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RCS: DD-A&T(Q&A)823-582



*Signal Data Processor with Sierra Chip
(SDP-S)*



*Planar Array Antenna Assembly
(PAAA)*

Cooperative Engagement Capability (CEC)

As of FY 2021 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

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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

Cooperative Engagement Capability (CEC)

DoD Component

Navy

Joint Participants

FMS; United States Marine Corps

Responsible Office

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References

SAR Baseline (Production Estimate)

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated April 3, 2002

Approved APB

Component Acquisition Executive (CAE) Approved Acquisition Program Baseline (APB) dated January 19, 2019

Mission and Description

The Cooperative Engagement Capability (CEC) acquisition program is an ACAT IC program which is based on the Mission Needs Statement (MNS) M030-086-093 approved by the Chief of Naval Operations (CNO) on February 5, 1993.

The CEC system makes it possible for multiple surface ships and aircrafts to form an air defense network for the purpose of sharing radar target measurements in real-time, thus a "cooperative engagement." Sharing data from all capable sensors' assets in a battle force provides increased timeliness, accuracy, and continuity for greater engagement decision and prosecution responsiveness.

The CEC program provides a sensor network with Integrated Fire Control capability that significantly improves battle force air and missile defense capabilities by coordinating measurement data from air search sensors on CEC-equipped units into a single, integrated real-time, composite track air picture. The CEC sensor netting system extracts sensor-derived information and distributes a superset of the best Anti Air Warfare (AAW) sensor data to all CEC Cooperating Units (CUs) participating in Naval Carrier and Expeditionary Strike Groups. Each CU independently employs high capacity, parallel processing and advanced algorithms to combine all distributed sensor data into a fire control quality track picture improving own unit track precision, consistency and continuity; expanding detection range; and increasing reaction time.

CEC also provides situational awareness by enabling longer range, cooperative, multiple or layered engagement strategies to improve strike force effectiveness and is highly resistant to jamming and delivers accurate gridlocking between CUs.

CEC is comprised of the following:

- AN/USG-2/2A/2B: Shipboard designation of CEC deployed aboard CG, DDG, FFG, LPD, LHD, LHA and CVN ship platforms
- AN/USG-3/3B: Airborne designation of CEC deployed in Hawkeye, Navy Airborne Warning and Control System Aircraft (E-2C) and Advanced Hawkeye (AHE), Navy Airborne Warning and Control System Aircraft (E-2D)
- AN/USG-4B: USMC Ground Mobile designation of CEC Composite Tracking Network (CTN)
- AN/USG-7B: CEC designation for Shipboard Foreign Military Sales (FMS) to Australia
- AN/USG-10B: CEC designation for Shipboard FMS to Japan

Executive Summary

Program Highlights Since Last Report

The CEC program has been in FRP for the AN/USG-2 (shipboard variant) since CY 2002 and for the AN/USG-3B (E-2D airborne variant) since CY 2014. Development efforts continue in order to keep pace with the security threats and ensure producibility. The program remains focused on ensuring compatibility and interoperability.

- DDG 1000 and CEC are implementing the Accelerated Mid-Term Interoperability Improvement Plan (AMIIP) for the DDG 1000 Zumwalt combat system. Fielding in 4Q FY 2020.
- CEC is fielding Identification Friend or Foe (IFF) Mode 5 updates to all CEC equipped platforms.

In 2018, the Program Office implemented annual maintenance builds and deliveries to address and resolve known priority software issues.

CEC follows an evolutionary acquisition process, delivering capability in increments of hardware and/or software upgrades. This evolutionary approach actively addresses the need for future capability improvements to overmatch evolving threats.

The Common Array Block (CAB) Pre-Production Unit (PPU) CLINs were executed in November 2018. Three CAB-Expeditionary and two CAB-Shipboard PPUs are being procured for development use.

A follow-on Design Agent/Engineering Services (DA/ES) contract was competitively awarded to Raytheon on May 8, 2019. N00024-19-C-5200 includes design, development, integration, test, and facility management.

The quantity change from 361 to 358 due to the removal of three DDGs (DDG 145, DDG 146, and DDG 147).

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
May 1995	CEC Acquisition Decision Milestone CEC Milestone (MS) I/II Navy Program Decision - Approved to proceed into EMD
July 1996	Preliminary Design Review CEC Shipboard
December 1996	Critical Design Review (CDR) CEC Shipboard
May 1997	CDR CEC Airborne Transceiver
December 1997	Initial Operation Testing and Evaluation (IOT&E) of AN/USG-2 equipment
February 1998	AN/USG-2 equipment LRIP award
April 1998	Initial production of AN/USG-2 equipment was awarded
April 2002	CEC MS III ADM - Approved for the AN/USG-2 Surface-based CEC system for MS III for FRP
April 2002	CEC MS III ADM - Approved the FY 2002 and FY 2003 AN/USG-3 Airborne-based CEC System LRIP quantity (5 units each year)
April 2002	CEC MS III ADM - Approved the updated APB
May 2005	CEC achieves FOC
January 2009	CEC Acquisition Decision Milestone Program Decision Memorandum - Approved an increase in the total LRIP quantity for CEC program of an additional 14 AN/USG-3A systems
February 2009	CEC Acquisition Decision Milestone Program Decision Memorandum - Approved the second LRIP of up to six (6) complete AN/USG-3B systems
February 2010	CEC Acquisition Decision Milestone Program Decision Memorandum - Approved the procurement of up to two (2) additional SDP-S components, to support the E-2D Advanced Hawkeye LRIP
August 2010	CEC Acquisition Decision Milestone Program Decision Memorandum - Authorized the Navy to procure one additional CEC AN/USG-3B system as part of the second LRIP Lot, increasing the total CEC LRIP Lot 2 quantity authorized to 7
December 2011	CEC Acquisition Decision Milestone Program Decision Memorandum - Authorized the Navy to procure one additional CEC AN/USG-3B unit as part of the FY 2011 LRIP Lot 2, approved via ADM on February 12, 2010. This decision now authorizes procurement of up to eight complete AN/USG-3B units as CEC LRIP Lot 2. Also authorize an increase in the total CEC AN/USG-3A/B LRIP quantity to not more than 16 units
May 2012	CEC Acquisition Decision Milestone Program Decision Memorandum - Approved the LRIP Lot 3 for up to five (5) complete AN/USG-3B systems. Designate the CEC program as an ACAT 1C program with the Navy as the lead Component
May 2012	The USD(AT&L) memorandum of May 25, 2012 - Re-designated CEC from an ACAT 1D to an ACAT 1C program with the Navy as lead component and authorized the Navy to procure the third increment of LRIPs for the CEC Airborne variant
April 2014	CEC Acquisition Decision Memorandum - Authorized entrance into FRP for the CEC AN/USG-3B (E-2D Airborne Variant) System in support of E-2D Advance Hawkeye FRP

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

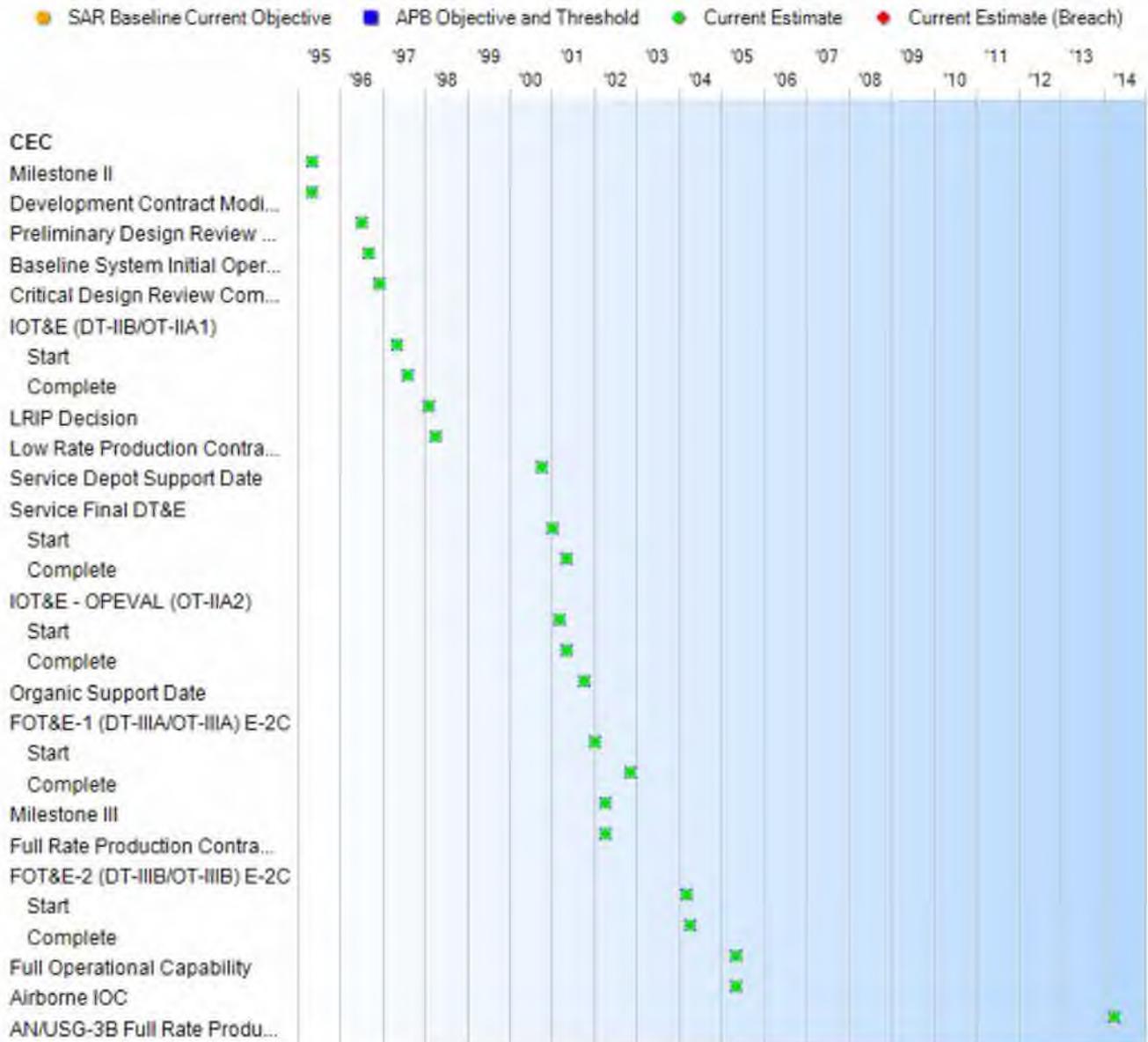
Current UCR Baseline

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 II	May 1995	May 1995	May 1995	May 1995
Development Contract Modification	May 1995	May 1995	May 1995	May 1995
Preliminary Design Review Complete	Feb 1996	Jul 1996	Jul 1996	Jul 1996
Baseline System Initial Operational Capability	Sep 1996	Sep 1996	Sep 1996	Sep 1996
Critical Design Review Complete	Aug 1996	Dec 1996	Dec 1996	Dec 1996
IOT&E (DT-IIIB/OT-IIA1)				
Start	May 1997	May 1997	May 1997	May 1997
Complete	Aug 1997	Aug 1997	Aug 1997	Aug 1997
LRIP Decision	Dec 1997	Feb 1998	Feb 1998	Feb 1998
Low Rate Production Contract Award	Apr 1998	Apr 1998	Apr 1998	Apr 1998
Service Depot Support Date	Oct 2000	Oct 2000	Oct 2000	Oct 2000
Service Final DT&E				
Start	Jul 2000	Jan 2001	Jan 2001	Jan 2001
Complete	Nov 2000	May 2001	May 2001	May 2001
IOT&E - OPEVAL (OT-IIA2)				
Start	Sep 2000	Mar 2001	Mar 2001	Mar 2001
Complete	Nov 2000	May 2001	May 2001	May 2001
Organic Support Date	Oct 2001	Oct 2001	Oct 2001	Oct 2001
FOT&E-1 (DT-IIIA/OT-IIIA) E-2C				
Start	Jan 2002	Jan 2002	Jan 2002	Jan 2002
Complete	Aug 2002	Nov 2002	Nov 2002	Nov 2002
Milestone III	Apr 2002	Apr 2002	Apr 2002	Apr 2002
Full Rate Production Contract Award	May 2002	Apr 2002	Apr 2002	Apr 2002
FOT&E-2 (DT-IIIB/OT-IIIB) E-2C				
Start	Mar 2003	Mar 2004	Mar 2004	Mar 2004
Complete	Jul 2003	Apr 2004	Apr 2004	Apr 2004
Full Operational Capability	Dec 2003	May 2005	May 2005	May 2005
Airborne IOC	Dec 2003	May 2005	May 2005	May 2005
AN/USG-3B Full Rate Production Decision for E-2D	N/A	Apr 2014	Apr 2014	Apr 2014

Change Explanations

None

Notes

AN/USG-2 FRP and AN/USG-3 LRIP occurred at Milestone III in April 2002.

AN/USG-2 FRP Contract Award occurred April 2002.

AN/USG-2 FOC occurred May 2005.

AIR IOC and FOC events scheduled at the same time.

Performance

Performance Characteristics				
SAR Baseline Production Estimate	Current APB Production Objective/Threshold	Demonstrated Performance	Current Estimate	
Operational Availability				
>=.95	N/A	N/A	N/A	N/A
Interoperability				
Information Exchange Requirements (IER)				
100% of top-level IERs	100% of top-level IERs.	100% of top-level IERs designated critical	100% of top-level IERs designated critical	100% of top-level IERs designated critical
Track File Consistency				
Integration will improve track file consistency in each host system	CEC integration will improve track file consistency as measured in each host system	CEC integration must not degrade track file consistency (0% degradation)as measured in each host system	CEC integration will improve track file consistency as measured in each host system	CEC integration will improve track file consistency in each host system

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

Requirements Reference

CEC Increment 1 CPD as validated by JROC memorandum dated August 12, 2016 which replaces the 2011 Change 1 CEC ORD, which was rescinded.

Change Explanations

None

Notes

CEC Security Classification change in December 2017 classified the Operational Availability (Ao) Objective and Threshold.

Track to Budget

RDT&E

Appn	BA	PE	
Navy	1319 07	0206313M	
	Project	Name	
	2273	Air Ops Cmd & Control (C2) Sys (Shared)	
	Notes: Shared with Composite Tracking Network		
Navy	1319 04	0603658N	
	Project	Name	
	2039	Cooperative Engagement Capability (CEC) (Sunk)	
	Notes: Reported Sunk as of FY 2017 PB.		
	2616	Cooperative Engagement Capability (CEC) (Sunk)	
Navy	1319 05	0604234N	
	Project	Name	
	3051	Advanced Hawkeye (Shared) (Sunk)	
	Notes: Shared with Advanced Hawkeye Program		
	5EJ	Advanced Hawkeye (Shared) (Sunk)	
	Notes: Shared with Advanced Hawkeye Program		
Navy	1319 07	0607658N	
	Project	Name	
	2039	COOP Engagement	
	9999	Congressional Adds (Sunk)	
	Notes: Reported sunk as of FY 2020 PB.		
Army	2040 07	0102419A	
	Project	Name	
	55	Army Patriot JLENS (Shared) (Sunk)	
	Notes: Shared with Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System		

Procurement

Appn	BA	PE	
Navy	1109 01	0206313M	
	Line Item	Name	
	4640	Air Operations C2 Systems (Shared)	
	Notes: Shared with Composite Tracking Network		
Navy	1109 04	0206313M	
	Line Item	Name	
	4644	Common Aviation Command (Shared) (Sunk)	

& Control System (CAC2S)

Navy	1506	01	0204152N
	Line Item		Name
	0195		E-2D AHE (Shared)
	Notes:	Shared with E-2C Hawkeye	
Navy	1611	02	0204112N
	Line Item		Name
	2001		Carrier Replacement Program (Shared)
	Notes:	Shared with CVN Replacement Program	
	2086		CVN Refueling Overhauls (Shared)
	Notes:	Shared with Refueling Complex Overhaul	
Navy	1611	02	0204222N
	Line Item		Name
	2119		DDG 1000 (Shared) (Sunk)
	Notes:	Shared with DDG 1000 Program	
Navy	1611	05	0204228N
	Line Item		Name
	2119		DDG 1000 (Shared) (Sunk)
	Notes:	Shared with DDG 1000 Program	
Navy	1611	02	0204222N
	Line Item		Name
	2122		DDG-51 (Shared)
	Notes:	Shared with DDG-51 Program	
Navy	1611	02	0204420N
	Line Item		Name
	2128		FFG-Frigate (Shared)
Navy	1611	03	0204410N
	Line Item		Name
	3010		LPD Flight II (Shared)
Navy	1611	03	0204411N
	Line Item		Name
	3035		LHD-1 (Shared) (Sunk)
	Notes:	Shared with Amphibious Assault Ships	
	3036		LPD-17 (Shared)
	Notes:	Shared with Amphibious Assault Ships	
	3041		LHA Replacement (Shared)
	Notes:	Shared with Amphibious Assault Ships	
Navy	1810	01	0204228N
	Line Item		Name
	0900		DDG Modernization (Shared) (Sunk)
	Notes:	Shared with DDG Modernization Program - Reported as sunk as of 2017 PB.	
Navy	1810	01	0204162N

Line Item	Name
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0960 CG Modernization (Shared)

Notes: Shared with Cruiser Modernization Program.

Navy 1810 02 0204228N

Line Item	Name
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2606 Cooperative Engagement
Capability (CEC)

Navy 1810 02 0204221N

Line Item	Name
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2606 Cooperative Engagement (Shared) (Sunk)
Capability (CEC)

Notes: Shared in PB19

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 2002 \$M			BY 2002 \$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	2028.1	3326.9	3662.3	3346.4	1946.5	3666.6	3720.6
Procurement	2095.2	2104.2	2314.6	2137.4	2364.2	2749.5	2846.2
Flyaway	--	--	--	1813.0	--	--	2378.4
Recurring	--	--	--	1813.0	--	--	2378.4
Non Recurring	--	--	--	0.0	--	--	0.0
Support	--	--	--	324.4	--	--	467.8
Other Support	--	--	--	324.4	--	--	467.8
Initial Spares	--	--	--	0.0	--	--	0.0
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	4123.3	5431.1	N/A	5483.8	4310.7	6416.1	6566.8

Current APB Cost Estimate Reference

Naval Sea Systems Command - Cost Engineering and Industrial Analysis Group (NAVSEA 05C) changes to CEC APB Change 2 (Production) of November 27, 2017 that are identified in NAVSEA letter 7000 Ser 05C/037 dated December 13, 2018

Cost Notes

A Component Cost Estimate was created in FY 2019 in support of the current CEC APB that was approved on January 19, 2019.

Total Quantity			
Quantity	SAR Baseline Production Estimate	Current APB Production	Current Estimate
RDT&E	16	30	30
Procurement	256	328	328
Total	272	358	358

Quantity Notes

The quantity change from 361 to 358 due to the removal of three DDGs (DDG 145, DDG 146, and DDG 147).

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	2999.6	110.3	103.1	125.0	125.7	127.2	129.7	0.0	3720.6
Procurement	1841.4	98.8	68.1	66.7	80.3	85.9	88.4	516.6	2846.2
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB 2021 Total	4841.0	209.1	171.2	191.7	206.0	213.1	218.1	516.6	6566.8
PB 2020 Total	4851.4	201.5	207.8	232.5	216.8	249.7	80.5	370.0	6410.2
Delta	-10.4	7.6	-36.6	-40.8	-10.8	-36.6	137.6	146.6	156.6

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	30	0	0	0	0	0	0	0	0	30
Production	0	216	11	8	9	10	11	8	55	328
PB 2021 Total	30	216	11	8	9	10	11	8	55	358
PB 2020 Total	30	218	11	10	12	13	15	10	42	361
Delta	0	-2	0	-2	-3	-3	-4	-2	13	-3

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
1994	--	--	--	--	--	--	203.2
1995	--	--	--	--	--	--	154.1
1996	--	--	--	--	--	--	256.4
1997	--	--	--	--	--	--	224.7
1998	--	--	--	--	--	--	200.8
1999	--	--	--	--	--	--	189.8
2000	--	--	--	--	--	--	179.8
2001	--	--	--	--	--	--	173.4
2002	--	--	--	--	--	--	106.7
2003	--	--	--	--	--	--	107.1
2004	--	--	--	--	--	--	91.1
2005	--	--	--	--	--	--	114.0
2006	--	--	--	--	--	--	99.8
2007	--	--	--	--	--	--	55.0
2008	--	--	--	--	--	--	53.4
2009	--	--	--	--	--	--	44.2
2010	--	--	--	--	--	--	65.8
2011	--	--	--	--	--	--	59.6
2012	--	--	--	--	--	--	60.0
2013	--	--	--	--	--	--	52.5
2014	--	--	--	--	--	--	60.0
2015	--	--	--	--	--	--	42.6
2016	--	--	--	--	--	--	73.8
2017	--	--	--	--	--	--	78.7
2018	--	--	--	--	--	--	90.2
2019	--	--	--	--	--	--	125.9
2020	--	--	--	--	--	--	110.3
2021	--	--	--	--	--	--	103.1
2022	--	--	--	--	--	--	125.0
2023	--	--	--	--	--	--	125.7
2024	--	--	--	--	--	--	127.2
2025	--	--	--	--	--	--	129.7
Subtotal	22	--	--	--	--	--	3683.6

Annual Funding							
1319 RDT&E Research, Development, Test, and Evaluation, Navy							
Fiscal Year	Quantity	BY 2002 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1994	--	--	--	--	--	--	224.2
1995	--	--	--	--	--	--	166.8
1996	--	--	--	--	--	--	272.9
1997	--	--	--	--	--	--	236.3
1998	--	--	--	--	--	--	209.4
1999	--	--	--	--	--	--	195.7
2000	--	--	--	--	--	--	182.7
2001	--	--	--	--	--	--	173.8
2002	--	--	--	--	--	--	105.9
2003	--	--	--	--	--	--	104.7
2004	--	--	--	--	--	--	86.7
2005	--	--	--	--	--	--	105.7
2006	--	--	--	--	--	--	89.7
2007	--	--	--	--	--	--	48.3
2008	--	--	--	--	--	--	46.0
2009	--	--	--	--	--	--	37.6
2010	--	--	--	--	--	--	55.2
2011	--	--	--	--	--	--	48.8
2012	--	--	--	--	--	--	48.3
2013	--	--	--	--	--	--	41.8
2014	--	--	--	--	--	--	47.1
2015	--	--	--	--	--	--	33.1
2016	--	--	--	--	--	--	56.3
2017	--	--	--	--	--	--	58.9
2018	--	--	--	--	--	--	66.0
2019	--	--	--	--	--	--	90.3
2020	--	--	--	--	--	--	77.6
2021	--	--	--	--	--	--	71.1
2022	--	--	--	--	--	--	84.5
2023	--	--	--	--	--	--	83.3
2024	--	--	--	--	--	--	82.6
2025	--	--	--	--	--	--	82.6
Subtotal	22	--	--	--	--	--	3313.9

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
1999	--	--	--	--	--	--	9.7
2000	--	--	--	--	--	--	--
2001	--	--	--	--	--	--	--
2002	--	--	--	--	--	--	--
2003	--	--	--	--	--	--	--
2004	--	--	--	--	--	--	--
2005	--	--	--	--	--	--	--
2006	--	--	--	--	--	--	--
2007	--	--	--	--	--	--	--
2008	--	--	--	--	--	--	--
2009	--	--	--	--	--	--	8.6
2010	--	--	--	--	--	--	5.2
2011	--	--	--	--	--	--	5.0
2012	--	--	--	--	--	--	5.6
2013	--	--	--	--	--	--	2.4
2014	--	--	--	--	--	--	0.5
Subtotal	8	--	--	--	--	--	37.0

Annual Funding 2040 RDT&E Research, Development, Test, and Evaluation, Army							
Fiscal Year	Quantity	BY 2002 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1999	--	--	--	--	--	--	10.0
2000	--	--	--	--	--	--	--
2001	--	--	--	--	--	--	--
2002	--	--	--	--	--	--	--
2003	--	--	--	--	--	--	--
2004	--	--	--	--	--	--	--
2005	--	--	--	--	--	--	--
2006	--	--	--	--	--	--	--
2007	--	--	--	--	--	--	--
2008	--	--	--	--	--	--	--
2009	--	--	--	--	--	--	7.3
2010	--	--	--	--	--	--	4.3
2011	--	--	--	--	--	--	4.1
2012	--	--	--	--	--	--	4.5
2013	--	--	--	--	--	--	1.9
2014	--	--	--	--	--	--	0.4
Subtotal	8	--	--	--	--	--	32.5

Annual Funding							
1109 Procurement Procurement, Marine Corps							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2008	--	--	3.0	--	3.0	--	3.0
2009	10	16.0	--	--	16.0	--	16.0
2010	--	--	--	--	--	--	--
2011	--	--	11.3	--	11.3	--	11.3
2012	--	--	3.8	--	3.8	--	3.8
2013	--	--	--	--	--	--	--
2014	--	--	--	--	--	--	--
2015	--	--	1.9	--	1.9	--	1.9
2016	--	--	0.7	--	0.7	--	0.7
2017	--	--	1.2	--	1.2	--	1.2
2018	--	--	8.4	--	8.4	--	8.4
2019	--	--	8.1	--	8.1	--	8.1
2020	--	--	3.6	--	3.6	--	3.6
Subtotal	10	16.0	42.0	--	58.0	--	58.0

Annual Funding 1109 Procurement Procurement, Marine Corps							
Fiscal Year	Quantity	BY 2002 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2008	--	--	2.6	--	2.6	--	2.6
2009	10	13.5	--	--	13.5	--	13.5
2010	--	--	--	--	--	--	--
2011	--	--	9.2	--	9.2	--	9.2
2012	--	--	3.0	--	3.0	--	3.0
2013	--	--	--	--	--	--	--
2014	--	--	--	--	--	--	--
2015	--	--	1.5	--	1.5	--	1.5
2016	--	--	0.5	--	0.5	--	0.5
2017	--	--	0.9	--	0.9	--	0.9
2018	--	--	6.1	--	6.1	--	6.1
2019	--	--	5.8	--	5.8	--	5.8
2020	--	--	2.5	--	2.5	--	2.5
Subtotal	10	13.5	32.1	--	45.6	--	45.6

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
2000	6	35.0	--	--	35.0	--	35.0
2001	1	14.7	--	--	14.7	--	14.7
2002	5	27.6	--	--	27.6	--	27.6
2003	6	33.3	--	--	33.3	--	33.3
2004	6	27.9	--	--	27.9	--	27.9
2005	--	--	--	--	--	--	--
2006	--	--	--	--	--	--	--
2007	--	--	--	--	--	--	--
2008	--	--	--	--	--	--	--
2009	2	7.7	--	--	7.7	--	7.7
2010	3	12.6	--	--	12.6	--	12.6
2011	5	16.3	--	--	16.3	--	16.3
2012	5	15.6	--	--	15.6	--	15.6
2013	5	14.9	--	--	14.9	--	14.9
2014	5	13.1	--	--	13.1	--	13.1
2015	5	16.0	--	--	16.0	--	16.0
2016	5	16.3	--	--	16.3	--	16.3
2017	6	19.9	--	--	19.9	--	19.9
2018	5	16.9	--	--	16.9	--	16.9
2019	4	13.8	--	--	13.8	--	13.8
2020	4	14.1	--	--	14.1	--	14.1
2021	4	14.3	--	--	14.3	--	14.3
2022	4	14.6	--	--	14.6	--	14.6
2023	4	14.9	--	--	14.9	--	14.9
2024	4	15.2	--	--	15.2	--	15.2
Subtotal	94	374.7	--	--	374.7	--	374.7

Annual Funding 1506 Procurement Aircraft Procurement, Navy							
Fiscal Year	Quantity	BY 2002 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2000	6	35.1	--	--	35.1	--	35.1
2001	1	14.6	--	--	14.6	--	14.6
2002	5	27.0	--	--	27.0	--	27.0
2003	6	32.0	--	--	32.0	--	32.0
2004	6	26.1	--	--	26.1	--	26.1
2005	--	--	--	--	--	--	--
2006	--	--	--	--	--	--	--
2007	--	--	--	--	--	--	--
2008	--	--	--	--	--	--	--
2009	2	6.5	--	--	6.5	--	6.5
2010	3	10.4	--	--	10.4	--	10.4
2011	5	13.2	--	--	13.2	--	13.2
2012	5	12.4	--	--	12.4	--	12.4
2013	5	11.7	--	--	11.7	--	11.7
2014	5	10.2	--	--	10.2	--	10.2
2015	5	12.3	--	--	12.3	--	12.3
2016	5	12.2	--	--	12.2	--	12.2
2017	6	14.7	--	--	14.7	--	14.7
2018	5	12.2	--	--	12.2	--	12.2
2019	4	9.8	--	--	9.8	--	9.8
2020	4	9.8	--	--	9.8	--	9.8
2021	4	9.7	--	--	9.7	--	9.7
2022	4	9.8	--	--	9.8	--	9.8
2023	4	9.8	--	--	9.8	--	9.8
2024	4	9.8	--	--	9.8	--	9.8
Subtotal	94	309.3	--	--	309.3	--	309.3

Annual Funding 1611 Procurement Shipbuilding and Conversion, Navy								
Fiscal Year	Quantity	TY \$M						
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program	
1995	1	13.9	--	--	13.9	1.6	15.5	
1996	1	11.3	--	--	11.3	0.1	11.4	
1997	--	--	--	--	--	--	--	
1998	3	31.8	--	--	31.8	3.2	35.0	
1999	1	9.0	--	--	9.0	0.9	9.9	
2000	2	14.3	--	--	14.3	1.7	16.0	
2001	2	12.3	--	--	12.3	1.1	13.4	
2002	2	15.4	--	--	15.4	1.7	17.1	
2003	1	5.8	--	--	5.8	0.8	6.6	
2004	1	6.3	--	--	6.3	0.6	6.9	
2005	1	7.6	--	--	7.6	0.6	8.2	
2006	2	12.6	--	--	12.6	1.3	13.9	
2007	3	16.8	--	--	16.8	5.9	22.7	
2008	2	12.8	--	--	12.8	3.3	16.1	
2009	3	13.8	--	--	13.8	6.4	20.2	
2010	1	6.9	--	--	6.9	0.7	7.6	
2011	3	12.1	--	--	12.1	4.9	17.0	
2012	2	8.6	--	--	8.6	3.3	11.9	
2013	5	24.1	--	--	24.1	6.2	30.3	
2014	1	5.0	--	--	5.0	1.4	6.4	
2015	2	8.8	--	--	8.8	2.4	11.2	
2016	5	31.2	--	--	31.2	6.2	37.4	
2017	4	23.5	--	--	23.5	6.5	30.0	
2018	4	22.5	--	--	22.5	5.6	28.1	
2019	3	13.5	--	--	13.5	3.4	16.9	
2020	6	38.2	--	--	38.2	9.5	47.7	
2021	3	22.0	--	--	22.0	5.5	27.5	
2022	3	17.3	--	--	17.3	4.3	21.6	
2023	4	29.8	--	--	29.8	7.5	37.3	
2024	5	34.6	--	--	34.6	8.6	43.2	
2025	6	48.3	--	--	48.3	12.1	60.4	
2026	5	35.2	--	--	35.2	8.8	44.0	
2027	4	35.3	--	--	35.3	8.8	44.1	
2028	4	35.8	--	--	35.8	8.9	44.7	
2029	3	26.1	--	--	26.1	6.5	32.6	
2030	3	26.0	--	--	26.0	6.5	32.5	
2031	1	11.2	--	--	11.2	2.8	14.0	
2032	1	11.4	--	--	11.4	2.9	14.3	
Subtotal	103	711.1	--	--	711.1	162.5	873.6	

Annual Funding 1611 Procurement Shipbuilding and Conversion, Navy							
Fiscal Year	Quantity	BY 2002 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1995	1	14.7	--	--	14.7	1.7	16.4
1996	1	11.8	--	--	11.8	0.1	11.9
1997	--	--	--	--	--	--	--
1998	3	32.0	--	--	32.0	3.2	35.2
1999	1	8.9	--	--	8.9	0.9	9.8
2000	2	13.8	--	--	13.8	1.7	15.5
2001	2	11.5	--	--	11.5	1.0	12.5
2002	2	14.3	--	--	14.3	1.6	15.9
2003	1	5.1	--	--	5.1	0.7	5.8
2004	1	5.3	--	--	5.3	0.5	5.8
2005	1	6.2	--	--	6.2	0.5	6.7
2006	2	9.9	--	--	9.9	1.0	10.9
2007	3	12.6	--	--	12.6	4.4	17.0
2008	2	9.3	--	--	9.3	2.4	11.7
2009	3	9.7	--	--	9.7	4.5	14.2
2010	1	4.7	--	--	4.7	0.5	5.2
2011	3	8.0	--	--	8.0	3.2	11.2
2012	2	5.5	--	--	5.5	2.2	7.7
2013	5	15.2	--	--	15.2	3.9	19.1
2014	1	3.1	--	--	3.1	0.9	4.0
2015	2	5.3	--	--	5.3	1.5	6.8
2016	5	18.5	--	--	18.5	3.7	22.2
2017	4	13.7	--	--	13.7	3.7	17.4
2018	4	12.8	--	--	12.8	3.2	16.0
2019	3	7.5	--	--	7.5	1.9	9.4
2020	6	20.9	--	--	20.9	5.2	26.1
2021	3	11.8	--	--	11.8	3.0	14.8
2022	3	9.1	--	--	9.1	2.3	11.4
2023	4	15.4	--	--	15.4	3.8	19.2
2024	5	17.5	--	--	17.5	4.3	21.8
2025	6	23.9	--	--	23.9	6.0	29.9
2026	5	17.1	--	--	17.1	4.3	21.4
2027	4	16.8	--	--	16.8	4.2	21.0
2028	4	16.7	--	--	16.7	4.2	20.9
2029	3	12.0	--	--	12.0	2.9	14.9
2030	3	11.7	--	--	11.7	2.9	14.6
2031	1	4.9	--	--	4.9	1.3	6.2
2032	1	4.9	--	--	4.9	1.3	6.2
Subtotal	103	442.1	--	--	442.1	94.6	536.7

Annual Funding 1810 Procurement Other 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
1998	5	55.2	--	--	55.2	12.1	67.3
1999	5	79.7	--	--	79.7	1.7	81.4
2000	3	53.2	--	--	53.2	6.0	59.2
2001	6	36.4	--	--	36.4	--	36.4
2002	4	77.6	--	--	77.6	6.4	84.0
2003	6	64.9	--	--	64.9	6.1	71.0
2004	4	60.4	--	--	60.4	5.8	66.2
2005	3	60.9	--	--	60.9	6.2	67.1
2006	3	21.2	--	--	21.2	3.8	25.0
2007	5	34.4	--	--	34.4	3.6	38.0
2008	4	33.1	--	--	33.1	5.8	38.9
2009	4	29.3	--	--	29.3	4.9	34.2
2010	5	42.1	--	--	42.1	7.9	50.0
2011	5	47.7	--	--	47.7	13.7	61.4
2012	--	--	40.2	--	40.2	--	40.2
2013	2	20.2	--	--	20.2	11.2	31.4
2014	2	19.9	--	--	19.9	15.7	35.6
2015	4	24.3	--	--	24.3	36.5	60.8
2016	1	11.2	--	--	11.2	16.9	28.1
2017	2	18.0	--	--	18.0	9.0	27.0
2018	2	18.2	--	--	18.2	12.1	30.3
2019	2	23.0	--	--	23.0	19.2	42.2
2020	1	26.7	--	--	26.7	6.7	33.4
2021	1	21.0	--	--	21.0	5.3	26.3
2022	2	24.4	--	--	24.4	6.1	30.5
2023	2	22.5	--	--	22.5	5.6	28.1
2024	2	22.0	--	--	22.0	5.5	27.5
2025	2	22.4	--	--	22.4	5.6	28.0
2026	5	31.8	--	--	31.8	8.0	39.8
2027	8	51.6	--	--	51.6	12.9	64.5
2028	7	46.2	--	--	46.2	11.6	57.8
2029	7	47.0	--	--	47.0	11.7	58.7
2030	7	47.9	--	--	47.9	12.0	59.9
2031	--	--	--	--	--	4.8	4.8
2032	--	--	--	--	--	4.9	4.9
Subtotal	121	1194.4	40.2	--	1234.6	305.3	1539.9

Annual Funding 1810 Procurement Other Procurement, Navy							
Fiscal Year	Quantity	BY 2002 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1998	5	57.3	--	--	57.3	12.5	69.8
1999	5	81.6	--	--	81.6	1.8	83.4
2000	3	53.7	--	--	53.7	6.1	59.8
2001	6	36.3	--	--	36.3	--	36.3
2002	4	76.3	--	--	76.3	6.3	82.6
2003	6	62.6	--	--	62.6	5.9	68.5
2004	4	56.9	--	--	56.9	5.4	62.3
2005	3	55.8	--	--	55.8	5.6	61.4
2006	3	18.8	--	--	18.8	3.4	22.2
2007	5	29.8	--	--	29.8	3.2	33.0
2008	4	28.3	--	--	28.3	4.9	33.2
2009	4	24.7	--	--	24.7	4.1	28.8
2010	5	34.8	--	--	34.8	6.5	41.3
2011	5	38.9	--	--	38.9	11.1	50.0
2012	--	--	32.2	--	32.2	--	32.2
2013	2	16.0	--	--	16.0	8.8	24.8
2014	2	15.5	--	--	15.5	12.3	27.8
2015	4	18.7	--	--	18.7	28.1	46.8
2016	1	8.5	--	--	8.5	12.8	21.3
2017	2	13.4	--	--	13.4	6.6	20.0
2018	2	13.2	--	--	13.2	8.8	22.0
2019	2	16.4	--	--	16.4	13.7	30.1
2020	1	18.7	--	--	18.7	4.6	23.3
2021	1	14.4	--	--	14.4	3.6	18.0
2022	2	16.4	--	--	16.4	4.1	20.5
2023	2	14.8	--	--	14.8	3.7	18.5
2024	2	14.2	--	--	14.2	3.6	17.8
2025	2	14.2	--	--	14.2	3.5	17.7
2026	5	19.7	--	--	19.7	5.0	24.7
2027	8	31.4	--	--	31.4	7.8	39.2
2028	7	27.5	--	--	27.5	7.0	34.5
2029	7	27.5	--	--	27.5	6.8	34.3
2030	7	27.5	--	--	27.5	6.8	34.3
2031	--	--	--	--	--	2.7	2.7
2032	--	--	--	--	--	2.7	2.7
Subtotal	121	983.8	32.2	--	1016.0	229.8	1245.8

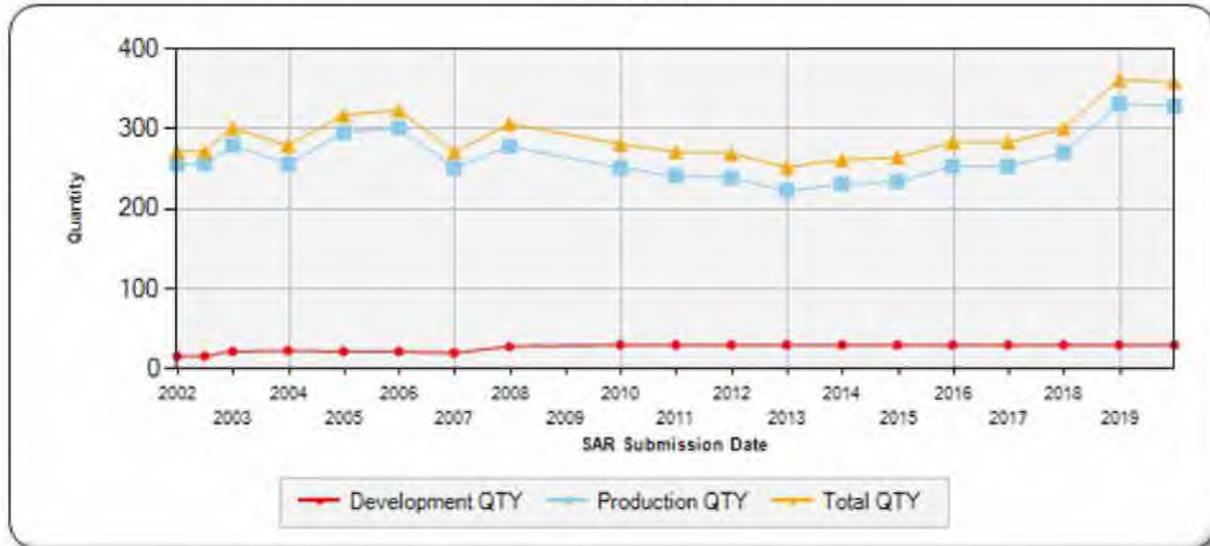
Charts

CEC first began SAR reporting in December 1997

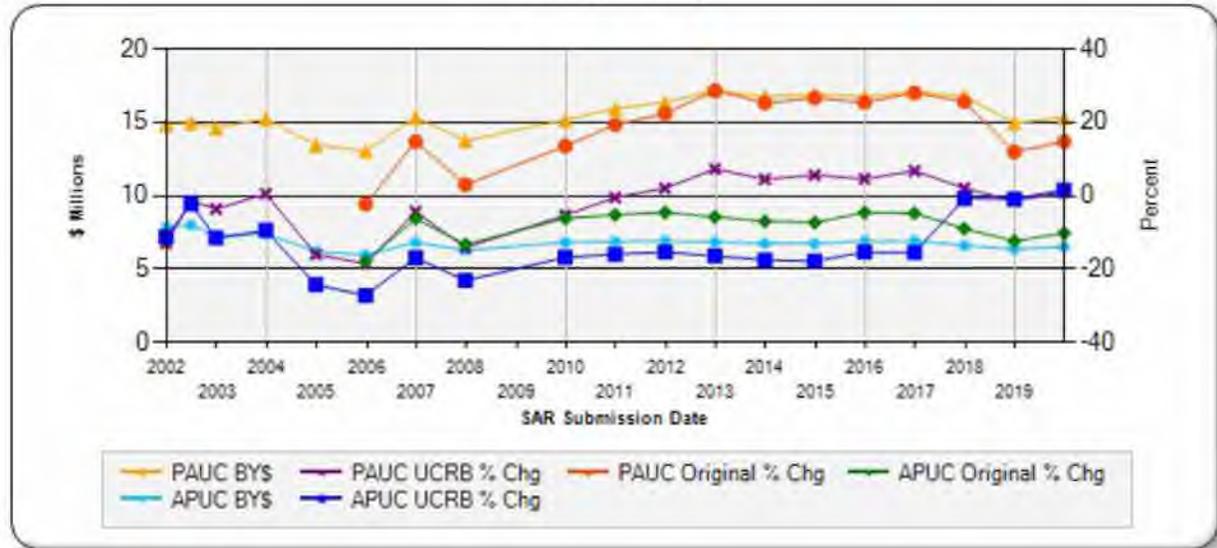
Program Acquisition Cost - CEC
Base Year 2002 \$M



Quantity - CEC



Unit Cost - CEC
Base Year 2002 \$M



Risks

Significant Schedule and Technical Risks

Significant Schedule and Technical Risks	
Airborne Milestone III (April 2014)	
1.	Track File Concurrence (TFC) Performance Shortfall: required software updates to resolve shortfalls
Milestone I (May 1995)	
1.	Interoperability between combat systems and tactical data links
Milestone II (May 1995)	
1.	Interoperability between combat systems and tactical data links
Shipboard Milestone III (April 2002)	
1.	CEC Shipboard-Block 2, new development effort to achieve advanced sensor netting system
Current Estimate (December 2019)	
1.	CEC Airborne Resolution of AN/USG-3B effectiveness - Mitigated via AMIIP
2.	Cybersecurity Vulnerabilities in Deployed CEC Assets
3.	Common Array Block-Shipboard (CAB-S) Antenna Late Delivery

Risks

Risk and Sensitivity Analysis

Risks and Sensitivity Analysis	
Current Baseline Estimate (January 2019)	
1.	Base Year-Total Acquisition Cost \$5431.1M, Average Procurement Unit Cost (APUC) \$6.415M, Program Acquisition Unit Cost \$15.171M
2.	Then Year-Total Acquisition Cost \$6416.1M, Average Procurement Unit Cost (APUC) \$8.383M, Program Acquisition Unit Cost \$17.922M
3.	Interoperability remains a technical risk with cost implications to the CEC program. To mitigate these risks the CEC program is continuing their evolutionary acquisition approach of delivering capability in increments, reducing technical and cost risk, while maintaining effectiveness and producibility.
4.	Track File Concurrence (TFC) Performance Shortfall: required software updates to resolve shortfalls
5.	Cybersecurity Vulnerabilities in Deployed CEC Assets
6.	Common Array Block-Shipboard (CAB-S) Antenna Late Delivery
Original Baseline Estimate (July 1995)	
1.	Base Year-Total Acquisition Cost \$2221.9M, Average Procurement Unit Cost (APUC) \$6.611M, Program Acquisition Unit Cost \$12.142M
2.	Then Year-Total Acquisition Cost \$2573.1M, Average Procurement Unit Cost (APUC) \$8.222M, Program Acquisition Unit Cost \$14.061M
3.	At program inception, interoperability between combat systems and tactical data links was a known risk with cost implications. To mitigate these risks the CEC program began pursuing an evolutionary acquisition process that would deliver capability in increments, reducing technical and cost risk, while maintaining effectiveness and producibility.
Revised Original Estimate (N/A)	
None	
Current Procurement Cost (December 2019)	
1.	Base Year-CEC Current Procurement Cost \$2137.4M
2.	Then Year-CEC Current Procurement Cost \$2846.2M

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	3/2/1998	10/31/2013
Approved Quantity	7	84
Reference	LRIP 1 ADM	LRIP 14 ADM
Start Year	1998	1998
End Year	1998	2013

The Current Total LRIP Quantity is more than 10% of the total production quantity due to the requirements to meet ship installation schedules, outfit Land Based Test Sites in preparation for completion of Operational Testing (OT), and to maintain the Minimum Sustaining Rate for production of CEC systems pending completion of OT and entry into FRP.

Foreign Military Sales

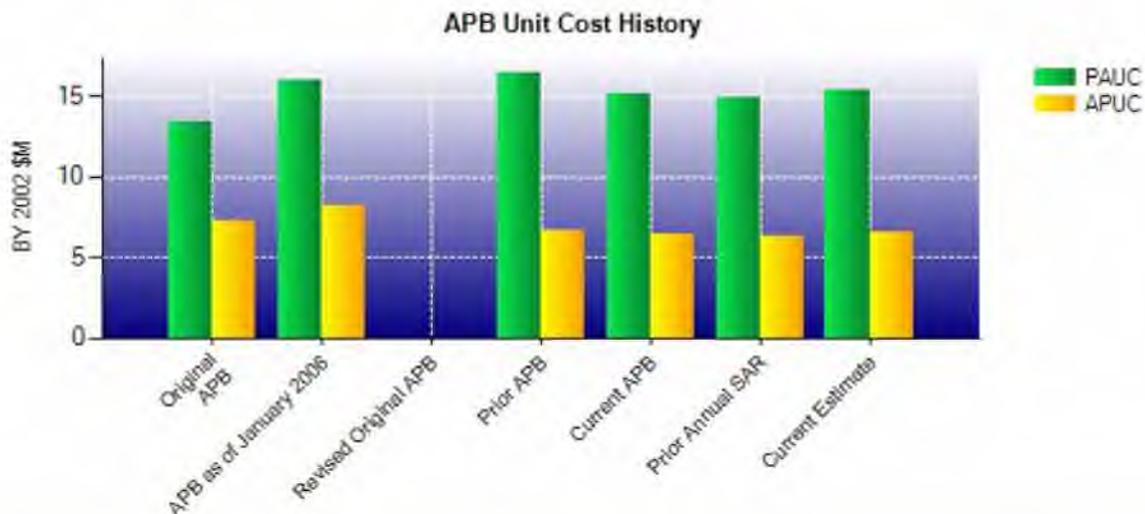
Classified FMS information is provided in the classified annex to this submission.

Nuclear Costs

None

Unit Cost

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2002 \$M	BY 2002 \$M	% Change
	Current UCR Baseline (Jan 2019 APB)	Current Estimate (Dec 2019 SAR)	
Program Acquisition Unit Cost			
Cost	5431.1	5483.8	
Quantity	358	358	
Unit Cost	15.171	15.318	+0.97
Average Procurement Unit Cost			
Cost	2104.2	2137.4	
Quantity	328	328	
Unit Cost	6.415	6.516	+1.57
Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2002 \$M	BY 2002 \$M	% Change
	Original UCR Baseline (Jul 1995 APB)	Current Estimate (Dec 2019 SAR)	
Program Acquisition Unit Cost			
Cost	2443.4	5483.8	
Quantity	183	358	
Unit Cost	13.352	15.318	+14.72
Average Procurement Unit Cost			
Cost	1262.8	2137.4	
Quantity	174	328	
Unit Cost	7.257	6.516	-10.21



APB Unit Cost History					
Item	Date	BY 2002 \$M		TY \$M	
		PAUC	APUC	PAUC	APUC
Original APB	Jul 1995	13.326	7.257	14.061	8.222
APB as of January 2006	Jun 2004	16.010	8.184	16.814	9.235
Revised Original APB	N/A	N/A	N/A	N/A	N/A
Prior APB	Nov 2017	16.431	6.660	18.560	8.111
Current APB	Jan 2019	15.171	6.415	17.922	8.383
Prior Annual SAR	Dec 2018	14.942	6.358	17.757	8.413
Current Estimate	Dec 2019	15.318	6.516	18.343	8.677

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	
14.060	-0.656	-2.840	0.590	0.420	5.010	0.000	-0.736	1.788	15.848

Current SAR Baseline to Current Estimate (TY \$M)									
PAUC Production Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
15.848	0.227	-2.268	3.125	0.708	0.178	0.000	0.525	2.495	18.343

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	
8.220	-0.532	-0.797	0.291	-0.439	1.761	0.000	0.731	1.015	9.235

Current SAR Baseline to Current Estimate (TY \$M)									
APUC Production Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
9.235	0.151	-0.505	1.043	-1.010	-0.799	0.000	0.562	-0.558	8.677

SAR Baseline History					
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current Estimate	
Milestone I		N/A	N/A	N/A	N/A
Milestone II		N/A	May 1995	May 1995	May 1995
Milestone III		N/A	Oct 1998	Apr 2002	Apr 2002
IOC		N/A	Sep 1996	Sep 1996	Sep 1996
Total Cost (TY \$M)		N/A	2573.1	4310.7	6566.8
Total Quantity		N/A	183	272	358
PAUC		N/A	14.061	15.848	18.343

IOC identified above refers to the CEC Shipboard configuration, AN/USG-2. FOC occurred in conjunction with Airborne IOC in May 2005.

Cost Variance

Summary TY \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	1946.5	2364.2	--	4310.7
Previous Changes				
Economic	+29.1	+49.0	--	+78.1
Quantity	+51.6	+530.3	--	+581.9
Schedule	+647.9	+271.7	--	+919.6
Engineering	+584.9	-336.8	--	+248.1
Estimating	+362.0	-266.5	--	+95.5
Other	--	--	--	--
Support	+3.6	+172.7	--	+176.3
Subtotal	+1679.1	+420.4	--	+2099.5
Current Changes				
Economic	+2.7	+0.4	--	+3.1
Quantity	--	-30.8	--	-30.8
Schedule	+128.5	+70.5	--	+199.0
Engineering	--	+5.5	--	+5.5
Estimating	-36.2	+4.4	--	-31.8
Other	--	--	--	--
Support	--	+11.6	--	+11.6
Subtotal	+95.0	+61.6	--	+156.6
Total Changes	+1774.1	+482.0	--	+2256.1
Current Estimate	3720.6	2846.2	--	6566.8

Summary BY 2002 \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	2028.1	2095.2	--	4123.3
Previous Changes				
Economic	--	--	--	--
Quantity	+47.8	+199.9	--	+247.7
Schedule	+450.6	+107.7	--	+558.3
Engineering	+494.5	-214.7	--	+279.8
Estimating	+265.7	-66.7	--	+199.0
Other	--	--	--	--
Support	+2.8	-16.8	--	-14.0
Subtotal	+1261.4	+9.4	--	+1270.8
Current Changes				
Economic	--	--	--	--
Quantity	--	-13.6	--	-13.6
Schedule	+82.1	+33.3	--	+115.4
Engineering	--	+2.4	--	+2.4
Estimating	-25.2	+4.9	--	-20.3
Other	--	--	--	--
Support	--	+5.8	--	+5.8
Subtotal	+56.9	+32.8	--	+89.7
Total Changes	+1318.3	+42.2	--	+1360.5
Current Estimate	3346.4	2137.4	--	5483.8

Previous Estimate: December 2018

RDT&E	\$M	
	Base Year	Then Year
Current Change Explanations		
Revised escalation indices. (Economic)	N/A	+2.7
New Schedule Change due to shifting a development effort from FY 2024 to FY 2025. (Schedule)	+82.1	+128.5
New Estimating Change due to reducing risk and Rate Model Adjustments. (Estimating)	-23.4	-33.5
Adjustment for current and prior escalation. (Estimating)	-0.7	-1.0
New Estimating change due to FY 2021 Inflation Indices applied. (Estimating)	-1.1	-1.7
RDT&E Subtotal	+56.9	+95.0

Procurement	\$M	
	Base Year	Then Year
Current Change Explanations		
Revised escalation indices. (Economic)	N/A	+0.4
Total Quantity variance resulting from a decrease of 3 Shipbuilding and Conversion, Navy (SCN) from 106 to 103 (Navy). (Subtotal)	-10.8	-24.5
Quantity variance resulting from a decrease of 3 SCN from 106 to 103 (Navy). (Quantity)	(-13.6)	(-30.8)
Allocation to Schedule resulting from Quantity change. (Schedule) (QR)	(-1.5)	(-3.4)
Allocation to Engineering resulting from Quantity change. (Engineering) (QR)	(+2.4)	(+5.5)
Allocation to Estimating resulting from Quantity change. (Estimating) (QR)	(+1.9)	(+4.2)
Stretch-out of SCN procurement buy profile from FY 2024 to FY 2025. One unit. (Schedule)	0.0	+6.5
Stretch-out of Other Procurement, Navy (OPN) procurement buy profile from FY 2024 to FY 2025. (Schedule)	0.0	+6.0
New Additional Schedule Change due to shift in SCN procurement quantities from FY 2021-FY 2024 to FY 2025-FY 2028. (Schedule)	+14.8	+28.1
New Additional Schedule Change due to shift in OPN procurement quantities from FY 2019-FY 2025 to FY 2026-FY 2030. (Schedule)	+20.0	+33.3
Adjustment for current and prior escalation. (Estimating)	+0.3	+0.1
New Estimating change due to FY 2021 Inflation Indices applied. (Estimating)	-8.7	-17.2
New Estimating change due to FY 2021 Inflation Indices applied. (Estimating)	+11.1	+16.8
New Estimating change due to FY 2021 Inflation Indices applied. (Estimating)	+0.3	+0.5
Adjustment for current and prior escalation. (Support)	-0.4	-0.4
Decrease in Other Support due to SCN schedule changes. FY 2019 to FY 2029. (Support)	-1.6	-2.2
Increase in Other Support due to OPN schedule changes. FY 2020 to FY 2030. (Support)	+7.8	+14.2
Procurement Subtotal	+32.8	+61.6

(QR) Quantity Related

Contracts

Contract Identification

Appropriation: Procurement
Contract Name: CEC Production (FY 2015- FY2021)
Contractor: DRS Laurel Technologies
Contractor Location: 246 Airport Rd
 Johnstown, PA 15904-7224
Contract Number: N00024-15-C-5228/0
Contract Type: Firm Fixed Price (FFP)
Award Date: February 25, 2015
Definitization Date: February 25, 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
2.0	N/A	2	86.8	N/A	53	227.0	227.0

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to increase of 51 CEC systems procured since initial contract.

Cost and Schedule Variance Explanations

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

Notes

The FFP portion of this contract includes production and testing for AN/USG-2B (Shipboard), AN/USG-3B (Airborne), AN/USG-4B (USMC) CEC systems and back fit kits to convert AN/USG -2/2A to AN/USG-2B. The Cost Plus Fixed Fee portion of the contract includes Engineering Services in support of the manufacture, assembly, and testing of the CEC production systems under the contract.

The Contract Current Contract Quantity changed from 41 to 53 to reflect current quantity on contract.

Contract Identification

Appropriation: RDT&E
Contract Name: Common Array Block (CAB) Antenna Development and Production
Contractor: Raytheon
Contractor Location: 8333 Bryan Dairy Road
 Largo, FL 33777-1444
Contract Number: N00024-13-C-5230/0
Contract Type: Cost Plus Incentive Fee (CPIF)
Award Date: September 27, 2013
Definitization Date: September 27, 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	
7.3	N/A	6	77.0	N/A	5	83.6	83.6	

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to exercising Engineering Development Model options and Pre-Production Unit options.

Contract Variance			
Item	Cost Variance		Schedule Variance
Cumulative Variances To Date (1/15/2020)	-0.8		-0.6
Previous Cumulative Variances	-17.5		-0.1
Net Change	+16.7		-0.5

Cost and Schedule Variance Explanations

The favorable net change in the cost variance is due to completion of most of the EDM Phase of the contract and realization of previous cost overruns.

The unfavorable net change in the schedule variance is due to delays in CAB-E and CAB-S PPU Hardware, Test, Software, and Manufacturing.

Notes

This contract includes labor, facilities, engineering and technical support services required for the design, engineering development, documentation, fabrication and test and production for the development and production of the next generation of antennas for the CEC System.

Contract Identification

Appropriation: Procurement
Contract Name: CEC Signal Data Processor (SDP) Production (FY2017 - FY 2022)
Contractor: DRS Laurel Technologies
Contractor Location: 246 Airport Road
 Johnstown, PA 15904
Contract Number: N00024-17-C-5201/0
Contract Type: Firm Fixed Price (FFP)
Award Date: August 24, 2017
Definitization Date: August 24, 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	
0.5	N/A	3	12.0	N/A	63	82.0	82.0	

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to 60 additional principle items in accordance with the latest authorized contract modification.

Cost and Schedule Variance Explanations

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

Notes

This CEC SDP Production (FY 2017 - FY 2022) contract is a follow-on to the CEC SDP-S Production (FY 2011 - FY 2016) contract and includes the manufacture, assembly, test, and repair, of a SDP assembly for the Cooperative Engagement Transmission Processing Set.

Contract Identification

Appropriation: RDT&E
Contract Name: CEC Design Agent/Engineering Services Competitive (FY 2019 - FY 2024)
Contractor: Raytheon
Contractor Location: Largo, FL 33777-1444
Contract Number: N00024-19-C-5200/0
Contract Type: Cost Plus Fixed Fee (CPFF), Cost Plus Incentive Fee (CPIF), Firm Fixed Price (FFP)
Award Date: May 08, 2020
Definitization Date: May 08, 2020

Contract Price								
Initial Contract Price (\$M)			Current Contract Price (\$M)			Estimated Price At Completion (\$M)		
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager	
8.0	N/A	0	21.5	N/A	0	279.3	279.3	

Target Price Change Explanation

The difference between the Initial Contract Price Target and the Current Contract Price Target is due to exercising options for CLIN 0100, CEC Advance Studies and Integration; and CLIN 0300, CEC Software Sustainment and Support.

Contract Variance			
Item	Cost Variance		Schedule Variance
Cumulative Variances To Date (1/12/2020)	+0.3		0.0
Previous Cumulative Variances	--		--
Net Change	+0.3		+0.0

Cost and Schedule Variance Explanations

The favorable cumulative cost variance is due to underruns in systems engineering support.

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	30	30	30	100.00%
Production	328	199	328	60.67%
Total Program Quantity Delivered	358	229	358	63.97%

Expended and Appropriated (TY \$M)			
Total Acquisition Cost	6566.8	Years Appropriated	27
Expended to Date	4627.6	Percent Years Appropriated	69.23%
Percent Expended	70.47%	Appropriated to Date	5050.1
Total Funding Years	39	Percent Appropriated	76.90%

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

Operating and Support Cost

Cost Estimate Details

Date of Estimate:	January 27, 2020
Source of Estimate:	Update to NAVSEA letter 7000 Ser 05C/037 dated December 13, 2018.
Quantity to Sustain:	314
Unit of Measure:	System
Service Life per Unit:	20.00 Years
Fiscal Years in Service:	FY 1994 - FY 2052

The total quantity changed from 361 to 358 systems. The total quantity to sustain changed from 317 to 314 since systems are CAB back fits and do not require sustainment. The unit of measure is the AN/USG-2/2A/2B Shipboard variant and AN/USG-3/3B Airborne Variant.

The sustainment strategy costs include: prime contractor and government in-service engineering support, continuing engineering support for Navy in-house facilities and software maintenance, depot repairs of CEC equipment, modification kit procurements and installations, and fleet recurring training.

Sustainment Strategy

Sustainment strategy for CEC uses a two-level maintenance philosophy, Organizational (O-Level) and Depot Level (D-Level). O-Level includes both corrective and preventive maintenance. In addition, the CEC program maximizes the use of Commercial Items/Non-Developmental Items (CI/NDI), as well as the use of common equipment such as the SDP-S and software across different platforms. Use of common equipment and software reduces initial acquisition costs and life cycle costs through supply chain efficiencies such as pooling of spares and sharing depot operations.

Antecedent Information

No Antecedent

Cost Element	Annual O&S Costs BY2002 \$M	
	CEC Average Annual Cost Per System	No Antecedent (Antecedent) N/A
Unit-Level Manpower	0.000	0.000
Unit Operations	0.007	0.000
Maintenance	0.114	0.000
Sustaining Support	0.058	0.000
Continuing System Improvements	0.151	0.000
Indirect Support	0.000	0.000
Other	0.000	0.000
Total	0.330	--

CEC Unit-Level Manpower and associated Indirect Support costs are covered by the host platforms.

Item	Total O&S Cost \$M			
	CEC		Current Estimate	No Antecedent (Antecedent)
	Current Production APB Objective/Threshold			
Base Year	1757.6	1933.4	1716.2	N/A
Then Year	3049.0	N/A	3002.0	N/A

Equation to Translate Annual Cost to Total Cost

The average annual cost for to support a CEC system (0.33M) multiplied by the number of systems to sustain (314) multiplied by a 20 year life results in a value higher than the Total O&S Estimated Cost Current Estimate (1716.2) due to some systems having an actual service life of less than the projected 20 years.

O&S Cost Variance		
Category	BY 2002 \$M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2018 SAR	1753.0	
Programmatic/Planning Factors	-24.4	Removal of 3 units from 361 to 358.
Cost Estimating Methodology	-12.4	Changes in escalation.
Cost Data Update	0.0	
Labor Rate	0.0	
Energy Rate	0.0	
Technical Input	0.0	
Other	0.0	
Total Changes	-36.8	
Current Estimate	1716.2	

Disposal Estimate Details

Date of Estimate:	January 27, 2020
Source of Estimate:	Update to NAVSEA letter 7000 Ser 05C/037 dated December 13, 2018
Disposal/Demilitarization Total Cost (BY 2002 \$M):	47.8

Disposal/Demilitarization Total Cost changed from 48.4M to 47.8M due to decreased quantity of ships requiring disposal.