Threshold	Demonstrated Performance	Current Estimate	
<b>MV-22</b>				
<b>Interoperability</b>				
Satisfy all top level IERs	Satisfy all top level IERs	Satisfy all top level IERs designated as critical	Satisfy all top level IERs designated as critical	Satisfy all top level IERs designated as critical
<b>Cruise Speed (kts)</b>				
270	270	240	255	285
<b>Mission Radius (nm)</b>				
<b>Land Trooplift</b>				
200X1	200X1	200X1	210x1	215X1 (Ch-1)
<b>Land External</b>				
110X1	110X1	50X1	69x1	50x1 (Ch-1)
<b>Sea Trooplift</b>				
110X2	110X2	50X2	53x2	89X2 (Ch-1)
<b>Sea External</b>				
110X1	110X1	50X1	89x1	81X1 (Ch-1)
<b>Amphibious Pre-Assault/Raid Ops (nm)</b>				
200X1	200X1	200X1	230x1	318x1 (Ch-1)
<b>Payload</b>				
<b>Troops</b>				
24	24	24	24	24
<b>External Lift (lbs)</b>				
15,000	15,000	10,000	10,000	12,500
<b>Aerial Refuel Capable</b>				
yes	yes	yes	yes	yes
<b>Self-Deployment (nm)</b>				
2100 w/no refuel	2100 w/no refuel	2100 w/1 refuel	2660 w/1 aerial refuel	2287 w/1 aerial refuel (Ch-2)
<b>Shipboard Compatible</b>				
yes	yes	yes	yes	yes
<b>V/STOL Capable</b>				
yes	yes	yes	yes	yes

<b>Reliability</b>					
<b>MFHBF (log)</b>					
>=1.2	>=1.2	>=0.9	1.3	1.19	(Ch-3)
<b>MFHBA</b>					
17 Hrs	17 Hrs	17 Hrs	31.2	36.1	(Ch-3)
<b>CV-22</b>					
<b>Interoperability</b>					
Satisfy all top level IERs	Satisfy all top level IERs	Satisfy all top level IERs designated as critical	Satisfy all top level IERs designated as critical	Satisfy all top level IERs designated as critical	
<b>Cruise Speed (kts)</b>					
270	270	230	264	261	
<b>Mission Radius (nm)</b>					
750	750	500	538	550	(Ch-2)
<b>Payload - Troops</b>					
24	24	18	18	18	
<b>Aerial Refuel Capable</b>					
yes	yes	yes	yes	yes	
<b>Self-Deployment (nm)</b>					
2100 w/0 aerial refuel	2100 w/0 aerial refuel	2100 w/1 aerial refuel	2144 w/1 aerial refuel	2174 w/1 aerial refuel	(Ch-2)
<b>Shipboard Compatible</b>					
yes	yes	yes	yes	yes	
<b>Operational Environment</b>					
100' TF/TA, Day/Night, VMC/IMC	100' TF/TA, Day/Night, VMC/IMC	300' TF/TA, Day/Night, VMC/IMC	100' TF/TA, Day/Night, VMC/IMC	100' TF/TA, Day/Night, VMC/IMC	
<b>Precision Navigation (diameter @ MAX Combat Radius)</b>					
Locate LZ W/IN 1 Rotor	Locate LZ W/IN 1 Rotor	Locate LZ W/IN 2X Rotor	Locate LZ W/IN 2X Rotor	Locate LZ W/IN 2X Rotor	
<b>Operational Environment</b>					
<b>DECM</b>					
SIRFC w/RF Jamming DIRCM	SIRFC w/RF Jamming DIRCM	SIRFC w/RWR, MW, CMDS	SIRFC w/RF, Jamming DIRCM	SIRFC w/RF, Jamming DIRCM	
<b>MMR (TF/TA)</b>					
100 FT	100 FT	300 FT	100FT	100 FT	
<b>Reliability</b>					
<b>MFHBF (LOG)</b>					
>=1.2	>=1.2	>=0.9	1.6	1.4	(Ch-4)

<b>MFHBA</b>					
15 Hrs	15 Hrs	15 Hrs	29.2	28.9	(Ch-4)
<b>CMV-22</b>					
<b>Range (Operational) (nm)</b>					
N/A	1150 with no refuel	(T=O) 1150 with no refuel	TBD	1150 with no refuel	(Ch-5)
<b>Carrier Suitability</b>					
N/A	Instrument conditions with ceiling/visibility down to 200 feet and 1/2 nm respectively	(T=O) Instrument conditions with ceiling/visibility down to 200 feet and 1/2 nm respectively	TBD	Instrument conditions with ceiling/visibility down to 200 feet and 1/2 nm respectively	(Ch-5)

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

### Requirements Reference

V-22 Block C/20 CPD dated September 1, 2010

CMV-22B Airborne Resupply/Logistics for Seabasing (AR/LSB) CPD dated July 25, 2016

### Change Explanations

(Ch-1) Performance Estimates for MV-22 are updated to reflect current Lot 21 (production lot) aircraft configuration. All mission radius values are reduced from previous estimates as a result of reliability and safety enhancements introduced for Lot 21 that have increased basic aircraft weight. Changes as follows: Land Troop Lift reduced from 216 to 215, Land External reduced from 51 to 50, Sea Troop Lift reduced from 90 to 89, Sea Extremal reduced from 84 to 81, and Amphibious Pre-Assault/Raid Ops reduced from 319 to 318.

(Ch-2) Corrected drag assessment for both MV-22 and CV-22 resulted in minor increases in range capabilities: from 2280 to 2287 for MV-22 Self-Deployment, from 549 to 550 for CV-22 Mission Radius, and from 2165 to 2174 for CV-22 Self-Deployment.

(Ch-3) MV-22 MFHBF and MFHBA have changed slightly reflecting the updated calculations from the V-22 Failure Reporting, Analysis and Corrective Action System database, from 1.23 to 1.19 for MFHBF and from 36.1 to 34.7 for MFHBA. This data is based on the Block B and C Aircraft operating in the Operational Vertical Marine Medium Tilt-Rotor Squadrons through December 2018 with 287,847 flight hours.

(Ch-4) CV-22 MFHBF and MFHBA have changed slightly reflecting updated calculations from the V-22 Failure Reporting, Analysis and Corrective Action System database, from 1.5 to 1.4 for MFHBF and from 28.8 to 28.9 for MFHBA. This data is based on the Block 10 and Block 20 Aircraft operating in Air Force Special Operations Command Squadrons through December 2018 with 63,464 flight hours.

(Ch-5) CMV-22 Range and Carrier Suitability are new Performance Characteristics added with APB Revision Change 4 approved on December 17, 2018. Demonstrated Performance data will not be available until the CMV-22 completes Operational Testing in fourth quarter FY2021.

**Acronyms and Abbreviations**

CMDS - Counter-Measures Dispenser System  
DECM - Defensive Electronic Countermeasure  
DIRCM - Directed Infrared Countermeasures  
Ft - Feet  
Hrs - Hours  
IERs - Information Exchange Requirements  
kts - knots  
lbs - Pounds  
LOG - Logistics  
LZ w/IN - Landing Zone Within  
MAX - Maximum  
MFHBA - Mean Flight Hours Between Aborts  
MFHBF - Mean Flight Hours Between Failures  
MW - Missile Warning  
nm - nautical miles  
SIRFC - Suite of Integrated Radio Frequency Countermeasures  
TF/TA - Terrain Following/Terrain Avoidance  
V/STOL - Vertical/Short Takeoff and Landing  
VMC/IMC - Visual Meteorological Conditions/Instrument Meteorological Conditions  
w/RF - with Radio Frequency  
w/RWR - with Radar Warning Receiver

## Track to Budget

### RDT&E

Appn	BA	PE	
Navy	1319	05	0604262N
	<b>Project</b>		<b>Name</b>
	1425		V-22
	<b>Notes:</b>	USMC MV-22 and USN CMV-22 Development and Test activities	
Air Force	3600	05	0401318F
	<b>Project</b>		<b>Name</b>
	654103		CV-22 (Sunk)
	<b>Notes:</b>	USAF CV-22 Development and Test activities	
Air Force	3600	07	0401318F
	<b>Project</b>		<b>Name</b>
	676033		CV-22 Post Production Support
Defense-Wide	0400	07	1160403BB
	<b>Project</b>		<b>Name</b>
	SF200		CV-22 Development (Shared)
	<b>Notes:</b>	Special Operations Command Development and Test activities	
Defense-Wide	0400	07	1160404BB
	<b>Project</b>		<b>Name</b>
	SF200		SO Tactical Systems (Automation) (Sunk)
Defense-Wide	0400	07	1160421BB
	<b>Project</b>		<b>Name</b>
	SF200		CV-22 (Sunk)

### Procurement

Appn	BA	PE	
Navy	1506	01	0206121M
	<b>Line Item</b>		<b>Name</b>
	0164		MV-22
Navy	1506	01	0204151N
	<b>Line Item</b>		<b>Name</b>
	0164		CMV-22
Navy	1506	06	0206121M
	<b>Line Item</b>		<b>Name</b>
	0605		Spares and Repair Parts (Shared)
Navy	1506	06	0204151N

		Line Item	Name		
		0605	Spares and Repair Parts		(Shared)
Air Force	3010 06	0401318F			
		Line Item	Name		
		000999	Initial Spares/Repair Parts		(Shared)
Air Force	3010 04	0401318F			
		Line Item	Name		
		V022A0	CV-22 (MYP)		
Defense-Wide	0300 02	1160421BB			
		Line Item	Name		
		1000CV22	CV-22 Modification		(Shared)
<b>Notes:</b> Does not include retrofit funding.					

**MILCON**

Appn	BA	PE			
Navy	1205 01	0203176N			
		Project	Name		
		02461018	CMV-22B Airfield Improvements		
		62688102	Hangar and Airfield Improvements for CMV-22B		
Navy	1205 01	0216496M			
		Project	Name		
		00318887	LHD Pad Conversion and MV-22 LZ Improvements		(Sunk)
Navy	1205 01	0712876N			
		Project	Name		
		02461024	CMV-22B Maintenance Hangar		
Navy	1205 01	0901211N			
		Project	Name		
		64482044	Design Funds for CMV-22B MILCON Funding for Naval Base Coronado		(Shared) (Sunk)
Defense-Wide	0500 01	1140494BB			
		Project	Name		
		AFSOC103	Special Operations Command Simulator Facility		(Sunk)

## Cost and Funding

### Cost Summary

Total Acquisition Cost							
Appropriation	BY 2005 \$M			BY 2005 \$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	11446.5	12759.7	14035.7	12850.0	9891.7	11552.1	11679.5
Procurement	38562.8	38853.9	42739.3	38226.8	43099.3	44495.7	43637.7
Flyaway	--	--	--	31191.5	--	--	35846.5
Recurring	--	--	--	29643.6	--	--	34156.0
Non Recurring	--	--	--	1547.9	--	--	1690.5
Support	--	--	--	7035.3	--	--	7791.2
Other Support	--	--	--	5387.3	--	--	6033.0
Initial Spares	--	--	--	1648.0	--	--	1758.2
MILCON	241.1	407.8	448.6	295.6	262.4	539.1	383.0
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	50250.4	52021.4	N/A	51372.4	53253.4	56586.9	55700.2

#### Current APB Cost Estimate Reference

Based on PB FY 2019 and POE for additional required CV-22 aircraft dated February 13, 2018

#### Cost Notes

A Program Office Estimate (POE) was completed for the program in the previous year, no risks identified.

For Procurement, Navy 1506, the correct 'To Complete' amount and quantity are provided below the description section of the APN-1 P-40 budget exhibit. This SAR reflects correct amounts/quantities.

Total Quantity			
Quantity	SAR Baseline Production Estimate	Current APB Production	Current Estimate
RDT&E		2	2
Procurement		456	462
Total		458	464

## Cost and Funding

### Funding Summary

Appropriation Summary									
FY 2020 President's Budget / December 2018 SAR (TY\$ M)									
Appropriation	Prior	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
RDT&E	10603.3	174.3	231.1	161.7	137.5	160.7	146.9	64.0	11679.5
Procurement	37482.7	1166.8	996.3	981.6	1118.7	913.4	341.3	636.9	43637.7
MILCON	158.4	77.8	86.8	0.0	60.0	0.0	0.0	0.0	383.0
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB 2020 Total	48244.4	1418.9	1314.2	1143.3	1316.2	1074.1	488.2	700.9	55700.2
PB 2019 Total	47647.3	1108.7	1416.4	1203.6	1456.1	1829.3	1362.8	215.2	56239.4
Delta	597.1	310.2	-102.2	-60.3	-139.9	-755.2	-874.6	485.7	-539.2

Quantity Summary										
FY 2020 President's Budget / December 2018 SAR (TY\$ M)										
Quantity	Undistributed	Prior	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023	FY 2024	To Complete	Total
Development	2	0	0	0	0	0	0	0	0	2
Production	0	405	13	10	9	11	8	2	4	462
PB 2020 Total	2	405	13	10	9	11	8	2	4	464
PB 2019 Total	2	397	7	10	9	11	15	11	0	462
Delta	0	8	6	0	0	0	-7	-9	4	2

## Cost and Funding

### Annual Funding By Appropriation

Annual Funding							
1319   RDT&E   Research, Development, Test, and Evaluation, Navy							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1982	--	--	--	--	--	--	0.7
1983	--	--	--	--	--	--	34.4
1984	--	--	--	--	--	--	83.1
1985	--	--	--	--	--	--	169.5
1986	--	--	--	--	--	--	525.1
1987	--	--	--	--	--	--	421.7
1988	--	--	--	--	--	--	404.8
1989	--	--	--	--	--	--	269.9
1990	--	--	--	--	--	--	204.2
1991	--	--	--	--	--	--	212.2
1992	--	--	--	--	--	--	758.0
1993	--	--	--	--	--	--	713.3
1994	--	--	--	--	--	--	8.7
1995	--	--	--	--	--	--	451.8
1996	--	--	--	--	--	--	716.4
1997	--	--	--	--	--	--	605.5
1998	--	--	--	--	--	--	487.5
1999	--	--	--	--	--	--	335.8
2000	--	--	--	--	--	--	175.9
2001	--	--	--	--	--	--	217.9
2002	--	--	--	--	--	--	391.6
2003	--	--	--	--	--	--	387.4
2004	--	--	--	--	--	--	357.3
2005	--	--	--	--	--	--	246.9
2006	--	--	--	--	--	--	192.2
2007	--	--	--	--	--	--	251.6
2008	--	--	--	--	--	--	118.0
2009	--	--	--	--	--	--	65.7
2010	--	--	--	--	--	--	76.9
2011	--	--	--	--	--	--	40.3
2012	--	--	--	--	--	--	69.1
2013	--	--	--	--	--	--	44.0
2014	--	--	--	--	--	--	40.6
2015	--	--	--	--	--	--	49.7
2016	--	--	--	--	--	--	74.4

2017	--	--	--	--	--	--	149.1
2018	--	--	--	--	--	--	176.8
2019	--	--	--	--	--	--	135.5
2020	--	--	--	--	--	--	185.1
2021	--	--	--	--	--	--	133.1
2022	--	--	--	--	--	--	110.4
2023	--	--	--	--	--	--	125.3
2024	--	--	--	--	--	--	110.8
2025	--	--	--	--	--	--	27.1
2026	--	--	--	--	--	--	25.9
2027	--	--	--	--	--	--	11.0
Subtotal	--	--	--	--	--	--	10392.2

Annual Funding							
1319   RDT&E   Research, Development, Test, and Evaluation, Navy							
Fiscal Year	Quantity	BY 2005 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1982	--	--	--	--	--	--	1.2
1983	--	--	--	--	--	--	56.7
1984	--	--	--	--	--	--	132.1
1985	--	--	--	--	--	--	261.3
1986	--	--	--	--	--	--	786.9
1987	--	--	--	--	--	--	613.8
1988	--	--	--	--	--	--	570.1
1989	--	--	--	--	--	--	364.7
1990	--	--	--	--	--	--	265.1
1991	--	--	--	--	--	--	266.0
1992	--	--	--	--	--	--	923.2
1993	--	--	--	--	--	--	849.1
1994	--	--	--	--	--	--	10.2
1995	--	--	--	--	--	--	517.9
1996	--	--	--	--	--	--	807.6
1997	--	--	--	--	--	--	674.3
1998	--	--	--	--	--	--	538.5
1999	--	--	--	--	--	--	366.6
2000	--	--	--	--	--	--	189.3
2001	--	--	--	--	--	--	231.3
2002	--	--	--	--	--	--	411.5
2003	--	--	--	--	--	--	401.2
2004	--	--	--	--	--	--	360.0
2005	--	--	--	--	--	--	242.4
2006	--	--	--	--	--	--	183.0
2007	--	--	--	--	--	--	233.8
2008	--	--	--	--	--	--	107.7
2009	--	--	--	--	--	--	59.2
2010	--	--	--	--	--	--	68.3
2011	--	--	--	--	--	--	34.9
2012	--	--	--	--	--	--	58.9
2013	--	--	--	--	--	--	37.1
2014	--	--	--	--	--	--	33.8
2015	--	--	--	--	--	--	40.8
2016	--	--	--	--	--	--	60.1
2017	--	--	--	--	--	--	118.2
2018	--	--	--	--	--	--	137.4
2019	--	--	--	--	--	--	103.2
2020	--	--	--	--	--	--	138.2
2021	--	--	--	--	--	--	97.4

2022	--	--	--	--	--	--	79.2
2023	--	--	--	--	--	--	88.2
2024	--	--	--	--	--	--	76.4
2025	--	--	--	--	--	--	18.3
2026	--	--	--	--	--	--	17.2
2027	--	--	--	--	--	--	7.2
Subtotal	--	--	--	--	--	--	11639.5

Annual Funding							
3600   RDT&E   Research, Development, Test, and Evaluation, Air Force							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1985	--	--	--	--	--	--	0.8
1986	--	--	--	--	--	--	2.3
1987	--	--	--	--	--	--	3.0
1988	--	--	--	--	--	--	--
1989	--	--	--	--	--	--	--
1990	--	--	--	--	--	--	--
1991	--	--	--	--	--	--	--
1992	--	--	--	--	--	--	--
1993	--	--	--	--	--	--	--
1994	--	--	--	--	--	--	--
1995	--	--	--	--	--	--	--
1996	--	--	--	--	--	--	--
1997	--	--	--	--	--	--	--
1998	--	--	--	--	--	--	--
1999	--	--	--	--	--	--	--
2000	--	--	--	--	--	--	--
2001	--	--	--	--	--	--	--
2002	--	--	--	--	--	--	145.5
2003	--	--	--	--	--	--	5.9
2004	--	--	--	--	--	--	52.7
2005	--	--	--	--	--	--	14.2
2006	--	--	--	--	--	--	30.5
2007	--	--	--	--	--	--	12.8
2008	--	--	--	--	--	--	22.0
2009	--	--	--	--	--	--	16.1
2010	--	--	--	--	--	--	15.5
2011	--	--	--	--	--	--	17.6
2012	--	--	--	--	--	--	9.6
2013	--	--	--	--	--	--	19.7
2014	--	--	--	--	--	--	44.9
2015	--	--	--	--	--	--	37.7
2016	--	--	--	--	--	--	26.8
2017	--	--	--	--	--	--	28.7
2018	--	--	--	--	--	--	17.7
2019	--	--	--	--	--	--	16.5
2020	--	--	--	--	--	--	17.9
2021	--	--	--	--	--	--	18.5
2022	--	--	--	--	--	--	17.5
2023	--	--	--	--	--	--	17.5
2024	--	--	--	--	--	--	17.7

Subtotal	2	--	--	--	--	--	629.6
----------	---	----	----	----	----	----	-------

Annual Funding							
3600   RDT&E   Research, Development, Test, and Evaluation, Air Force							
Fiscal Year	Quantity	BY 2005 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1985	--	--	--	--	--	--	1.2
1986	--	--	--	--	--	--	3.5
1987	--	--	--	--	--	--	4.3
1988	--	--	--	--	--	--	--
1989	--	--	--	--	--	--	--
1990	--	--	--	--	--	--	--
1991	--	--	--	--	--	--	--
1992	--	--	--	--	--	--	--
1993	--	--	--	--	--	--	--
1994	--	--	--	--	--	--	--
1995	--	--	--	--	--	--	--
1996	--	--	--	--	--	--	--
1997	--	--	--	--	--	--	--
1998	--	--	--	--	--	--	--
1999	--	--	--	--	--	--	--
2000	--	--	--	--	--	--	--
2001	--	--	--	--	--	--	--
2002	--	--	--	--	--	--	153.0
2003	--	--	--	--	--	--	6.1
2004	--	--	--	--	--	--	53.3
2005	--	--	--	--	--	--	14.0
2006	--	--	--	--	--	--	29.2
2007	--	--	--	--	--	--	11.9
2008	--	--	--	--	--	--	20.1
2009	--	--	--	--	--	--	14.5
2010	--	--	--	--	--	--	13.8
2011	--	--	--	--	--	--	15.4
2012	--	--	--	--	--	--	8.3
2013	--	--	--	--	--	--	16.7
2014	--	--	--	--	--	--	37.4
2015	--	--	--	--	--	--	31.1
2016	--	--	--	--	--	--	21.8
2017	--	--	--	--	--	--	22.9
2018	--	--	--	--	--	--	13.8
2019	--	--	--	--	--	--	12.6
2020	--	--	--	--	--	--	13.4
2021	--	--	--	--	--	--	13.6
2022	--	--	--	--	--	--	12.6
2023	--	--	--	--	--	--	12.4
2024	--	--	--	--	--	--	12.3

Subtotal	2	--	--	--	--	--	569.2
----------	---	----	----	----	----	----	-------

The FY 2002 Appropriation Act provided funding for two CV-22 Production Representative Test Vehicles.

Annual Funding							
0400   RDT&E   Research, Development, Test, and Evaluation, Defense-Wide							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1990	--	--	--	--	--	--	36.1
1991	--	--	--	--	--	--	8.0
1992	--	--	--	--	--	--	15.0
1993	--	--	--	--	--	--	--
1994	--	--	--	--	--	--	14.7
1995	--	--	--	--	--	--	--
1996	--	--	--	--	--	--	--
1997	--	--	--	--	--	--	--
1998	--	--	--	--	--	--	--
1999	--	--	--	--	--	--	--
2000	--	--	--	--	--	--	33.5
2001	--	--	--	--	--	--	40.1
2002	--	--	--	--	--	--	104.1
2003	--	--	--	--	--	--	32.2
2004	--	--	--	--	--	--	68.4
2005	--	--	--	--	--	--	53.1
2006	--	--	--	--	--	--	23.7
2007	--	--	--	--	--	--	--
2008	--	--	--	--	--	--	21.9
2009	--	--	--	--	--	--	30.5
2010	--	--	--	--	--	--	12.2
2011	--	--	--	--	--	--	14.0
2012	--	--	--	--	--	--	10.8
2013	--	--	--	--	--	--	2.1
2014	--	--	--	--	--	--	2.8
2015	--	--	--	--	--	--	0.2
2016	--	--	--	--	--	--	--
2017	--	--	--	--	--	--	15.6
2018	--	--	--	--	--	--	12.3
2019	--	--	--	--	--	--	22.3
2020	--	--	--	--	--	--	28.1
2021	--	--	--	--	--	--	10.1
2022	--	--	--	--	--	--	9.6
2023	--	--	--	--	--	--	17.9
2024	--	--	--	--	--	--	18.4
Subtotal	--	--	--	--	--	--	657.7

Annual Funding							
0400   RDT&E   Research, Development, Test, and Evaluation, Defense-Wide							
Fiscal Year	Quantity	BY 2005 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1990	--	--	--	--	--	--	46.9
1991	--	--	--	--	--	--	10.0
1992	--	--	--	--	--	--	18.2
1993	--	--	--	--	--	--	--
1994	--	--	--	--	--	--	17.2
1995	--	--	--	--	--	--	--
1996	--	--	--	--	--	--	--
1997	--	--	--	--	--	--	--
1998	--	--	--	--	--	--	--
1999	--	--	--	--	--	--	--
2000	--	--	--	--	--	--	36.0
2001	--	--	--	--	--	--	42.5
2002	--	--	--	--	--	--	109.3
2003	--	--	--	--	--	--	33.3
2004	--	--	--	--	--	--	69.1
2005	--	--	--	--	--	--	52.1
2006	--	--	--	--	--	--	22.6
2007	--	--	--	--	--	--	--
2008	--	--	--	--	--	--	20.0
2009	--	--	--	--	--	--	27.5
2010	--	--	--	--	--	--	10.8
2011	--	--	--	--	--	--	12.2
2012	--	--	--	--	--	--	9.3
2013	--	--	--	--	--	--	1.8
2014	--	--	--	--	--	--	2.3
2015	--	--	--	--	--	--	0.2
2016	--	--	--	--	--	--	--
2017	--	--	--	--	--	--	12.4
2018	--	--	--	--	--	--	9.6
2019	--	--	--	--	--	--	17.1
2020	--	--	--	--	--	--	21.1
2021	--	--	--	--	--	--	7.4
2022	--	--	--	--	--	--	6.9
2023	--	--	--	--	--	--	12.7
2024	--	--	--	--	--	--	12.8
Subtotal	--	--	--	--	--	--	641.3

Annual Funding 1506   Procurement   Aircraft Procurement, Navy							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1989	--	--	--	--	--	231.4	231.4
1990	--	--	--	--	--	--	--
1991	--	--	--	--	--	--	--
1992	--	--	--	--	--	--	--
1993	--	--	--	--	--	--	--
1994	--	--	--	--	--	--	--
1995	--	--	--	--	--	--	--
1996	--	41.1	--	--	41.1	--	41.1
1997	5	552.1	--	25.0	577.1	132.2	709.3
1998	7	622.1	--	20.4	642.5	66.2	708.7
1999	7	561.4	--	18.0	579.4	104.1	683.5
2000	11	768.4	--	31.0	799.4	187.8	987.2
2001	9	753.1	--	99.2	852.3	157.9	1010.2
2002	9	660.6	--	21.6	682.2	204.6	886.8
2003	11	844.2	--	109.4	953.6	129.6	1083.2
2004	9	651.9	--	59.9	711.8	167.5	879.3
2005	8	584.4	--	115.8	700.2	321.8	1022.0
2006	12	868.2	--	146.4	1014.6	367.1	1381.7
2007	14	1129.2	--	222.8	1352.0	244.3	1596.3
2008	23	1651.9	--	153.8	1805.7	308.1	2113.8
2009	30	1855.8	--	70.6	1926.4	307.8	2234.2
2010	30	1847.9	--	81.6	1929.5	317.4	2246.9
2011	30	1855.6	--	30.5	1886.1	264.7	2150.8
2012	30	1921.3	--	25.8	1947.1	264.3	2211.4
2013	18	1289.9	--	27.4	1317.3	165.8	1483.1
2014	19	1219.2	--	35.9	1255.1	157.0	1412.1
2015	19	1332.5	--	19.2	1351.7	196.0	1547.7
2016	19	1342.8	--	0.3	1343.1	97.6	1440.7
2017	19	1374.7	--	--	1374.7	122.5	1497.2
2018	14	1076.3	--	7.6	1083.9	199.8	1283.7
2019	13	1024.6	--	7.7	1032.3	134.5	1166.8
2020	10	793.0	--	8.0	801.0	195.3	996.3
2021	9	774.5	--	7.8	782.3	192.7	975.0
2022	11	928.1	--	7.9	936.0	171.7	1107.7
2023	8	762.8	--	7.0	769.8	140.1	909.9
2024	2	226.1	--	20.8	246.9	94.4	341.3
2025	2	246.4	--	31.7	278.1	--	278.1
2026	--	--	--	67.3	67.3	--	67.3
Subtotal	408	29560.1	--	1480.4	31040.5	5644.2	36684.7

Annual Funding 1506   Procurement   Aircraft Procurement, Navy							
Fiscal Year	Quantity	BY 2005 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1989	--	--	--	--	--	299.8	299.8
1990	--	--	--	--	--	--	--
1991	--	--	--	--	--	--	--
1992	--	--	--	--	--	--	--
1993	--	--	--	--	--	--	--
1994	--	--	--	--	--	--	--
1995	--	--	--	--	--	--	--
1996	--	45.8	--	--	45.8	--	45.8
1997	5	609.6	--	27.6	637.2	146.0	783.2
1998	7	679.0	--	22.3	701.3	72.3	773.6
1999	7	605.0	--	19.4	624.4	112.2	736.6
2000	11	817.2	--	33.0	850.2	199.8	1050.0
2001	9	791.5	--	104.3	895.8	166.0	1061.8
2002	9	685.6	--	22.4	708.0	212.4	920.4
2003	11	859.1	--	111.3	970.4	131.9	1102.3
2004	9	646.3	--	59.4	705.7	166.1	871.8
2005	8	563.5	--	111.7	675.2	310.3	985.5
2006	12	814.6	--	137.4	952.0	344.4	1296.4
2007	14	1035.3	--	204.3	1239.6	224.0	1463.6
2008	23	1492.2	--	138.9	1631.1	278.3	1909.4
2009	30	1653.4	--	62.9	1716.3	274.2	1990.5
2010	30	1612.6	--	71.2	1683.8	277.0	1960.8
2011	30	1587.8	--	26.1	1613.9	226.5	1840.4
2012	30	1620.7	--	21.8	1642.5	222.9	1865.4
2013	18	1076.4	--	22.9	1099.3	138.4	1237.7
2014	19	1004.3	--	29.6	1033.9	129.3	1163.2
2015	19	1081.3	--	15.6	1096.9	159.1	1256.0
2016	19	1067.6	--	0.2	1067.8	77.6	1145.4
2017	19	1071.3	--	--	1071.3	95.5	1166.8
2018	14	822.1	--	5.8	827.9	152.6	980.5
2019	13	767.2	--	5.8	773.0	100.7	873.7
2020	10	582.2	--	5.9	588.1	143.3	731.4
2021	9	557.4	--	5.6	563.0	138.8	701.8
2022	11	654.9	--	5.6	660.5	121.1	781.6
2023	8	527.7	--	4.8	532.5	97.0	629.5
2024	2	153.3	--	14.1	167.4	64.1	231.5
2025	2	163.8	--	21.1	184.9	--	184.9
2026	--	--	--	43.9	43.9	--	43.9
Subtotal	408	25648.7	--	1354.9	27003.6	5081.6	32085.2

The enacted FY 2019 appropriations bill included a Congressional Overseas Contingency Operations (OCO) plus-up for acceleration of two MV-22 aircraft from 2024 to 2019. However the Navy Program Budget Information System (PBIS) P-40 Budget Exhibit still reflects four aircraft in 2024. The USMC Program of Record (POR) for MV-22 aircraft quantities remains at 360 with USN POR of 48 for a total of 408. The FY 2024 SAR quantity has been reduced by two, with corresponding cost adjustments to maintain the approved POR. The program intends to pursue a correction to the Navy PBIS in future budget submissions.

Cost Quantity Information		
1506   Procurement   Aircraft Procurement, Navy		
Fiscal Year	Quantity	End Item Recurring Flyaway (Aligned With Quantity) BY 2005 \$M
1989	--	--
1990	--	--
1991	--	--
1992	--	--
1993	--	--
1994	--	--
1995	--	--
1996	--	--
1997	5	593.7
1998	7	675.2
1999	7	612.8
2000	11	800.2
2001	9	791.6
2002	9	722.8
2003	11	834.8
2004	9	670.4
2005	8	549.7
2006	12	803.9
2007	14	921.0
2008	23	1488.9
2009	30	1757.0
2010	30	1617.7
2011	30	1593.0
2012	30	1634.4
2013	18	1018.6
2014	19	1078.6
2015	19	1075.4
2016	19	1075.9
2017	19	1089.4

2018	14	819.5
2019	13	763.5
2020	10	583.8
2021	9	553.3
2022	11	659.4
2023	8	542.1
2024	2	158.3
2025	2	163.8
2026	--	--
<hr/>		
Subtotal	408	25648.7

Annual Funding								
3010   Procurement   Aircraft Procurement, Air Force								
Fiscal Year	Quantity	TY \$M						
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program	
1999	--	--	--	--	--	21.9	21.9	
2000	--	--	--	19.5	19.5	21.3	40.8	
2001	--	--	--	26.7	26.7	22.5	49.2	
2002	--	--	--	--	--	--	--	
2003	--	9.8	--	--	9.8	79.1	88.9	
2004	2	147.6	--	--	147.6	42.0	189.6	
2005	3	209.1	--	7.2	216.3	113.9	330.2	
2006	2	136.6	--	18.6	155.2	94.1	249.3	
2007	3	219.6	--	9.3	228.9	156.2	385.1	
2008	10	659.4	--	7.0	666.4	272.4	938.8	
2009	6	359.6	--	16.4	376.0	103.4	479.4	
2010	5	314.3	--	18.8	333.1	238.0	571.1	
2011	6	388.9	--	15.0	403.9	166.3	570.2	
2012	5	332.1	--	4.0	336.1	62.6	398.7	
2013	4	255.0	--	0.5	255.5	61.8	317.3	
2014	4	258.2	--	3.2	261.4	36.0	297.4	
2015	--	--	--	15.0	15.0	3.7	18.7	
2016	1	64.1	--	0.1	64.2	3.0	67.2	
2017	1	97.0	--	--	97.0	0.9	97.9	
2018	--	--	--	--	--	4.7	4.7	
2019	--	--	--	--	--	--	--	
2020	--	--	--	--	--	--	--	
2021	--	--	--	--	--	6.6	6.6	
2022	--	--	--	--	--	11.0	11.0	
2023	--	--	--	--	--	3.5	3.5	
2024	--	--	--	--	--	--	--	
2025	2	291.5	--	--	291.5	--	291.5	
Subtotal	54	3742.8	--	161.3	3904.1	1524.9	5429.0	

Annual Funding								
3010   Procurement   Aircraft Procurement, Air Force								
Fiscal Year	Quantity	BY 2005 \$M						
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program	
1999	--	--	--	--	--	23.6	23.6	
2000	--	--	--	20.7	20.7	22.6	43.3	
2001	--	--	--	28.0	28.0	23.7	51.7	
2002	--	--	--	--	--	--	--	
2003	--	10.0	--	--	10.0	80.9	90.9	
2004	2	147.0	--	--	147.0	41.8	188.8	
2005	3	202.3	--	7.0	209.3	110.2	319.5	
2006	2	128.7	--	17.5	146.2	88.8	235.0	
2007	3	201.6	--	8.5	210.1	143.4	353.5	
2008	10	595.8	--	6.3	602.1	246.2	848.3	
2009	6	319.5	--	14.6	334.1	91.8	425.9	
2010	5	274.0	--	16.4	290.4	207.5	497.9	
2011	6	333.7	--	12.9	346.6	142.6	489.2	
2012	5	280.7	--	3.4	284.1	52.9	337.0	
2013	4	211.2	--	0.4	211.6	51.2	262.8	
2014	4	210.8	--	2.6	213.4	29.4	242.8	
2015	--	--	--	12.1	12.1	3.0	15.1	
2016	1	50.6	--	0.1	50.7	2.4	53.1	
2017	1	75.1	--	--	75.1	0.7	75.8	
2018	--	--	--	--	--	3.6	3.6	
2019	--	--	--	--	--	--	--	
2020	--	--	--	--	--	--	--	
2021	--	--	--	--	--	4.7	4.7	
2022	--	--	--	--	--	7.7	7.7	
2023	--	--	--	--	--	2.4	2.4	
2024	--	--	--	--	--	--	--	
2025	2	192.2	--	--	192.2	--	192.2	
Subtotal	54	3233.2	--	150.5	3383.7	1381.1	4764.8	

Cost Quantity Information		
3010   Procurement   Aircraft Procurement, Air Force		
Fiscal Year	Quantity	End Item Recurring Flyaway (Aligned With Quantity) BY 2005 \$M
1999	--	--
2000	--	--
2001	--	--
2002	--	--
2003	--	--
2004	2	142.0
2005	3	206.8
2006	2	130.2
2007	3	185.2
2008	10	584.3
2009	6	343.8
2010	5	274.6
2011	6	334.1
2012	5	275.4
2013	4	215.8
2014	4	223.1
2015	--	--
2016	1	50.6
2017	1	75.1
2018	--	--
2019	--	--
2020	--	--
2021	--	--
2022	--	--
2023	--	--
2024	--	--
2025	2	192.2
Subtotal	54	3233.2

Annual Funding							
0300   Procurement   Procurement, Defense-Wide							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1999	--	--	--	--	--	4.0	4.0
2000	--	--	--	--	--	2.0	2.0
2001	--	--	--	--	--	6.8	6.8
2002	--	--	--	--	--	15.9	15.9
2003	--	5.0	--	--	5.0	36.9	41.9
2004	--	41.9	--	--	41.9	35.5	77.4
2005	--	54.5	--	0.2	54.7	58.6	113.3
2006	--	40.7	--	1.9	42.6	55.0	97.6
2007	--	113.9	--	--	113.9	79.9	193.8
2008	--	177.5	--	2.1	179.6	138.7	318.3
2009	--	85.4	--	11.6	97.0	29.7	126.7
2010	--	56.1	--	7.1	63.2	31.7	94.9
2011	--	57.3	--	9.1	66.4	37.2	103.6
2012	--	57.1	--	8.5	65.6	34.0	99.6
2013	--	59.1	--	3.8	62.9	30.3	93.2
2014	--	61.6	--	4.5	66.1	25.9	92.0
2015	--	--	--	--	--	--	--
2016	--	18.0	--	--	18.0	--	18.0
2017	--	25.0	--	--	25.0	--	25.0
Subtotal	--	853.1	--	48.8	901.9	622.1	1524.0

Annual Funding 0300   Procurement   Procurement, Defense-Wide							
Fiscal Year	Quantity	BY 2005 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1999	--	--	--	--	--	4.3	4.3
2000	--	--	--	--	--	2.1	2.1
2001	--	--	--	--	--	7.2	7.2
2002	--	--	--	--	--	16.5	16.5
2003	--	5.1	--	--	5.1	37.6	42.7
2004	--	41.5	--	--	41.5	35.2	76.7
2005	--	52.5	--	0.2	52.7	56.5	109.2
2006	--	38.2	--	1.8	40.0	51.7	91.7
2007	--	104.8	--	--	104.8	73.6	178.4
2008	--	160.9	--	1.9	162.8	125.6	288.4
2009	--	76.4	--	10.4	86.8	26.5	113.3
2010	--	49.3	--	6.2	55.5	27.9	83.4
2011	--	49.6	--	7.9	57.5	32.1	89.6
2012	--	48.6	--	7.2	55.8	28.9	84.7
2013	--	49.7	--	3.2	52.9	25.4	78.3
2014	--	51.1	--	3.7	54.8	21.5	76.3
2015	--	--	--	--	--	--	--
2016	--	14.4	--	--	14.4	--	14.4
2017	--	19.6	--	--	19.6	--	19.6
Subtotal	--	761.7	--	42.5	804.2	572.6	1376.8

Cost Quantity Information		
0300   Procurement   Procurement, Defense-Wide		
Fiscal Year	Quantity	End Item Recurring Flyaway (Aligned With Quantity) BY 2005 \$M
1999	--	--
2000	--	--
2001	--	--
2002	--	--
2003	--	--
2004	--	40.0
2005	--	56.4
2006	--	38.2
2007	--	46.2
2008	--	215.0
2009	--	79.6
2010	--	49.4
2011	--	49.7
2012	--	49.9
2013	--	50.3
2014	--	53.0
2015	--	--
2016	--	14.4
2017	--	19.6
Subtotal	--	761.7

Annual Funding 1205   MILCON   Military Construction, Navy and Marine Corps		
Fiscal Year	TY \$M	
	Total Program	
2003		0.8
2004		10.9
2005		14.5
2006		22.4
2007		--
2008		--
2009		--
2010		7.2
2011		--
2012		6.2
2013		--
2014		--
2015		--
2016		--
2017		--
2018		26.6
2019		77.8
2020		86.8
2021		--
2022		60.0
	Subtotal	313.2

Annual Funding 1205   MILCON   Military Construction, Navy and Marine Corps		
Fiscal Year	BY 2005 \$M	
	Total Program	
2003		0.8
2004		10.8
2005		13.9
2006		21.0
2007		--
2008		--
2009		--
2010		6.2
2011		--
2012		5.2
2013		--
2014		--
2015		--
2016		--
2017		--
2018		19.8
2019		56.9
2020		62.2
2021		--
2022		41.3
Subtotal		238.1

Annual Funding		
0500   MILCON   Military Construction, Defense-Wide		
Fiscal Year	TY \$M	
	Total Program	
2000		0.2
2001		0.3
2002		8.5
2003		1.9
2004		--
2005		--
2006		1.8
2007		1.9
2008		0.7
2009		8.3
2010		--
2011		--
2012		6.3
2013		--
2014		--
2015		--
2016		--
2017		6.3
2018		33.6
Subtotal		69.8

Annual Funding 0500   MILCON   Military Construction, Defense-Wide	
Fiscal Year	BY 2005 \$M
	Total Program
2000	0.2
2001	0.3
2002	8.8
2003	1.9
2004	--
2005	--
2006	1.7
2007	1.7
2008	0.6
2009	7.3
2010	--
2011	--
2012	5.3
2013	--
2014	--
2015	--
2016	--
2017	4.8
2018	24.9
Subtotal	57.5

## Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
<b>Approval Date</b>	4/25/1997	5/6/2002
<b>Approved Quantity</b>	25	58
<b>Reference</b>	LRIP ADM	Program Restructure ADM
<b>Start Year</b>	1997	1997
<b>End Year</b>	2001	2009

The Current Total LRIP Quantity is more than 10% of the total production quantity due to a program restructure with the May 2002 ADM which authorized additional LRIP aircraft. Lots 1-9 were LRIP aircraft.

## Foreign Military Sales

Country	Date of Sale	Quantity	Total Cost \$M	Description
Japan	8/8/2018	4	633.9	FMS Case JA-P-SCP: Procurement of continued Phase III Non-Recurring Engineering, four V-22 aircraft, and logistics elements.
Japan	8/8/2017	4	655.2	FMS Case JA-P-SCO: Procurement of Phase III Non-Recurring Engineering, four V-22 aircraft, long lead components for four additional aircraft, and logistics elements.
Japan	6/9/2016	4	661.1	FMS Case JA-P-SCS: Procurement of four V-22 aircraft, long lead parts for four aircraft completion of Non-Recurring Engineering test and integration of Japan configuration into the MV-22 aircraft and MV-22 containerized flight training device.
Japan	6/12/2015	5	556.0	FMS Case JA-P-SCH: Procurement of five V-22 aircraft, unique Japan communications equipment, development, and associated logistics support for long lead requirements.
Japan	8/22/2014		1.0	FMS Case JA-P-FXQ: Studies and Analysis of the V-22 Program to refine requirements for future aircraft procurement and conduct site assessments in Japan.
Israel	11/21/2013		1.3	FMS Case IS-P-GOY-A1: Studies and Analysis of the V-22 Program to refine requirements for future aircraft procurement and conduct site assessments in Israel.

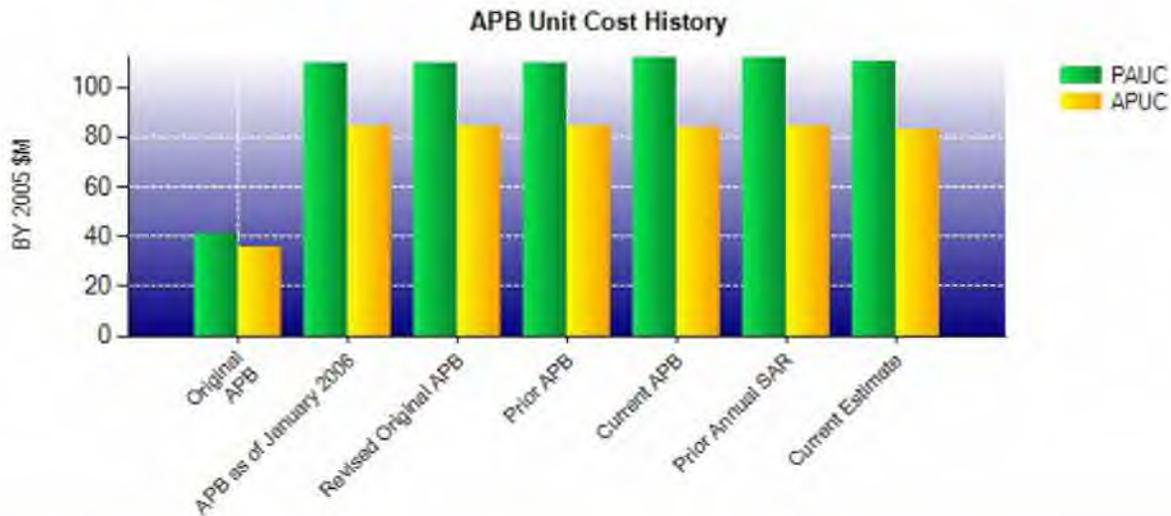
### Notes

## Nuclear Costs

None

**Unit Cost**

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2005 \$M	BY 2005 \$M	% Change
	Current UCR Baseline (Dec 2018 APB)	Current Estimate (Dec 2018 SAR)	
<b>Program Acquisition Unit Cost</b>			
Cost	52021.4	51372.4	
Quantity	464	464	
Unit Cost	112.115	110.716	-1.25
<b>Average Procurement Unit Cost</b>			
Cost	38853.9	38226.8	
Quantity	462	462	
Unit Cost	84.099	82.742	-1.61
Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2005 \$M	BY 2005 \$M	% Change
	Revised Original UCR Baseline (Sep 2005 APB)	Current Estimate (Dec 2018 SAR)	
<b>Program Acquisition Unit Cost</b>			
Cost	50250.4	51372.4	
Quantity	458	464	
Unit Cost	109.717	110.716	+0.91
<b>Average Procurement Unit Cost</b>			
Cost	38562.8	38226.8	
Quantity	456	462	
Unit Cost	84.568	82.742	-2.16



APB Unit Cost History					
Item	Date	BY 2005 \$M		TY \$M	
		PAUC	APUC	PAUC	APUC
Original APB	Feb 1988	41.101	35.309	34.657	30.541
APB as of January 2006	Sep 2005	109.717	84.568	116.274	94.516
Revised Original APB	Sep 2005	109.717	84.568	116.274	94.516
Prior APB	Oct 2011	109.717	84.568	116.274	94.516
Current APB	Dec 2018	112.115	84.099	121.955	96.311
Prior Annual SAR	Dec 2017	112.069	84.161	121.730	96.300
Current Estimate	Dec 2018	110.716	82.742	120.044	94.454

**SAR Unit Cost History**

Initial SAR Baseline to Current SAR Baseline (TY \$M)									
Initial PAUC Development Estimate	Changes								PAUC Production Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
40.180	-12.793	50.391	-4.762	8.157	30.121	0.000	4.980	76.094	116.274

Current SAR Baseline to Current Estimate (TY \$M)									
PAUC Production Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
116.274	-1.019	-0.263	4.790	3.038	-3.312	0.000	0.536	3.770	120.044

Initial SAR Baseline to Current SAR Baseline (TY \$M)									
Initial APUC Development Estimate	Changes								APUC Production Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
36.641	-12.349	47.964	-4.862	5.134	16.986	0.000	5.002	57.875	94.516

Current SAR Baseline to Current Estimate (TY \$M)									
APUC Production Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
94.516	-1.036	0.017	4.811	0.468	-4.861	0.000	0.539	-0.062	94.454

SAR Baseline History				
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current Estimate
Milestone I	Dec 1982	Dec 1982	Dec 1982	Dec 1982
Milestone II	May 1985	Apr 1986	Apr 1986	Apr 1986
Milestone III	Jul 1989	N/A	Oct 2005	Oct 2005
IOC	Dec 1991	N/A	Mar 2007	Jun 2007
Total Cost (TY \$M)	24467.0	29662.3	53253.4	55700.2
Total Quantity	609	919	458	464
PAUC	40.176	32.277	116.274	120.044

**Cost Variance**

Summary TY \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	9891.7	43099.3	262.4	53253.4
Previous Changes				
Economic	-5.3	-580.7	-1.3	-587.3
Quantity	--	+294.6	--	+294.6
Schedule	--	+2167.2	--	+2167.2
Engineering	+928.4	+214.6	+265.1	+1408.1
Estimating	+737.3	-1350.5	-137.1	-750.3
Other	--	--	--	--
Support	--	+453.7	--	+453.7
Subtotal	+1660.4	+1198.9	+126.7	+2986.0
Current Changes				
Economic	+9.9	+101.9	+2.8	+114.6
Quantity	--	+280.6	--	+280.6
Schedule	--	+55.5	--	+55.5
Engineering	--	+1.5	--	+1.5
Estimating	+117.5	-895.1	-8.9	-786.5
Other	--	--	--	--
Support	--	-204.9	--	-204.9
Subtotal	+127.4	-660.5	-6.1	-539.2
Total Changes	+1787.8	+538.4	+120.6	+2446.8
CE - Cost Variance	11679.5	43637.7	383.0	55700.2
CE - Cost & Funding	11679.5	43637.7	383.0	55700.2

Summary BY 2005 \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	11446.5	38562.8	241.1	50250.4
Previous Changes				
Economic	--	--	--	--
Quantity	--	+235.4	--	+235.4
Schedule	--	+1063.4	--	+1063.4
Engineering	+696.7	+158.2	+190.8	+1045.7
Estimating	+616.5	-1548.4	-129.8	-1061.7
Other	--	--	--	--
Support	--	+242.7	--	+242.7
Subtotal	+1313.2	+151.3	+61.0	+1525.5
Current Changes				
Economic	--	--	--	--
Quantity	--	+185.0	--	+185.0
Schedule	--	+105.9	--	+105.9
Engineering	--	+1.0	--	+1.0
Estimating	+90.3	-638.3	-6.5	-554.5
Other	--	--	--	--
Support	--	-140.9	--	-140.9
Subtotal	+90.3	-487.3	-6.5	-403.5
Total Changes	+1403.5	-336.0	+54.5	+1122.0
CE - Cost Variance	12850.0	38226.8	295.6	51372.4
CE - Cost & Funding	12850.0	38226.8	295.6	51372.4

Previous Estimate: December 2017

RDT&E	\$M	
Current Change Explanations	Base Year	Then Year
Adjustment for current and prior escalation. (Estimating)	-2.8	-3.4
Revised escalation indices. (Economic)	N/A	+9.9
Revised estimate to reflect actuals (Navy). (Estimating)	-1.8	-2.2
Revised estimate to reflect actuals (Air Force). (Estimating)	-4.4	-5.8
Revised estimate to reflect actuals (DoD). (Estimating)	+10.2	+12.9
Revised estimate for FOT&E (Air Force). (Estimating)	+18.7	+26.5
Revised estimate for FOT&E (DoD). (Estimating)	+12.0	+17.3
Revised estimate to complete CMV-22 test activities through IOC (Navy). (Estimating)	+107.2	+145.6
Revised estimate to account for Navy project reprioritization (Navy). (Estimating)	-36.1	-48.7
Revised estimate for Follow-On Test and Evaluation (FOT&E) (Navy). (Estimating)	-12.7	-24.7
<b>RDT&amp;E Subtotal</b>	<b>+90.3</b>	<b>+127.4</b>

Procurement	\$M	
Current Change Explanations	Base Year	Then Year
Revised escalation indices. (Economic)	N/A	+101.9
Adjustment for current and prior escalation. (Estimating)	-25.2	-32.4
Total Quantity variance resulting from an increase of two CV-22s from 52 to 54 (Air Force). (Subtotal)	+120.8	+183.2
Quantity variance resulting from an increase of two CV-22s from 52 to 54 (Air Force). (Quantity)	(+113.6)	(+172.3)
Allocation to Schedule resulting from Quantity change. (Schedule) (QR)	(+9.8)	(+14.9)
Allocation to Engineering resulting from Quantity change. (Engineering) (QR)	(+1.0)	(+1.5)
Allocation to Estimating resulting from Quantity change. (Estimating) (QR)	(-3.6)	(-5.5)
Additional Quantity variance for an increase of 2 CV-22s from 52 to 54 to address the CV unique configuration (Air Force). (Quantity)	+71.4	+108.3
Acceleration of the procurement buy profile from FY 2023 - FY 2025 to FY 2018 - FY 2020 (Navy). (Schedule)	0.0	-115.3
Stretch-out of the procurement buy profile from FY 2025 to FY 2026 (Navy). (Schedule)	+96.1	+155.9
Revised estimate to reflect contract prices for Multi-Year Procurement III (Navy). (Estimating)	-482.1	-681.8
Revised estimate to reflect contract prices for engines (Navy). (Estimating)	-99.2	-136.4
Revised estimate for updated pricing on Government Furnished Equipment and Engineering Change Orders (Navy). (Estimating)	-23.5	-32.2
Revised estimate to reflect actuals (Navy). (Estimating)	+0.8	+1.0
Revised estimate for Non-Recurring Engineering and Ancillary Equipment (Navy). (Estimating)	-5.5	-7.8
Adjustment for current and prior escalation. (Support)	-3.8	-4.8
Decrease in Other Support due to revised estimate of Support Equipment (Navy). (Support)	-4.9	-10.7
Decrease in Initial Spares to update remaining spares requirements based on current projections (Navy). (Support)	-144.5	-206.7
Increase in Other Support due to revised estimate of Program Engineering Support (Air Force). (Support)	+3.4	+4.5

Increase in Initial Spares to update remaining spares requirements based on current projections (Air Force). (Support)	+8.9	+12.8
Procurement Subtotal	-487.3	-660.5

(QR) Quantity Related

MILCON	\$M	
	Base Year	Then Year
Current Change Explanations		
Revised escalation indices. (Economic)	N/A	+2.8
Revised estimate for CMV-22B Maintenance Hangar (Navy). (Estimating)	-5.5	-7.5
Adjustment for current and prior escalation. (Estimating)	-1.0	-1.4
MILCON Subtotal	-6.5	-6.1

## Contracts

Contract Identification	
<b>Appropriation:</b>	RDT&E
<b>Contract Name:</b>	Japan NRE
<b>Contractor:</b>	Bell-Boeing JPO
<b>Contractor Location:</b>	401 Tiltrotor Drive Amarillo, TX 79111
<b>Contract Number:</b>	N00019-12-G-0006/112
<b>Contract Type:</b>	Cost Plus Incentive Fee (CPIF)
<b>Award Date:</b>	September 15, 2015
<b>Definitization Date:</b>	September 15, 2015

Contract Price							
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
20.9	N/A	N/A	197.8	N/A	N/A	171.6	170.9

### Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to incorporation of Non-Recurring Engineering for additional engineering changes for the Japan configuration of the V-22 aircraft.

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2018)	+9.1	-5.7
Previous Cumulative Variances	+9.5	-6.4
Net Change	-0.4	+0.7

### Cost and Schedule Variance Explanations

The unfavorable net change in the cost variance is due to supplier actual costs that were higher than originally budgeted.

The favorable net change in the schedule variance is due to engineering tasks completed earlier than planned.

**Contract Identification**

**Appropriation:** RDT&E  
**Contract Name:** Navy Variant NRE  
**Contractor:** Bell-Boeing  
**Contractor Location:** 401 Tiltrotor Drive  
 Amarillo, TX 79111  
**Contract Number:** N00019-12-G-0006/130  
**Contract Type:** Cost Plus Fixed Fee (CPFF)  
**Award Date:** March 31, 2016  
**Definitization Date:** March 31, 2016

**Contract Price**

Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
152.5	N/A	1	151.3	N/A	1	136.2	135.5

**Target Price Change Explanation**

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to a de-scope of the Aft Cargo Bay/Loading Ramp Illumination and Forward Microphone Requirements.

**Contract Variance**

Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2018)	-0.7	-6.2
Previous Cumulative Variances	-1.7	-7.1
Net Change	+1.0	+0.9

**Cost and Schedule Variance Explanations**

The favorable net change in the cost variance is due to a decrease in the material costs from the original estimate.

The favorable net change in the schedule variance is due to engineering tasks completed earlier than planned.

**Contract Identification**

**Appropriation:** Acq O&M  
**Contract Name:** Mission Care Engine Sustainment (FY17-FY19)  
**Contractor:** Rolls Royce Corporation  
**Contractor Location:** 2355 S. Tibbs Avenue  
 Indianapolis, IN 46206  
**Contract Number:** N00019-15-D-0019/1  
**Contract Type:** Firm Fixed Price (FFP)  
**Award Date:** December 20, 2016  
**Definitization Date:** December 20, 2016

**Contract Price**

Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
407.8	N/A	N/A	449.0	N/A	N/A	449.0	449.0

**Target Price Change Explanation**

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to additional Engine Flight Hours and Low Power Engine Repairs that were not included in the original contract award.

**Cost and Schedule Variance Explanations**

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

**Notes**

The V-22 Mission Care contract provides for sustainment of V-22 aircraft engines from FY 2017 through FY 2019. This is a Commercial Federal Acquisition Regulation Part 12 contract.

**Contract Identification**

**Appropriation:** Procurement  
**Contract Name:** V-22 MYP2 YR 5 (FY17 Lot 21)  
**Contractor:** Bell-Boeing JPO  
**Contractor Location:** 401 Tiltrotor Drive  
 Amarillo, TX 79111  
**Contract Number:** N00019-12-C-2001/21  
**Contract Type:** Fixed Price Incentive(Firm Target) (FPIF)  
**Award Date:** December 15, 2016  
**Definitization Date:** December 15, 2016

Contract Price							
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
1210.0	1273.7	16	1841.1	1938.1	27	1478.1	1473.3

**Target Price Change Explanation**

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to incorporation of additional Variation In Quantity (VIQ) aircraft, supported by the approved budget, as well as, Engineering Change Proposals into the production line.

Contract Variance		
Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2018)	+18.8	-66.0
Previous Cumulative Variances	+2.8	+5.1
Net Change	+16.0	-71.1

**Cost and Schedule Variance Explanations**

The favorable net change in the cost variance is due to labor efficiencies on the production line.

The unfavorable net change in the schedule variance is due to late parts from the suppliers to the production line.

**Notes**

An administrative change was required to reflect the corrected the Initial Contract Price Target (from 1838.9 to 1210.0) and Ceiling (from 1935.9 to 1273.7), reported in last year's SAR.

**Contract Identification**

**Appropriation:** Procurement  
**Contract Name:** V-22 AE1107C Engine Production  
**Contractor:** Rolls-Royce Corporation  
**Contractor Location:** 2355 South Tibbs Avenue  
 Indianapolis, IL 46241  
**Contract Number:** N00019-17-C-0081/1  
**Contract Type:** Firm Fixed Price (FFP)  
**Award Date:** September 21, 2017  
**Definitization Date:** September 21, 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
288.7	N/A	131	288.7	N/A	131	288.7	288.7

**Cost and Schedule Variance Explanations**

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

**Notes**

An administrative change was required to reflect the corrected the Initial Contract Price Target (from 287.4 to 288.7), reported in last year's SAR.

**Contract Identification**

**Appropriation:** Procurement  
**Contract Name:** V-22 MYP3 YR 1 (FY18 Lot 22)  
**Contractor:** Bell-Boeing JPO  
**Contractor Location:** 401 Tiltrotor Drive  
 Amarillo, TX 79111  
**Contract Number:** N00019-17-C-0015/22  
**Contract Type:** Fixed Price Incentive(Firm Target) (FPIF)  
**Award Date:** June 29, 2018  
**Definitization Date:** June 29, 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
1401.9	1451.9	11	1401.9	1451.9	11	1236.0	1236.0

**Contract Variance**

Item	Cost Variance	Schedule Variance
Cumulative Variances To Date (12/31/2018)	+1.9	-1.2
Previous Cumulative Variances	--	--
Net Change	+1.9	-1.2

**Cost and Schedule Variance Explanations**

The favorable cumulative cost variance is due to manufacturing labor efficiencies and lower than budgeted material costs.

The unfavorable cumulative schedule variance is due to delays in supplier parts for fuselage and landing gear to the production line.

**Notes**

This is the first time this contract is being reported.

## Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	2	2	2	100.00%
Production	381	381	462	82.47%
Total Program Quantity Delivered	383	383	464	82.54%

Expended and Appropriated (TY \$M)			
Total Acquisition Cost	55700.2	Years Appropriated	38
Expended to Date	45791.5	Percent Years Appropriated	82.61%
Percent Expended	82.21%	Appropriated to Date	49663.3
Total Funding Years	46	Percent Appropriated	89.16%

The above data is current as of March 11, 2018.

## Operating and Support Cost

### Cost Estimate Details

<b>Date of Estimate:</b>	December 18, 2018
<b>Source of Estimate:</b>	POE
<b>Quantity to Sustain:</b>	454
<b>Unit of Measure:</b>	Aircraft
<b>Service Life per Unit:</b>	25.00 Years
<b>Fiscal Years in Service:</b>	FY 2001 - FY 2053

The O&S cost estimate does not include the 2 developmental aircraft, 4 HX-21 aircraft, and 2 test aircraft.

	MV-22	Navy CMV-22	CV-22
Aircraft Service Life (hrs)	10,000	10,000	10,000
Aircraft Attrition Rate	0.7%	1.0%	0.6%
Aircraft Pipeline Rate	12.7%	10.0%	8%
Total Aircraft Inventory (TAI)	360	48	54
Primary Aircraft Authorized (PAA)	276	36	50
Flight Hour per Month	35	35	36
Flight Hours per Year	420	420	432
Total Aircraft Operating Years	7,870	1,139	1,236

### Sustainment Strategy

The V-22 Program Office is executing a Joint Sustainment Strategy that provides the product support elements for the Marine Corps MV-22, Air Force CV-22 fleets and Navy CMV-22. The sustainment strategy addresses all three levels of maintenance (Organizational, Intermediate and Depot). The cornerstones of the Joint Sustainment Strategy are the Performance Based Agreements (PBA) between the Program Office and the war fighters. The PBAs clearly define the war fighter's product support requirements to be achieved through the execution of the V-22 Joint Sustainment Strategy. The Joint Sustainment Strategy is executed via a myriad of processes and organizations to include DoD organic activities and commercial contractors. Multiple Performance Based Logistics contracts are used to support the V-22 Program.

The V-22 Program Common Configuration - Readiness and Modernization (CC-RAM) effort, introduced in August 2017, provides for the modification of Block B aircraft to a Block C configuration for up to 129 aircraft, funded with APN-5. This

common configuration concept will decrease non-mission capable rates by simplifying and streamlining supply and maintenance, increasing aircraft availability and fleet readiness. CC-RAM also significantly reduces the number of different aircraft configurations fielded and maintained, thus improving Life Cycle Support costs for the V-22 platform.

### Antecedent Information

The V-22s antecedent aircraft are the CH-46E Sea Knight, CH-53D Sea Stallion, MH-53J/M Pave Low, and the C-2A Greyhound aircraft.

The CH-46E Sea Knight's O&S costs were used as the basis for the V-22 antecedent aircraft costs. The largest number of V-22s being procured (360 MV-22s) are being used to replace the CH-46E aircraft. The antecedent cost is based on the CH-46E's 3-year average (1999-2001) O&S cost data extracted from Naval Visibility and Management of Operating and Support Costs (VAMOSC) database for the 229 aircraft reported on during that time. Years 1999-2001 were used for the average because those years were the most stable and highest quantity per year resulting in the best representation for O&S costs. The antecedent aircraft began phasing out of the inventory in the following years. Since VAMOSC does not capture Indirect Support costs, the CH-46E Indirect Support cost is calculated by multiplying the CH-46E Unit-Level Manpower by the ratio of V-22 Indirect Support to V-22 Unit-Level Manpower. The data was normalized to BY 2005 \$M.

Annual O&S Costs BY2005 \$M		
Cost Element	V-22 Average Annual Cost Per Aircraft	CH-46E (Antecedent) Average Annual Cost Per Aircraft
Unit-Level Manpower	1.420	0.449
Unit Operations	0.360	0.058
Maintenance	4.700	1.227
Sustaining Support	0.380	0.038
Continuing System Improvements	0.650	0.182
Indirect Support	0.650	0.220
Other	--	--
<b>Total</b>	<b>8.160</b>	<b>2.174</b>

Item	Total O&S Cost \$M			
	V-22		CH-46E (Antecedent)	
	Current Production APB Objective/Threshold	Current Estimate		
<b>Base Year</b>	80381.8	88420.0	83623.5	20782.3
<b>Then Year</b>	121543.7	N/A	136068.6	N/A

Disposal Cost is included in the Operating and Support Cost of the current APB objective and threshold for this program.

### Equation to Translate Annual Cost to Total Cost

Total O&S Cost / (MV-22 USMC operating years + CMV-22 Navy operating years + CV-22 operating years) = Average Annual O&S Cost per Aircraft; therefore \$83.623B / (7,879 + 1,139 + 1,236) = \$8.16M.

O&S Cost Variance		
Category	BY 2005 \$M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2017 SAR	80381.9	
Programmatic/Planning Factors	915.2	Adjustments for PB19 quantity profile and Flying hour adjustment for the FYDP
Cost Estimating Methodology	0.0	
Cost Data Update	1238.8	Adjustment of Flying Hour Program estimate due to updated AVDLR and AFM Pricing. Increased fuel consumption
Labor Rate	0.0	
Energy Rate	1087.6	Incorporation of PB20 Fuel Rate increases
Technical Input	0.0	
Other	0.0	
<b>Total Changes</b>	<b>3241.6</b>	
Current Estimate	83623.5	

#### Disposal Estimate Details

<b>Date of Estimate:</b>	December 18, 2018
<b>Source of Estimate:</b>	POE
<b>Disposal/Demilitarization Total Cost (BY 2005 \$M):</b>	98.4