



## Selected Acquisition Report (SAR)

RCS: DD-A&T(Q&A)823-180



### **DDG 51 Arleigh Burke Class Guided Missile Destroyer (DDG 51)**

As of FY 2020 President's Budget

Defense Acquisition Management  
Information Retrieval  
(DAMIR)

This document contains information that may be exempt from mandatory disclosure under the FOIA.

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**~~(U//FOUO)~~ Sensitivity Originator**

**Organization:** PMS 400D  
**Organization Email:**  
**Organization Phone:** 202-781-2177

The Aggregate Report Sensitivity has been defined as (U//~~FOUO~~) with the following explanation: Non public competitive/company proprietary information

## 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**

DDG 51 Arleigh Burke Class Guided Missile Destroyer (DDG 51)

**DoD Component**

Navy

## Responsible Office

CAPT Casey J. Moton, USN  
Program Executive Office Ships (PEO Ships)  
1333 Isaac Hull Avenue SE  
Washington, DC 20376-2301

[casey.moton@navy.mil](mailto:casey.moton@navy.mil)

**Phone:** 202-781-2177  
**Fax:** 202-781-0021  
**DSN Phone:** 336-2177  
**DSN Fax:**  
**Date Assigned:** August 14, 2016

## References

### SAR Baseline (Production Estimate)

Decision Coordinating Paper #1337 Revision 1, Change 1 of August 22, 1986

### Approved APB

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated October 31, 2017



## Mission and Description

The DDG 51 Arleigh Burke Class Guided Missile Destroyer (DDG 51) is a multi-mission guided missile destroyer designed to operate offensively and defensively, independently, or as units of Carrier Strike Groups, Expeditionary Strike Groups, and Surface Action Groups in multi-threat environments that include air, surface, and subsurface threats. These ships will respond to Low Intensity Conflict/Coastal and Littoral Offshore Warfare scenarios as well as open ocean conflict providing or augmenting power projection, forward presence requirements, and escort operations at sea.

The DDG 51 Class comprises four separate variants or "Flights." DDGs 51–71 represent the original design and are designated as Flight I ships, whereas DDGs 72–78 are designated as Flight II ships and included capability upgrades such as the Joint Tactical Information Distribution System (JTIDS) Command and Control Processor, Combat Direction Finding, the Tactical Information Exchange System (TADIX B), SLQ-32(V)3, and the capability to launch and control the SM-2 Block IV Extended Range Missile. Flight IIA ships introduced new capabilities including Cooperative Engagement Capability (CEC) and a MK-45 Gun providing improved air and anti-missile defense and land attack. Flight III upgrades are centered on the Air and Missile Defense Radar (AMDR) AN/SPY-6(V)1 that enables Flight III ships to simultaneously perform Anti-Air Warfare (AAW) and Ballistic Missile Defense (BMD), which satisfies the Navy's critical need for an enhanced surface combatant Integrated Air and Missile Defense (IAMD) capability.

The DDG 51 Class ships provide outstanding combat capability and survivability characteristics while considering procurement and lifetime support costs. They feature extraordinary seakeeping and low observability characteristics. The DDG 51 features the AEGIS Weapon System (AWS), which has quick reaction time, high firepower, and improved Electronic Countermeasures capability in Anti-Air Warfare (AAW). The ships' Anti-Submarine Warfare (ASW) System provides superior long range multi-target detection and engagement capability with two embarked Light Airborne MultiPurpose System MK-III helicopters (DDG 79 and follow-on ships). The Advanced Tomahawk Weapon Control System (DDGs 79-95) and the Tactical Tomahawk Weapons Control System (DDG 96 and follow-on ships) allow employment of multiple variants of Tomahawk missiles for strike warfare. The MK-45 gun weapon system provides significant capability for surface warfare, land attack, and air defense. The CEC is being installed on DDG 51 Class Ships to promote Network Centric Warfare capability. The AWS is the heart of an integrated combat system that provides area coverage and command/control focus in all dimensions of Naval Warfighting and Joint Military Operations: AAW; ASW; Anti-Surface Warfare; Command, Control, Communications, Computers & Intelligence; and Strike Warfare. DDG 113 and follow ships will provide IAMD and work with other BMD assets.

The AWS for Flight III comprises the AN/SPY-6(V)1 radar system, Command and Decision System MK 2, Weapons Control System MK 7, Missile Fire Control System MK 99, Operational Readiness and Test System MK 9, AEGIS Display System MK 2, AEGIS Computer Programs, Advanced Training Domain, and Logistic Support System.



## Executive Summary

### Program Highlights Since Last Report

The DDG 51 Program has successfully delivered 67 ships since program inception in 1985. The program is currently in serial production with nine ships under construction and a total of 21 under contract at two current DDG 51 class shipbuilders, Huntington Ingalls Industries – Ingalls Shipbuilding (Hill Ingalls) and General Dynamics - Bath Iron Works (GD BIW), as of this report date.

The Navy has instituted several initiatives to continually manage cost associated with DDG 51 Class ships including the increased use of competitive contracts in lieu of sole source contracts. Other cost savings initiatives include the use of competitive Multi-Year Procurement (MYP) contracts, refurbished assets from retiring Navy ships and leveraging Government Furnished Equipment (GFE) contracts across multiple ship classes to obtain better prices across the Navy.

The Navy is currently procuring Flight III ships which will provide enhanced surface combatant Integrated Air Missile Defense (IAMD) capability. The Flight III baseline consists of the integration of the AN/SPY-6(V)1 radar along with upgrades to the electrical power and cooling capacity plus additional associated changes. The Flight III baseline begins with DDGs 125-126 (FY 2017 hulls) and will continue with DDG 128 (FY 2018) and follow. DDG 125 started fabrication on May 07, 2018.

The Navy awarded two contracts for the DDG 51 FY 2018 - 2022 MYP for a total of 10 Flight III destroyers on September 27, 2018. The MYP continues the procurement for the proven DDG 51 Class shipbuilding program, leveraging competition, a strong industrial base and a stable design in order to achieve savings. On December 21, 2018, the Navy awarded the FY 2019 option ship appropriated in the FY 2019 Consolidated Appropriations Act (P.L. 115-245) to GD BIW, bringing the total number of Flight III ships on contract to 13.

Congress reduced the DDG 51 Shipbuilding and Conversion, Navy (SCN) FY 2019 budget request by \$3.5 million for excess electronics growth and added \$250 million in Advance Procurement (AP) for an additional FY 2020 ship. Congress also rescinded \$94 million in FY 2011 and \$66 million in FY 2012 SCN funding due to efficiencies following program restart.

The PB 2020 budget requests \$5,149.3M Full Funding for three ships in FY 2020 and \$224.0M in Economic Order Quantity funds to procure ship construction material for FY 2021 and FY 2022 hulls.

The DDG 51 Class Program has achieved the following significant production milestones since the last report:

- DDG 114 (RALPH JOHNSON) Commissioned in Charleston, SC March 24, 2018.
- DDG 114 (RALPH JOHNSON) Final Contract Trials (FCT) completed September 24, 2018.
- DDG 116 (THOMAS HUDNER) Acceptance (Charlie) Trials completed April 30, 2018.
- DDG 116 (THOMAS HUDNER) Delivered June 15, 2018.
- DDG 116 (THOMAS HUDNER) Commissioned December 01, 2018.
- DDG 117 (PAUL IGNATIUS) Acceptance Trials completed December 21, 2018.
- DDG 117 (PAUL IGNATIUS) Delivered February 22, 2019.
- DDG 118 (DANIEL INOUYE) Lay Keel achieved March 20, 2018.
- DDG 119 (DELBERT BLACK) AEGIS Light Off completed September 07, 2018.
- DDG 120 (CARL M. LEVIN) Lay Keel achieved February 01, 2019.
- DDG 121 (FRANK E. PETERSEN, JR.) Launched July 13, 2018.
- DDG 121 (FRANK E. PETERSEN, JR.) Christened October 06, 2018.
- DDG 124 (HARVEY C. BARNUM, JR.) Start of Fabrication achieved July 17, 2018.
- DDG 125 (JACK H. LUCAS) Start of Fabrication achieved May 07, 2018.
- DDG 127 (PATRICK GALLAGHER) Start of Construction achieved November 09, 2018.
- DDG 128 (TED STEVENS) named January 04, 2019.
- DDG 129 (JEREMIAH DENTON) named January 04, 2019.

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
May 1978	The Chief of Naval Operations (CNO) initiated DDGX Study Group to establish the requirements for the next generation of surface combatants.
October 1979	DDGX Project Office (93X) established in NAVSEA.
February 1980	Surface Force Level-CNO Executive Board (CEB) promulgated.
February 1980	Surface Combatant CEB Decision Memorandum (Milestone 0).
June 1981	Department of the Navy Systems Acquisition Review Council (DNSARC) reviewed the DDGX Program.
September 1981	Requirement for a DSARC at Milestone I waived by SECDEF.
December 1981	DDGX re-designated DDG 51.
May 1982	DDG 51 Project Office was transferred from the Surface Ship Warfare Directorate (SEA 93X) into the AEGIS Shipbuilding Project Office as the Destroyer Division (PMS 400D).
November 1982	Secretary of the Navy (SECNAV) named DDG 51 "ARLEIGH BURKE".
December 1982	Preliminary Design completed.
May 1983	Contract Design initiated to support competitive selection of the lead shipbuilder in early FY 1985.
December 1983	The Secretary of Defense (SECDEF) Decision Memorandum authorized Program to proceed (Milestone II).
December 1984	SECDEF approved DDG 51 Acquisition Strategy for Flight I as part of the Program's Milestone II decision.
April 1985	Lead ship (DDG 51) contract awarded to Bath Iron Works Corporation (BIW).
1st Quarter FY 1986	Ships Characteristics Improvement Board (SCIB) approved the first upgrade to the DDG 51 Class ship configuration, designated Flight II, and implemented in the last ship in FY 1992.
October 1986	Approval of Milestone IIIA and Approval for Limited Production (ALP) for FY 1987 through FY 1989 (for three FY 1987 ships, three FY 1988, three 1989, and advance procurement of long lead material for three FY 1990 ships) granted by Assistant Secretary of the Navy for Shipbuilding and Logistics (ASN (S&L)) Program Decision Memorandum.
May 1987	Follow ship (DDG 52) awarded to Ingalls Shipbuilding, Incorporated.
February 1988	DDG 51 Class APB approved.
August 1989	ALP extended for DDG 51 Class ships and systems for which funds were appropriated through FY 1990, and long lead material for FY 1991 ships and systems by ASN (S&L) Program Decision Memorandum.
August 1990	SECDEF Major Warship Review (MWR) decision approved procurement of four DDG 51 Class ships per year starting in FY 1991.
January 1991	Continued production of the DDG 51 Class ships through FY 1991 approved by the Assistant Secretary of the Navy for Research, Development, and Acquisition (ASN (RD&A)) Program Decision Memorandum.
April 1991	Lead ship (DDG 51) delivered to Navy.
1st Quarter FY 1992	Upgrade for Flight II was introduced into DDG 72 in FY 1992 and was awarded to BIW as the lead yard.
April 1992	Continued production of the DDG 51 Class ships through FY 1992 approved by ASN (RD&A)

	Program Decision Memorandum.
July 1992	The Deputy Under Secretary of Defense (Acquisition) Memorandum established the DDG 51 Class Flight IIA variant as an ACAT ID program.
October 1992	DDG 52 delivered to Navy.
January 1993	Continued production of the DDG 51 Class ships and AN/SPY-1D radar system through FY 1993 approved by ASN (RD&A) Program Decision Memorandum.
February 1993	Initial Operating Capability achieved.
February 1994	DDG 51 Class Acquisition Strategy, Revision 1, was approved by Under Secretary of Defense for Acquisition and Technology (USD (A&T)) as part of the part of the Defense Acquisition Board's (DAB) Milestone IV Program Review prior to implementing Flight IIA.
April 1994	DDG Flight IIA ORD, Revision 1, Serial No. 336(1)-86-94.
July 1994	Flight IIA design awarded to BIW as lead yard for DDG 79.
July 1995	USD (A&T) re-designated the DDG 51 Ship Acquisition Program as an ACAT IC program.
March 1998	FY 1998 - FY 2001 Multi-Year Procurement (MYP) contracts awarded to BIW and Ingalls Shipbuilding.
April 2001	DDG 51 FY 2002 - FY 2004 MYP Acquisition Plan approved.
September 2002	FY 2002 - FY 2005 MYP contracts awarded to BIW and Ingalls Shipbuilding.
August 2005	DDG Flight IIA ORD, Revision 1 Serial No. 336(1)-86-94, Amended by Vice Chief of Naval Operations (VCNO) ltr Ser No. N09/484.
4th Quarter FY 2008	Navy announced decision to truncate the DDG 1000 Program at three ships and to continue production of the DDG 51 Class Program based on the changed threat assessment.
January 2009	USD (AT&L) Memorandum directed re-start of DDG 51 production through FY 2011, with an increase from 62 to 65 ships.
June 2009	DDG 51 Class Acquisition Strategy, Revision 2, approved by ASN (RD&A) reflecting continuing production of the DDG 51 Program and procurement of three additional ships (one in FY 2010 and two in FY 2011).
June 2011	First FY 2010 restart ship, DDG 113, awarded to Huntington Ingalls Industries (HII - formerly Ingalls Shipbuilding).
September 2011	DDG 51 Program Acquisition Strategy, Revision 2 with Addendum to reflect one ship in FY 2012, was approved by USD (AT&L).
September 2011	FY 2011 ships awarded to BIW and HII (one each). DDG 115 is first restart ship at BIW.
June 2012	DDG 51 Program Acquisition Strategy updated to reflect FY 2013 – FY 2017 MYP approved by USD (AT&L) to include introduction of Flight III in FY 2016 and FY 2017.
July 2012	USD (AT&L) established as Milestone Decision Authority for DDG 51 as an ACAT ID program.
June 2013	FY 2013 - FY 2017 MYP contracts awarded to BIW and HII.
May 2014	DDG 51 Class Acquisition Strategy Addendum for Air and Missile Defense Radar Incorporation (Flight III) approved.
October 2014	DDG 51 Flight III Capabilities Development Document validated by the Joint Requirements Oversight Council (JROC).
November 2016	DDG 51 Flight III Critical Design Review completed.
December 2016	First restart ship at HII, DDG 113, delivered to Navy.
February 2017	First restart ship at BIW, DDG 115, delivered to Navy.
June 2017	USD (AT&L) approves production of DDG 51 Flight III design and authorizes award of contracts for



	the first DDG 51 Flight III ships.
June 2017	HII awarded Flight III Engineering Change Proposal for DDG 125 (FY 2017 ship).
August 2017	Acquisition Program Baseline update to reflect Flight III ships approved by USD (AT&L).
September 2017	Acquisition Strategy Third Addendum for procurement of one FY 2016 Flight IIA Ship approved by USD (AT&L).
September 2017	BIW awarded Flight III ECP ship for DDG 126 (FY 2017 ship) and a construction contract for the congressionally-added third FY 2016 ship, DDG 127, as a Flight IIA.
January 2018	USD (AT&L) redesignated the DDG 51 Ship Acquisition Program as an ACAT IC program.
February 2018	Acquisition Strategy update reflecting FY 2018 - FY 2022 MYP signed.
May 2018	First Flight III (DDG 125) started fabrication.
September 2018	FY 2018 – FY 2022 MYP contracts awarded to BIW and HII.
December 2018	FY 2019 Option Ship awarded to BIW.

## 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 checked="" type="checkbox"/>
<b>Unit Cost</b>	PAUC	<input type="checkbox"/>
	APUC	<input type="checkbox"/>

### Explanation of Breach

The O&S Cost Breach exceeded APB estimates due to increase in ship quantity from last approved APB to current estimate (89 vice 97 ships). A Program Deviation Report is in progress.

### Nunn-McCurdy Breaches

#### Current UCR Baseline

PAUC	None
APUC	None

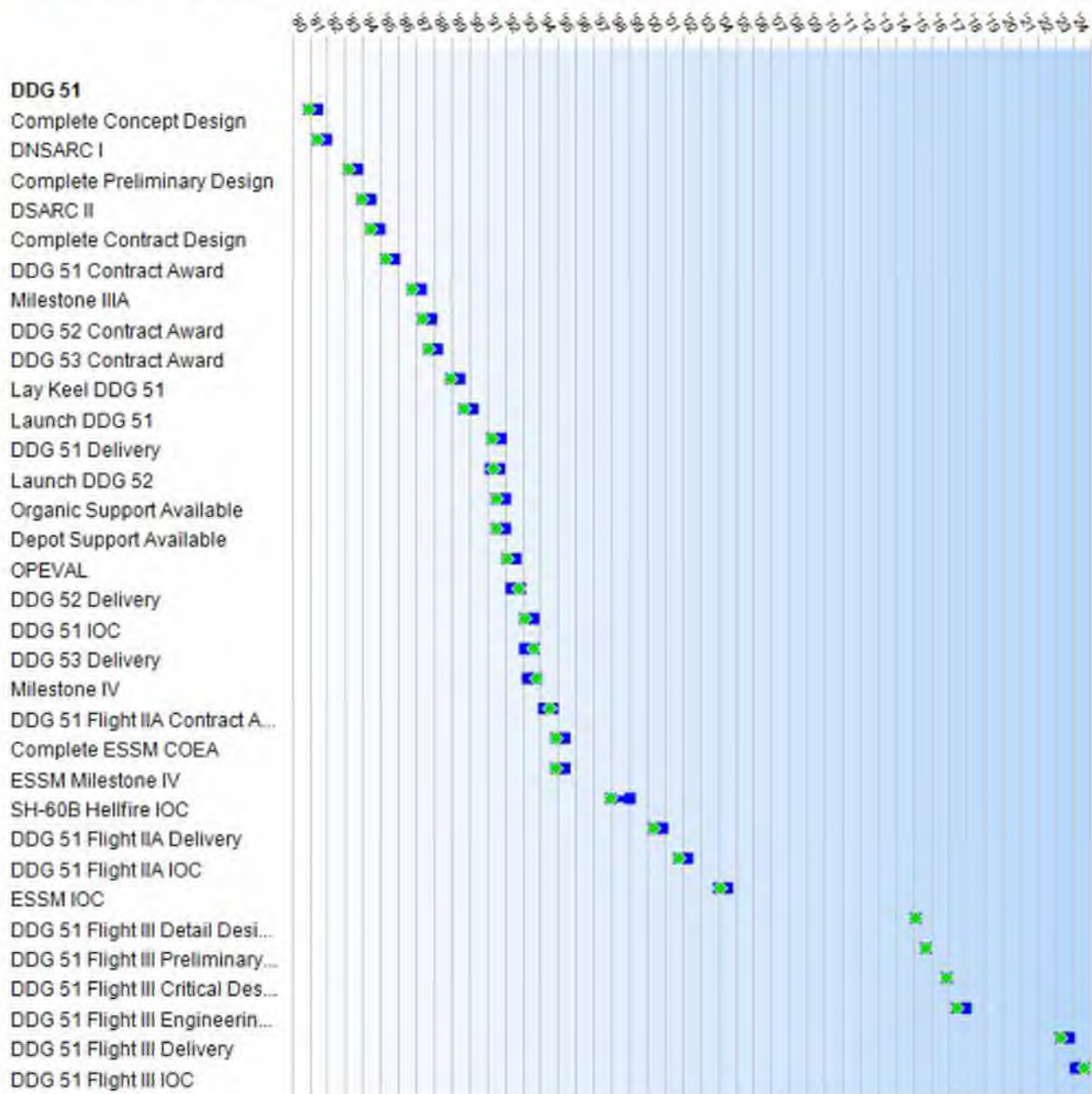
#### Original UCR Baseline

PAUC	None
APUC	None



# Schedule

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



Schedule Events				
Events	SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Current Estimate
Complete Concept Design	N/A	Dec 1980	Jun 1981	Dec 1980
DNSARC I	Jun 1981	Jun 1981	Dec 1981	Jun 1981
Complete Preliminary Design	N/A	Mar 1983	Sep 1983	Mar 1983
DSARC II	Dec 1983	Dec 1983	Jun 1984	Dec 1983
Complete Contract Design	N/A	Jun 1984	Dec 1984	Jun 1984
DDG 51 Contract Award	Apr 1985	Apr 1985	Oct 1985	Apr 1985
Milestone IIIA	Oct 1986	Oct 1986	Apr 1987	Oct 1986
DDG 52 Contract Award	Jan 1987	May 1987	Nov 1987	May 1987
DDG 53 Contract Award	N/A	Sep 1987	Mar 1988	Sep 1987
Lay Keel DDG 51	N/A	Dec 1988	Jun 1989	Dec 1988
Launch DDG 51	N/A	Sep 1989	Mar 1990	Sep 1989
DDG 51 Delivery	N/A	Apr 1991	Oct 1991	Apr 1991
Launch DDG 52	N/A	Mar 1991	Sep 1991	May 1991
Organic Support Available	N/A	Jul 1991	Jan 1992	Jul 1991
Depot Support Available	N/A	Jul 1991	Jan 1992	Jul 1991
OPEVAL	N/A	Feb 1992	Aug 1992	Feb 1992
DDG 52 Delivery	N/A	May 1992	Nov 1992	Oct 1992
DDG 51 IOC	Oct 1990	Feb 1993	Aug 1993	Feb 1993
DDG 53 Delivery	N/A	Feb 1993	Aug 1993	Aug 1993
Milestone IV	N/A	Apr 1993	Oct 1993	Oct 1993
DDG 51 Flight IIA Contract Award	N/A	Mar 1994	Sep 1994	Jul 1994
Complete ESSM COEA	N/A	Nov 1994	May 1995	Nov 1994
ESSM Milestone IV	N/A	Nov 1994	May 1995	Nov 1994
SH-60B Hellfire IOC	N/A	Dec 1997	Jan 1999	Dec 1997
DDG 51 Flight IIA Delivery	N/A	May 2000	Nov 2000	May 2000
DDG 51 Flight IIA IOC	N/A	Oct 2001	Apr 2002	Oct 2001
ESSM IOC	N/A	Jan 2004	Jul 2004	Feb 2004
DDG 51 Flight III Detail Design Contract Award	N/A	Feb 2015	Feb 2015	Feb 2015
DDG 51 Flight III Preliminary Design Review	N/A	Sep 2015	Sep 2015	Sep 2015
DDG 51 Flight III Critical Design Review	N/A	Nov 2016	Nov 2016	Nov 2016
DDG 51 Flight III Engineering Change Proposal Contract Award	N/A	Jun 2017	Dec 2017	Jun 2017
DDG 51 Flight III Delivery	N/A	Apr 2023	Oct 2023	Apr 2023
DDG 51 Flight III IOC	N/A	Feb 2024	Aug 2024	Aug 2024



**Change Explanations**

None

**Notes**

Planned Delivery Dates / Obligation Work Limiting Date for DDG 51 Ships

DDG 117: February 2019 / May 2020

DDG 118: April 2020 / July 2021

DDG 119: October 2019 / January 2021

DDG 120: January 2021 / April 2022

DDG 121: July 2020 / November 2021

DDG 122: October 2021 / January 2023

DDG 123: July 2021 / October 2022

DDG 124: June 2022 / September 2023

DDG 127: November 2022 / February 2024

DDG 125: April 2023 / July 2024

DDG 126: June 2024 / September 2025

DDG 128: October 2024 / January 2026

DDG 129: July 2025 / October 2026

DDG 130: July 2025 / October 2026

DDG 131: April 2026 / July 2027

DDG 132: May 2026 / August 2027

DDG 133: November 2026 / February 2028

DDG 134: November 2026 / February 2028

DDG 135: March 2027 / July 2028

DDG 136: June 2027 / TBD

DDG 137: September 2027 / TBD

DDG 138: December 2027 / TBD

Notes:

DDG 126- DDG 134 reflects contract milestone dates; DDG 135 reflects notional dates

**Acronyms and Abbreviations**

COEA - Cost and Operational Effectiveness Analysis  
DNSARC - Department of the Navy System Acquisition Review Council  
DSARC - Defense System Acquisition Review Council  
ESSM - Evolved Sea Sparrow Missile  
OPEVAL - Operational Evaluation

## Performance

Performance Characteristics				
SAR Baseline Production Estimate	Current APB Production Objective/Threshold		Demonstrated Performance	Current Estimate
<b>SHIP:</b>				
<b>Length (ft)</b>				
466	N/A	N/A	Baseline Dependent	Baseline Dependent
<b>Beam (ft)</b>				
59	N/A	N/A	59	59
<b>Navigational Draft (ft)</b>				
30.6	N/A	N/A	31.0	31.0
<b>Displacement (long tons)</b>				
8300	N/A	N/A	9300	9300
<b>Propulsion LM (Gas Turbine)</b>				
2500	N/A	N/A	2500	2500
<b>Accommodations</b>				
341	N/A	N/A	314	314
<b>MOBILITY:</b>				
<b>Speed (knots)</b>				
30	30	30	30	30
<b>Armament</b>				
<b>Anti-Submarine Warfare</b>				
<b>ASW System</b>				
AN/SQQ-89	N/A	N/A	AN/SQQ-89	AN/SQQ-89
<b>ASROC</b>				
VLA	N/A	N/A	VLA	VLA
<b>Helo</b>				
SEAHAWK; LAMPS	2 EMBARKEDHELOS	2 EMBARKEDHELOS	2 Embarked Helos	2 Embarked Helos
<b>Anti-Air Warfare</b>				
<b>Launchers</b>				
MK 41 VLS	N/A	N/A	MK 41 VLS	MK 41 VLS
<b>Missiles</b>				
SM-2 MR	N/A	N/A	SM-2 MR/SM-	SM-2 MR/SM-3/ESSM



			3/ESSM	
<b>Missile Fire Control System</b>				
3 MK 99	N/A	N/A	3 MK 99	3 MK 99
<b>Guns</b>				
2 PHALANX	N/A	N/A	2 PHALANX	2 PHALANX
<b>Anti-Surface/Strike Warfare</b>				
<b>Guns</b>				
1 5"/54	N/A	N/A	1 5"/62	1 5"/62
<b>Gunfire Control System</b>				
MK 160	N/A	N/A	MK 160	MK 160
<b>Anti-Ship Cruise Missile</b>				
HARPOON	N/A	N/A	N/A	N/A
<b>Cruise Missile</b>				
TOMAHAWK	N/A	N/A	TOMAHAWK	TOMAHAWK
<b>Electronic Warfare</b>				
SLQ-32 SRBOC	N/A	N/A	SLQ-32, SRBOC, Combat DF	SLQ-32, SRBOC, Combat DF
<b>Radars</b>				
<b>Surface</b>				
SPS-67	N/A	N/A	SPS-67	SPS-67/SPQ-9B
<b>3D</b>				
SPY-1D	N/A	N/A	SPY-1D (V)	SPY-1D (V)/SPY-6
<b>Cost (Flight III BY14\$B)</b>				
N/A	\$1.9	\$2.1	TBD	\$1.8
<b>Energy (Flight III Fuel Consumption BBL/168 hours)</b>				
N/A	5,500	8,500	TBD	8,500
<b>Annual Energy (Flight III Fuel Consumption) BBL per ship, per year</b>				
N/A	90,000	115,000	TBD	115,000
<b>Schedule (IOC first Flight III ship)</b>				
N/A	2nd Quarter FY 2024	4th Quarter FY 2024	TBD	4th Quarter FY 2024
<b>Space (Flight III - Square feet of Unassigned Arrangeable Area)</b>				
N/A	400	0	TBD	0
<b>Weight SLA (Flight III Full Load Displacement in Long Tons )</b>				
N/A	at least 10 percent	at least 5 percent	TBD	at least 5 percent
<b>Power SLA (Flight III MW remaining)</b>				
N/A	at least 1.435	at least 1.125	TBD	at least 1.125
<b>Cooling SLA (Flight III Rtons remaining)</b>				



N/A	110	(T=O) 110	TBD	110
<b>Sustainment (Flight III Material Availability)</b>				
N/A	at least 63 percent	at least 52 percent	TBD	at least 52 percent
<b>Sustainment (Flight III Operational Availability)</b>				
N/A	at least 87 percent	at least 72 percent	TBD	at least 72 percent
<b>Vertical Launching System (Flight III cells)</b>				
N/A	96	(T=O) 96	TBD	96
<b>Endurance (Flight III - Nm)</b>				
N/A	5,000	4,000	TBD	4,000
<b>Manpower (Flight III)</b>				
N/A	No greater than 297 (with accommodations for 380)	No greater than 318 (with accommodations for 359)	TBD	No greater than 318 (with accommodations for 359)
<b>Warfare Commander (Flight III)</b>				
N/A	12 watch standers (9 officer/3 enlisted), 4 consoles, 1 PC Chat, Single Office/Planning Space	2 consoles, 1 PC Chat (Dual Use Space)	TBD	2 consoles, 1 PC Chat (Dual use space)

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

#### Requirements Reference

ORD dated April 15, 1994 and the DDG 51 Flight III CDD, October 28, 2014

#### Change Explanations

None

**Acronyms and Abbreviations**

ASROC - Anti-Submarine Rocket  
ASW - Anti-Submarine Warfare  
BBL - Barrels  
BY - Base Year  
DF - Direction Finding  
ESSM - Evolved Sea Sparrow Missile  
FLT - Flight  
ft - Feet  
FTM - Flight Test Mission  
HELO - Helicopter  
IOC - Initial Operating Capability  
MK - Mark  
MR - Medium Range  
NM - Nautical Miles  
Rtons - Refrigeration Tons  
SLA - Service Life Allowance  
SM-2 - Standard Missile 2  
SM-3 - Standard Missile 3  
SRBOC - Super Rapid Blooming Off-Board Chaff  
TEMP - Test & Evaluation Master Plan  
VLA - Vertical Launching ASROC (Anti-Submarine Rocket)  
VLS - Vertical Launching System  
YDS - Yards

## Track to Budget

**RDT&E**

Appn	BA	PE		
Navy	1319	04	0603564N	
	<b>Project</b>		<b>Name</b>	
	0409		DDG-51 Flt III Concept Development	(Sunk)
Navy	1319	05	0604303N	
	<b>Project</b>		<b>Name</b>	
	1776		AEGIS Weapon System Mods	(Sunk)
Navy	1319	05	0604307N	
	<b>Project</b>		<b>Name</b>	
	1447		Surf Combatant Combat System Imp	(Shared)

**Procurement**

Appn	BA	PE		
Navy	1611	02	0204222N	
	<b>Line Item</b>		<b>Name</b>	
	2122		DDG-51	(Shared)
Navy	1611	05	0204222N	
	<b>Line Item</b>		<b>Name</b>	
	5110		Outfitting	(Shared)
	5300		Completion of PY Shipbuilding Programs	(Shared)

**MILCON**

Appn	BA	PE		
Navy	1205		0204228N	
	<b>Project</b>		<b>Name</b>	
	263		AEGIS Computer Center Building Addition	(Sunk)
Navy	1205		0605896N	
	<b>Project</b>		<b>Name</b>	
	261		Battle Force Combatant Education Facility	(Sunk)



## Cost and Funding

### Cost Summary

Total Acquisition Cost							
Appropriation	BY 1987 \$M			BY 1987 \$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	979.8	3504.1	3854.5	3598.6	916.6	4915.6	5119.3
Procurement	15948.3	64949.2	71444.1	70652.3	19173.1	106171.0	121481.8
Flyaway	--	--	--	70652.3	--	--	121481.8
Recurring	--	--	--	69547.0	--	--	119936.4
Non Recurring	--	--	--	1105.3	--	--	1545.4
Support	--	--	--	0.0	--	--	0.0
Other Support	--	--	--	0.0	--	--	0.0
Initial Spares	--	--	--	0.0	--	--	0.0
MILCON	25.6	37.6	41.4	37.6	27.8	44.5	44.5
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	16953.7	68490.9	N/A	74288.5	20117.5	111131.1	126645.6

#### Current APB Cost Estimate Reference

Department of the Navy Component Cost Position for the DDG 51 Arleigh Burke Class Guided Missile Destroyer. The O&S cost estimates include mid-life modernization for Flight III ships. The Component Cost Position is dated March 10, 2017

#### Cost Notes

No cost estimate for the program has been completed in the previous year. However, the Director of Cost Assessment and Program Evaluation did provide an updated independent cost estimate for the DDG 51 multi-year procurement (MYP) in August 2018. No program risks were identified in that estimate.

Total Quantity			
Quantity	SAR Baseline Production Estimate	Current APB Production	Current Estimate
RDT&E		0	0
Procurement		23	89
Total		23	89

## 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	4102.3	189.5	185.9	168.1	169.1	154.1	150.3	0.0	5119.3
Procurement	86423.2	6018.8	5454.2	3593.9	3716.2	6274.6	5766.4	4234.5	121481.8
MILCON	44.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.5
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB 2020 Total	90570.0	6208.3	5640.1	3762.0	3885.3	6428.7	5916.7	4234.5	126645.6
PB 2019 Total	91038.9	5961.8	4187.4	5417.6	5481.4	5595.1	4019.1	46.6	121747.9
Delta	-468.9	246.5	1452.7	-1655.6	-1596.1	833.6	1897.6	4187.9	4897.7

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	0	0	0	0	0	0	0	0	0	0
Production	0	79	3	3	2	2	3	3	2	97
PB 2020 Total	0	79	3	3	2	2	3	3	2	97
PB 2019 Total	0	79	3	2	3	3	3	2	0	95
Delta	0	0	0	1	-1	-1	0	1	2	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
1980	--	--	--	--	--	--	10.5
1981	--	--	--	--	--	--	35.3
1982	--	--	--	--	--	--	102.0
1983	--	--	--	--	--	--	150.7
1984	--	--	--	--	--	--	121.1
1985	--	--	--	--	--	--	138.8
1986	--	--	--	--	--	--	93.5
1987	--	--	--	--	--	--	100.4
1988	--	--	--	--	--	--	93.4
1989	--	--	--	--	--	--	52.3
1990	--	--	--	--	--	--	41.2
1991	--	--	--	--	--	--	87.5
1992	--	--	--	--	--	--	87.2
1993	--	--	--	--	--	--	110.6
1994	--	--	--	--	--	--	102.7
1995	--	--	--	--	--	--	89.6
1996	--	--	--	--	--	--	87.3
1997	--	--	--	--	--	--	82.5
1998	--	--	--	--	--	--	78.3
1999	--	--	--	--	--	--	155.4
2000	--	--	--	--	--	--	232.6
2001	--	--	--	--	--	--	143.5
2002	--	--	--	--	--	--	230.7
2003	--	--	--	--	--	--	199.0
2004	--	--	--	--	--	--	135.3
2005	--	--	--	--	--	--	126.0
2006	--	--	--	--	--	--	113.4
2007	--	--	--	--	--	--	69.2
2008	--	--	--	--	--	--	37.4
2009	--	--	--	--	--	--	8.7
2010	--	--	--	--	--	--	16.8
2011	--	--	--	--	--	--	42.5
2012	--	--	--	--	--	--	48.8
2013	--	--	--	--	--	--	62.1
2014	--	--	--	--	--	--	86.3



2015	--	--	--	--	--	--	125.7
2016	--	--	--	--	--	--	243.4
2017	--	--	--	--	--	--	175.5
2018	--	--	--	--	--	--	185.1
2019	--	--	--	--	--	--	189.5
2020	--	--	--	--	--	--	185.9
2021	--	--	--	--	--	--	168.1
2022	--	--	--	--	--	--	169.1
2023	--	--	--	--	--	--	154.1
2024	--	--	--	--	--	--	150.3
Subtotal	--	--	--	--	--	--	5119.3

Annual Funding							
1319   RDT&E   Research, Development, Test, and Evaluation, Navy							
Fiscal Year	Quantity	BY 1987 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1980	--	--	--	--	--	--	14.0
1981	--	--	--	--	--	--	43.1
1982	--	--	--	--	--	--	118.3
1983	--	--	--	--	--	--	167.3
1984	--	--	--	--	--	--	129.8
1985	--	--	--	--	--	--	144.2
1986	--	--	--	--	--	--	94.4
1987	--	--	--	--	--	--	98.5
1988	--	--	--	--	--	--	88.7
1989	--	--	--	--	--	--	47.6
1990	--	--	--	--	--	--	36.1
1991	--	--	--	--	--	--	73.9
1992	--	--	--	--	--	--	71.6
1993	--	--	--	--	--	--	88.7
1994	--	--	--	--	--	--	80.9
1995	--	--	--	--	--	--	69.2
1996	--	--	--	--	--	--	66.3
1997	--	--	--	--	--	--	61.9
1998	--	--	--	--	--	--	58.3
1999	--	--	--	--	--	--	114.3
2000	--	--	--	--	--	--	168.7
2001	--	--	--	--	--	--	102.7
2002	--	--	--	--	--	--	163.4
2003	--	--	--	--	--	--	138.9
2004	--	--	--	--	--	--	91.9
2005	--	--	--	--	--	--	83.4
2006	--	--	--	--	--	--	72.8
2007	--	--	--	--	--	--	43.3
2008	--	--	--	--	--	--	23.0
2009	--	--	--	--	--	--	5.3
2010	--	--	--	--	--	--	10.1
2011	--	--	--	--	--	--	24.8
2012	--	--	--	--	--	--	28.1
2013	--	--	--	--	--	--	35.3
2014	--	--	--	--	--	--	48.4
2015	--	--	--	--	--	--	69.6
2016	--	--	--	--	--	--	132.5
2017	--	--	--	--	--	--	93.8
2018	--	--	--	--	--	--	96.9
2019	--	--	--	--	--	--	97.3

2020	--	--	--	--	--	--	93.6
2021	--	--	--	--	--	--	82.9
2022	--	--	--	--	--	--	81.8
2023	--	--	--	--	--	--	73.1
2024	--	--	--	--	--	--	69.9
Subtotal	--	--	--	--	--	--	3598.6

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
1984	--	78.5	--	--	78.5	--	78.5
1985	1	846.6	--	299.2	1145.8	--	1145.8
1986	--	98.1	--	--	98.1	--	98.1
1987	3	2326.7	--	158.2	2484.9	--	2484.9
1988	--	9.6	--	--	9.6	--	9.6
1989	4	2876.5	--	--	2876.5	--	2876.5
1990	5	3569.5	--	13.5	3583.0	--	3583.0
1991	4	3145.1	--	3.6	3148.7	--	3148.7
1992	5	3982.8	--	38.3	4021.1	--	4021.1
1993	4	3379.3	--	7.9	3387.2	--	3387.2
1994	3	2703.3	--	86.9	2790.2	--	2790.2
1995	3	2779.7	--	37.8	2817.5	--	2817.5
1996	2	2289.5	--	61.7	2351.2	--	2351.2
1997	4	3541.9	--	38.8	3580.7	--	3580.7
1998	4	3424.3	--	110.5	3534.8	--	3534.8
1999	3	2674.1	--	44.2	2718.3	--	2718.3
2000	3	2651.1	--	30.1	2681.2	--	2681.2
2001	3	3231.3	--	--	3231.3	--	3231.3
2002	3	3293.7	--	14.4	3308.1	--	3308.1
2003	2	2657.2	--	63.1	2720.3	--	2720.3
2004	3	3345.3	--	4.7	3350.0	--	3350.0
2005	3	3653.5	--	8.9	3662.4	--	3662.4
2006	--	508.6	--	--	508.6	--	508.6
2007	--	289.2	--	--	289.2	--	289.2
2008	--	94.9	--	--	94.9	--	94.9
2009	--	331.2	--	--	331.2	--	331.2
2010	1	2192.4	--	121.8	2314.2	--	2314.2
2011	2	2427.5	--	11.6	2439.1	--	2439.1
2012	1	1714.8	--	120.2	1835.0	--	1835.0
2013	3	4471.5	--	29.8	4501.3	--	4501.3
2014	1	2086.5	--	--	2086.5	--	2086.5
2015	2	2932.9	--	--	2932.9	--	2932.9
2016	3	3982.3	--	230.2	4212.5	--	4212.5
2017	2	3722.1	--	10.0	3732.1	--	3732.1
2018	2	3566.3	--	--	3566.3	--	3566.3
2019	3	6018.8	--	--	6018.8	--	6018.8
2020	3	5454.2	--	--	5454.2	--	5454.2
2021	2	3593.9	--	--	3593.9	--	3593.9
2022	2	3716.2	--	--	3716.2	--	3716.2
2023	3	6274.6	--	--	6274.6	--	6274.6

2024	3	5766.4	--	--	5766.4	--	5766.4
2025	2	4067.2	--	--	4067.2	--	4067.2
2026	--	167.3	--	--	167.3	--	167.3
Subtotal	97	119936.4	--	1545.4	121481.8	--	121481.8



Annual Funding 1611   Procurement   Shipbuilding and Conversion, Navy							
Fiscal Year	Quantity	BY 1987 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1984	--	78.5	--	--	78.5	--	78.5
1985	1	829.8	--	293.3	1123.1	--	1123.1
1986	--	94.0	--	--	94.0	--	94.0
1987	3	2179.7	--	148.2	2327.9	--	2327.9
1988	--	8.7	--	--	8.7	--	8.7
1989	4	2540.5	--	--	2540.5	--	2540.5
1990	5	3064.1	--	11.6	3075.7	--	3075.7
1991	4	2626.4	--	3.1	2629.5	--	2629.5
1992	5	3242.3	--	31.1	3273.4	--	3273.4
1993	4	2723.5	--	6.3	2729.8	--	2729.8
1994	3	2127.5	--	68.3	2195.8	--	2195.8
1995	3	2163.3	--	29.4	2192.7	--	2192.7
1996	2	1762.8	--	47.5	1810.3	--	1810.3
1997	4	2686.1	--	29.4	2715.5	--	2715.5
1998	4	2539.8	--	81.9	2621.7	--	2621.7
1999	3	1952.3	--	32.3	1984.6	--	1984.6
2000	3	1887.5	--	21.5	1909.0	--	1909.0
2001	3	2224.1	--	--	2224.1	--	2224.1
2002	3	2254.2	--	9.9	2264.1	--	2264.1
2003	2	1719.2	--	40.8	1760.0	--	1760.0
2004	3	2088.6	--	2.9	2091.5	--	2091.5
2005	3	2184.2	--	5.3	2189.5	--	2189.5
2006	--	293.7	--	--	293.7	--	293.7
2007	--	159.7	--	--	159.7	--	159.7
2008	--	50.7	--	--	50.7	--	50.7
2009	--	171.6	--	--	171.6	--	171.6
2010	1	1097.7	--	61.0	1158.7	--	1158.7
2011	2	1176.8	--	5.6	1182.4	--	1182.4
2012	1	812.8	--	57.0	869.8	--	869.8
2013	3	2077.4	--	13.9	2091.3	--	2091.3
2014	1	951.1	--	--	951.1	--	951.1
2015	2	1309.6	--	--	1309.6	--	1309.6
2016	3	1742.0	--	100.7	1842.7	--	1842.7
2017	2	1595.2	--	4.3	1599.5	--	1599.5
2018	2	1498.3	--	--	1498.3	--	1498.3
2019	3	2479.1	--	--	2479.1	--	2479.1
2020	3	2202.5	--	--	2202.5	--	2202.5
2021	2	1422.8	--	--	1422.8	--	1422.8
2022	2	1442.4	--	--	1442.4	--	1442.4
2023	3	2387.7	--	--	2387.7	--	2387.7



2024	3	2151.2	--	--	2151.2	--	2151.2
2025	2	1487.6	--	--	1487.6	--	1487.6
2026	--	60.0	--	--	60.0	--	60.0
Subtotal	97	69547.0	--	1105.3	70652.3	--	70652.3

Cost Quantity Information 1611   Procurement   Shipbuilding and Conversion, Navy		
Fiscal Year	Quantity	End Item Recurring Flyaway (Aligned With Quantity) BY 1987 \$M
1984	--	--
1985	1	934.7
1986	--	--
1987	3	2344.3
1988	--	--
1989	4	2630.9
1990	5	3159.7
1991	4	2666.6
1992	5	3305.4
1993	4	2672.1
1994	3	2117.9
1995	3	2157.2
1996	2	1560.9
1997	4	2631.7
1998	4	2805.7
1999	3	2159.1
2000	3	2063.3
2001	3	2107.5
2002	3	2335.6
2003	2	1576.1
2004	3	2159.8
2005	3	2210.6
2006	--	--
2007	--	--
2008	--	--
2009	--	--
2010	1	976.7
2011	2	1481.5
2012	1	834.2
2013	3	2054.0
2014	1	813.4
2015	2	1383.5
2016	3	2109.1
2017	2	1488.2
2018	2	1465.9
2019	3	2253.0
2020	3	2229.4
2021	2	1514.9
2022	2	1501.7

2023	3	2159.6
2024	3	2093.3
2025	2	1589.5
2026	--	--
<hr/>		
Subtotal	97	69547.0



Annual Funding 1205   MILCON   Military Construction, Navy and Marine Corps	
Fiscal Year	TY \$M
	Total Program
1986	4.6
1987	--
1988	14.7
1989	8.5
1990	--
1991	--
1992	--
1993	--
1994	--
1995	--
1996	--
1997	--
1998	13.2
1999	--
2000	--
2001	3.5
Subtotal	44.5

Annual Funding 1205   MILCON   Military Construction, Navy and Marine Corps	
Fiscal Year	BY 1987 \$M
	Total Program
1986	4.5
1987	--
1988	13.4
1989	7.5
1990	--
1991	--
1992	--
1993	--
1994	--
1995	--
1996	--
1997	--
1998	9.7
1999	--
2000	--
2001	2.5
Subtotal	37.6

**Low Rate Initial Production**

<b>Item</b>	<b>Initial LRIP Decision</b>	<b>Current Total LRIP</b>
<b>Approval Date</b>	10/30/1986	10/30/1986
<b>Approved Quantity</b>	9	9
<b>Reference</b>	Milestone IIIA Review Decision Memorandum	Milestone IIIA Review Decision Memorandum
<b>Start Year</b>	1985	1985
<b>End Year</b>	1989	1989



## Foreign Military Sales

Country	Date of Sale	Quantity	Total Cost \$M	Description
Norway	10/4/2018	14	398.0	Date cited is date of last case sale.
Japan	8/17/2018	139	6575.0	Date cited is date of last case sale.
South Korea	12/12/2017	13	3129.0	Date cited is date of last case sale.
Spain	5/5/2016	8	1292.0	Date cited is date of last case sale.
Australia	2/5/2016	7	1529.0	Date cited is date of last case sale.

### Notes

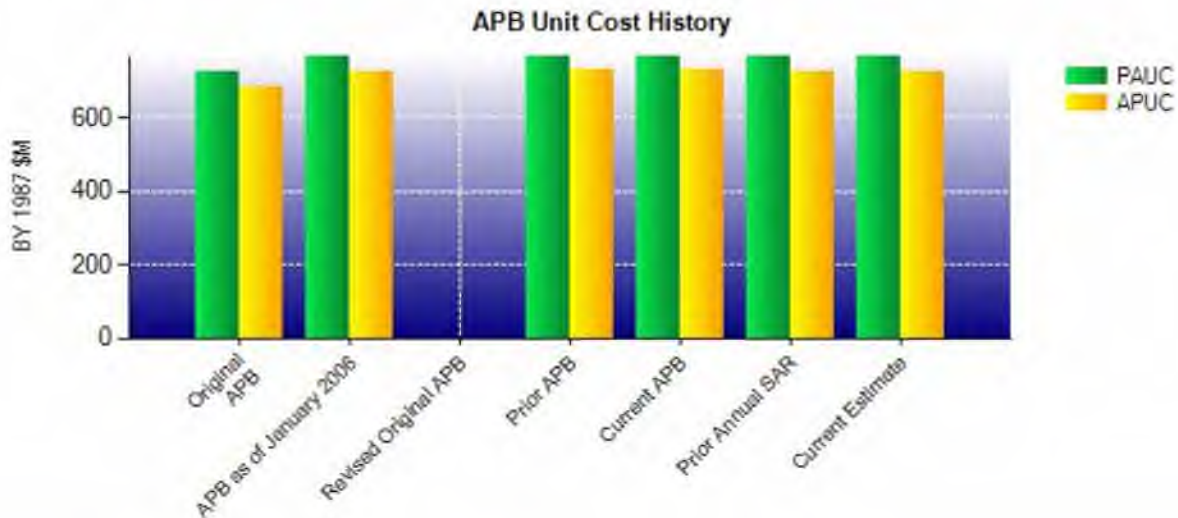
Quantity numbers above reflect FMS cases, rather than ships. Cases are agreements between the United States and an eligible foreign country to provide defense articles, training, and/or services for purchase. Cases can be related to procurements (e.g., Ordalt or standard missile), training (e.g., AEGIS shipboard training or replacement crew training), and program management support (e.g., Combat System Ship Qualification Test). Case quantity numbers reflect all cases; open and closed.

## Nuclear Costs

None

**Unit Cost**

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 1987 \$M	BY 1987 \$M	% Change
	Current UCR Baseline (Oct 2017 APB)	Current Estimate (Dec 2018 SAR)	
<b>Program Acquisition Unit Cost</b>			
Cost	68490.9	74288.5	
Quantity	89	97	
Unit Cost	769.561	765.861	-0.48
<b>Average Procurement Unit Cost</b>			
Cost	64949.2	70652.3	
Quantity	89	97	
Unit Cost	729.766	728.374	-0.19
Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 1987 \$M	BY 1987 \$M	% Change
	Original UCR Baseline (Feb 1988 APB)	Current Estimate (Dec 2018 SAR)	
<b>Program Acquisition Unit Cost</b>			
Cost	16723.8	74288.5	
Quantity	23	97	
Unit Cost	727.122	765.861	+5.33
<b>Average Procurement Unit Cost</b>			
Cost	15745.3	70652.3	
Quantity	23	97	
Unit Cost	684.578	728.374	+6.40



APB Unit Cost History					
Item	Date	BY 1987 \$M		TY \$M	
		PAUC	APUC	PAUC	APUC
Original APB	Feb 1988	727.122	684.578	883.152	843.209
APB as of January 2006	Aug 2002	766.675	725.342	1031.612	981.022
Revised Original APB	N/A	N/A	N/A	N/A	N/A
Prior APB	Aug 2017	769.561	729.766	1248.664	1192.933
Current APB	Oct 2017	769.561	729.766	1248.664	1192.933
Prior Annual SAR	Dec 2017	766.345	728.661	1281.557	1228.588
Current Estimate	Dec 2018	765.861	728.374	1305.625	1252.390

SAR Unit Cost History

Current SAR Baseline to Current Estimate (TY \$M)									
PAUC Production Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
874.674	-29.530	143.236	21.627	111.318	184.300	0.000	0.000	430.951	1305.625

Current SAR Baseline to Current Estimate (TY \$M)									
Initial APUC Production Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
833.613	-28.314	174.561	20.236	94.073	158.221	0.000	0.000	418.777	1252.390



SAR Baseline History				
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current Estimate
Milestone I	Jun 1981	Jun 1981	Jun 1981	Jun 1981
Milestone II	May 1983	Dec 1983	Dec 1983	Dec 1983
Milestone III	Aug 1986	Aug 1986	N/A	N/A
IOC	N/A	N/A	Oct 1990	Feb 1993
Total Cost (TY \$M)	10953.5	14910.6	20117.5	126645.6
Total Quantity	9	14	23	97
PAUC	1217.056	1065.043	874.674	1305.625



**Cost Variance**

Summary TY \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	916.6	19173.1	27.8	20117.5
Previous Changes				
Economic	-126.8	-3424.7	+0.1	-3551.4
Quantity	--	+75901.8	--	+75901.8
Schedule	+144.9	+1828.8	--	+1973.7
Engineering	+1514.2	+8309.3	+16.7	+9840.2
Estimating	+2538.6	+14927.6	-0.1	+17466.1
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+4070.9	+97542.8	+16.7	+101630.4
Current Changes				
Economic	+8.8	+678.2	--	+687.0
Quantity	--	+2718.0	--	+2718.0
Schedule	-10.0	+134.1	--	+124.1
Engineering	+141.8	+815.8	--	+957.6
Estimating	-8.8	+419.8	--	+411.0
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+131.8	+4765.9	--	+4897.7
Total Changes	+4202.7	+102308.7	+16.7	+106528.1
CE - Cost Variance	5119.3	121481.8	44.5	126645.6
CE - Cost & Funding	5119.3	121481.8	44.5	126645.6

Summary BY 1987 \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Production Estimate)	979.8	15948.3	25.6	16953.7
Previous Changes				
Economic	--	--	--	--
Quantity	--	+41520.5	--	+41520.5
Schedule	+89.1	+674.9	--	+764.0
Engineering	+847.8	+4049.1	+11.9	+4908.8
Estimating	+1625.7	+7030.0	+0.1	+8655.8
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+2562.6	+53274.5	+12.0	+55849.1
Current Changes				
Economic	--	--	--	--
Quantity	--	+994.1	--	+994.1
Schedule	-5.2	+34.4	--	+29.2
Engineering	+65.8	+305.3	--	+371.1
Estimating	-4.4	+95.7	--	+91.3
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+56.2	+1429.5	--	+1485.7
Total Changes	+2618.8	+54704.0	+12.0	+57334.8
CE - Cost Variance	3598.6	70652.3	37.6	74288.5
CE - Cost & Funding	3598.6	70652.3	37.6	74288.5

Previous Estimate: December 2017



RDT&E	\$M	
	Base Year	Then Year
<b>Current Change Explanations</b>		
Revised escalation indices. (Economic)	N/A	+8.8
Schedule Variance due to a Congressional reduction in FY 2018 resulted in ACB 20 testing activities being re-phased. (Schedule)	-5.2	-10.0
Additional funding for development of future Aegis requirements (ACB 20) (Engineering)	+65.8	+141.8
Adjustment for current and prior escalation. (Estimating)	-1.8	-3.5
Revised estimates to reflect application of new outyear inflation indices. (Estimating)	-2.6	-5.3
<b>RDT&amp;E Subtotal</b>	<b>+56.2</b>	<b>+131.8</b>

Procurement	\$M	
	Base Year	Then Year
<b>Current Change Explanations</b>		
Revised escalation indices. (Economic)	N/A	+678.2
Total Quantity variance resulting from an increase of two DDGs from 95 to 97. (Subtotal)	+1465.0	+4005.5
Quantity variance resulting from an increase of two ships from 95 to 97. (Quantity)	(+994.1)	(+2718.0)
Allocation to Schedule resulting from Quantity change. (Schedule) (QR)	(+34.4)	(+94.1)
Allocation to Engineering resulting from Quantity change. (Engineering) (QR)	(+156.1)	(+426.8)
Allocation to Estimating resulting from Quantity change. (Estimating) (QR)	(+280.4)	(+766.6)
Stretch-out of procurement buy from FY 2021 to FY 2024. (Schedule)	0.0	+40.0
Additional funding to incorporate Cyber Boundary Defense, Multi Function Towed Array for ships in FY 2020 - FY 2024 and Surface Electronic Warfare Improvement Program (SEWIP) Block 3 for ships in FY 2022 - FY 2024. (Engineering)	+149.2	+389.0
Revised adjustment due to a Congressional Add in FY 2019 for Advanced Procurement for an additional ship in FY 2020 and revised adjustment for Advance Procurement in FY 2023 - FY 2024. (Estimating)	+365.7	+944.4
Adjustment for Congressional rescissions in FY 2011 and FY 2012. (Estimating)	-76.9	-160.0
Adjustment to reflect prior year actuals. (Estimating)	-59.0	-120.0
Revised estimate to reflect refinement of FY 2020 - FY 2025 shipbuilding estimates. (Estimating)	-151.9	-403.9
Adjustment for Congressional reduction of a previously funded AMDR in FY 2018 and Congressional reduction in FY 2019 for electronics excess growth. (Estimating)	-61.0	-145.5
Revised estimate to reflect refinement of outfitting and post delivery requirements. (Estimating)	+79.7	+231.9
Revised estimate due to Navy-wide funding adjustments. (Estimating)	-6.1	-15.5
Adjustment for current and prior escalation. (Estimating)	-128.4	-299.9
Revised estimates to reflect application of new outyear inflation indices. (Estimating)	-146.8	-378.3
<b>Procurement Subtotal</b>	<b>+1429.5</b>	<b>+4765.9</b>

(QR) Quantity Related

~~(U//FOUO)~~ Contracts**Contract Identification**

**Appropriation:** Procurement  
**Contract Name:** DDG 117 Guided Missile Destroyer  
**Contractor:** Huntington Ingalls Industries (HII)  
**Contractor Location:** 1000 Access Road  
 Pascagoula, MS 39567  
**Contract Number:** N00024-13-C-2307  
**Contract Type:** Fixed Price Incentive(Firm Target) (FPIF)  
**Award Date:** June 03, 2013  
**Definitization Date:** June 03, 2013

~~(U//FOUO)~~ Contract Price

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

(b)(4)

**Notes**

DDG 117 (one of three FY 2013 ships) is part of the FY 2013 - FY 2017 Multi-Year Procurement awarded on June 3, 2013.

Current Contract Price (\$M), Estimated Price at Completion (\$M) and Cost and Schedule Variance for this contract is For Official Use Only - Exempt from FOIA release under 5 U.S.C. 552(b)(4).

Due to HII transition to a new Business/Financial system on January 2018, the December 2018 CPR is used in this report.

This contract is more than 90% complete; therefore, this is the final report for this contract.



**Contract Identification**

**Appropriation:** Procurement  
**Contract Name:** DDG 118 Guided Missile Destroyer  
**Contractor:** General Dynamics (GD), Bath Iron Works (BIW)  
**Contractor Location:** 700 Washington Street  
 Bath, ME 04530  
**Contract Number:** N00024-13-C-2305  
**Contract Type:** Fixed Price Incentive(Firm Target) (FPIF)  
**Award Date:** June 03, 2013  
**Definitization Date:** June 03, 2013

(U//~~FOUO~~) Contract Price

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

(b)(4)

**Notes**

DDG 118 (one of three FY 2013 ships) is part of the FY 2013 - FY 2017 Multi-Year Procurement awarded on June 3, 2013. Current Contract Price (\$M), Estimated Price at Completion (\$M) and Cost and Schedule Variance for this contract is For Official Use Only - Exempt from FOIA release under 5 U.S.C. 552(b)(4).

**Contract Identification**

**Appropriation:** Procurement  
**Contract Name:** DDG 119 Guided Missile Destroyer  
**Contractor:** Huntington Ingalls Industries (HII)  
**Contractor Location:** 1000 Access Road  
 Pascagoula, MS  
**Contract Number:** N00024-13-C-2307/119  
**Contract Type:** Fixed Price Incentive(Firm Target) (FPIF)  
**Award Date:** June 03, 2013  
**Definitization Date:** June 03, 2014

**(U//~~FOUO~~) Contract Price**

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

(b)(4)

**Notes**

DDG 119 (FY 2014 ship) is part of the FY 2013 - FY 2017 Multi-Year Procurement awarded on June 3, 2013.

Current Contract Price (\$M), Estimated Price at Completion (\$M) and Cost and Schedule Variance for this contract is For Official Use Only - Exempt from FOIA release under 5 U.S.C. 552(b)(4).

Due to HII transition to a new Business/Financial system on January 2018, the December 2018 CPR is used in this report.

This contract is more than 90% complete; therefore, this is the final report for this contract.

**Contract Identification**

**Appropriation:** Procurement  
**Contract Name:** DDG 120 Guided Missile Destroyer  
**Contractor:** General Dynamics (GD), Bath Iron Works (BIW)  
**Contractor Location:** 700 Washington Street  
 Bath, ME 04530  
**Contract Number:** N00024-13-C-2305/120  
**Contract Type:** Fixed Price Incentive(Firm Target) (FPIF)  
**Award Date:** March 14, 2014  
**Definitization Date:** March 14, 2014

~~(U//FOUO)~~ Contract Price

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

(b)(4)

**Notes**

DDG 120 (one of three FY 2013 ships) is part of the FY 2013 - FY 2017 Multi-Year Procurement awarded on June 3, 2013.

Current Contract Price (\$M), Estimated Price at Completion (\$M) and Cost and Schedule Variance for this contract is For Official Use Only - Exempt from FOIA release under 5 U.S.C. 552(b)(4).



**Contract Identification**

**Appropriation:** Procurement  
**Contract Name:** DDG 121 Guided Missile Destroyer  
**Contractor:** Huntington Ingalls Industries (HII)  
**Contractor Location:** 1000 Access Road  
 Pascagoula, MS  
**Contract Number:** N00024-13-C-2307/121  
**Contract Type:** Fixed Price Incentive(Firm Target) (FPIF)  
**Award Date:** June 03, 2013  
**Definitization Date:** March 27, 2015

(U//~~FOUO~~) Contract Price

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

(b)(4)

**Notes**

DDG 121 (FY 2015 ship) is part of the FY 2013 - FY 2017 Multi-Year Procurement awarded on June 3, 2013.

Current Contract Price (\$M), Estimated Price at Completion (\$M) and Cost and Schedule Variance for this contract is For Official Use Only - Exempt from FOIA release under 5 U.S.C. 552(b)(4).

Due to HII transition to a new Business/Financial system on January 2018, the December 2018 CPR is used in this report.



**Contract Identification**

**Appropriation:** Procurement  
**Contract Name:** DDG 122 Guided Missile Destroyer  
**Contractor:** General Dynamics (GD), Bath Iron Works (BIW)  
**Contractor Location:** 700 Washington Street  
 Bath, ME 04530  
**Contract Number:** N00024-13-C-2305/122  
**Contract Type:** Fixed Price Incentive(Firm Target) (FPIF)  
**Award Date:** June 03, 2013  
**Definitization Date:** June 03, 2013

~~(U//FOUO)~~ Contract Price

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

(b)(4)

**Notes**

DDG 122 (FY 2015 ship) is part of the FY 2013 - FY 2017 Multi-Year Procurement awarded on June 3, 2013.

Current Contract Price (\$M), Estimated Price at Completion (\$M) and Cost and Schedule Variance for this contract is For Official Use Only - Exempt from FOIA release under 5 U.S.C. 552(b)(4).

**Contract Identification**

**Appropriation:** Procurement  
**Contract Name:** DDG 123 Guided Missile Destroyer  
**Contractor:** Huntington Ingalls Industries (HII)  
**Contractor Location:** 100 Access Road  
 Pascagoula, MS 39567  
**Contract Number:** N00024-13-C-2307/123  
**Contract Type:** Fixed Price Incentive(Firm Target) (FPIF)  
**Award Date:** June 03, 2013  
**Definitization Date:** March 29, 2016

**(U//FOUO) Contract Price**

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

(b)(4)

**Notes**

DDG 123 (FY 2016 ship) is part of the FY 2013 - FY 2017 Multi-Year Procurement awarded on June 3, 2013.

Current Contract Price (\$M), Estimated Price at Completion (\$M) and Cost and Schedule Variance for this contract is For Official Use Only - Exempt from FOIA release under 5 U.S.C. 552(b)(4).

Due to HII transition to a new Business/Financial system on January 2018, the December 2018 CPR is used in this report.

## Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	0	0	0	--
Production	67	67	97	69.07%
Total Program Quantity Delivered	67	67	97	69.07%

Expended and Appropriated (TY \$M)			
Total Acquisition Cost	126645.6	Years Appropriated	40
Expended to Date	76343.4	Percent Years Appropriated	85.11%
Percent Expended	60.28%	Appropriated to Date	96778.3
Total Funding Years	47	Percent Appropriated	76.42%

The above data is current as of March 11, 2019.



## Operating and Support Cost

### Cost Estimate Details

<b>Date of Estimate:</b>	January 24, 2019
<b>Source of Estimate:</b>	NAVSEA 05C
<b>Quantity to Sustain:</b>	97
<b>Unit of Measure:</b>	Ship
<b>Service Life per Unit:</b>	40.00 Years
<b>Fiscal Years in Service:</b>	FY 1992 - FY 2071

Estimates are based on a service life of 35 years for the 28 Flight I and Flight II ships and 40 years for the 69 Flight IIA and Flight III ships.

### Sustainment Strategy

The DDG 51 sustainment strategy leverages Third Party Planning contracts, Indefinite Delivery/Indefinite Quantity (IDIQ) multi-award contracts within a ship's homeport for Chief of Naval Operations (CNO) availabilities less than ten months and single award coast-wide Firm Fixed Priced Contracts for CNO availabilities greater than ten months. The program provides Integrated Logistics Support for hull, mechanical and electrical systems and oversight and guidance to Participating Acquisition Resource Managers that develop various sustainment approaches for combat systems and Communications, Command, Control, Computers, and Intelligence.

### Antecedent Information

The Antecedent System is the CG 47 class of ships. The CG 47 class was used since it is the only other ship class with the AEGIS Weapon System installed. The CG 47 estimates were derived using the Naval Visibility And Management of Operating and Support Costs (VAMOSC) database. CG 47 estimates are based on 27 ships. The years of data used for the CG 47 class are FY 1984-2018.

Cost Element	Annual O&S Costs BY1987 \$M	
	DDG 51 Average Annual Cost Per Ship	CG 47 (Antecedent) Average Annual Cost Per Ship
Unit-Level Manpower	10.050	10.129
Unit Operations	4.259	4.975
Maintenance	7.186	8.029
Sustaining Support	1.366	1.326
Continuing System Improvements	4.805	3.911
Indirect Support	6.550	7.363
Other	0.000	0.000
<b>Total</b>	<b>34.216</b>	<b>35.733</b>



Item	Total O&S Cost \$M			
	DDG 51			CG 47 (Antecedent)
	Current Production APB Objective/Threshold		Current Estimate	
<b>Base Year</b>	113493.3	124842.6	<b>127968.0<sup>1</sup></b>	32982.0
<b>Then Year</b>	326443.0	N/A	387461.1	N/A

<sup>1</sup> APB O&S Cost Breach

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

The DDG 51 APB is for 89 ships while the current estimate is for 97 ships.

#### Equation to Translate Annual Cost to Total Cost

DDG 51 (Ship Quantity X Avg. Annual Cost per Ship, per Year X Ship Service Life)  
 (28 ships X \$34.216M X 35 years) + (69 ships X \$34.216M X 40 years) = \$127,968M

CG 47 (Ship quantity X Avg. Annual Cost per Ship, per Year X Ship Service Life)  
 (11 ships X \$35.733M X 40 years) + (11 ships X \$35.733M X 35 years) + (1 ship X \$35.733M X 21 years) + (2 ships X \$35.733M X 20 years) + (1 ship X \$35.733M X 19 years) + (1 ship X \$35.733M X 18 years) = \$32,982M

O&S Cost Variance		
Category	BY 1987 \$M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2017 SAR	122957.5	
Programmatic/Planning Factors	3297.0	Addition of two ships.
Cost Estimating Methodology	0.0	
Cost Data Update	1713.5	Updated per ship average based on VAMOSOC actual data as of January 2019.
Labor Rate	0.0	
Energy Rate	0.0	
Technical Input	0.0	
Other	0.0	
<b>Total Changes</b>	<b>5010.5</b>	
Current Estimate	127968.0	

The O&S cost estimate includes mid-life modernization for Flight III ships.

#### Disposal Estimate Details

**Date of Estimate:** January 24, 2019  
**Source of Estimate:** NAVSEA 05C  
**Disposal/Demilitarization Total Cost (BY 1987 \$M):** 250.0

The DDG 51 Class remains in full rate production and continues to be upgraded in new construction. The oldest of the class are approaching mid service life now and many are being upgraded with newer technologies which will inevitably change the cost of inactivation and disposal for the class. The ship disposal methodology has been updated to reflect the NAVSEA Update of Conventional Surface Ship Environmental and Disposal Liability Estimate (October 2017).