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



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

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**

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

**DoD Component**

Navy

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**Date Assigned:** April 15, 2019

## 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. Beginning with DDG 79, 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 will be incorporated on DDG 125, 126, 128 and follow ships. Flight III is 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 (HII 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. DDG 126 will start construction in FY 2020.

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.

The FY 2020 Defense Appropriations Bill reduced the DDG 51 Shipbuilding and Conversion, Navy (SCN) FY 2020 budget request by \$24.0 million for basic construction excess growth and \$10.0 million for electronics excess growth. The same bill added \$390.0 million in FY 2020 Advance Procurement for long lead time material for FY 2021 Flight III ships and \$130.0 million for surface combatant supplier base. There were two prior year rescissions: \$51.0 million in FY 2019 Advance Procurement for the removal of the FY 2022 third ship and \$44.5 million in FY 2012 SCN funding, though the FY 2019 Advance Procurement rescission is not reflected in the FY 2021 President's Budget request.

The PB 2021 budget requests \$3,040.3 million Full Funding for two ships in FY 2021, \$29.3 million in Economic Order Quantity funds to procure ship construction material and GFE for FY 2022 hulls, and \$9.6 million in Cost to Complete for FY 2015 hulls.

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

- DDG 117 (PAUL IGNATIUS) Commissioned July 27, 2019.
- DDG 118 (DANIEL INOUYE) Christened June 22, 2019.
- DDG 118 (DANIEL INOUYE) AEGIS Light Off completed September 20, 2019.
- DDG 118 (DANIEL INOUYE) Launched October 26, 2019.
- DDG 119 (DELBERT D. BLACK) Alpha Trials completed December 13, 2019.
- DDG 121 (FRANK E. PETERSEN, JR.) AEGIS Light Off completed December 19, 2019.
- DDG 122 (JOHN BASILONE) Lay Keel Ceremony achieved January 10, 2020.
- DDG 123 (LENAH H. SUTCLIFFE HIGBEE) Launched January 23, 2020.
- DDG 125 (JACK H. LUCAS) Lay Keel achieved October 07, 2019.
- DDG 130 (WILLIAM CHARETTE) named March 18, 2019.
- DDG 131 (GEORGE M. NEAL) named March 26, 2019.
- DDG 132 (QUENTIN WALSH) named June 06, 2019.
- DDG 133 (SAM NUNN) named May 06, 2019.
- DDG 134 (JOHN E. KILMER) named October 16, 2019.
- Future DDG (RICHARD G. LUGAR) named November 15, 2019.



- Future DDG (THAD COCHRAN) named November 15, 2019.

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 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 Naval Sea Systems Command (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 the Secretary of Defense (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	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 the Undersecretary of Defense for Acquisition, Technology and Logistics (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 (ECP) 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 was previously reported in the December 2018 SAR.

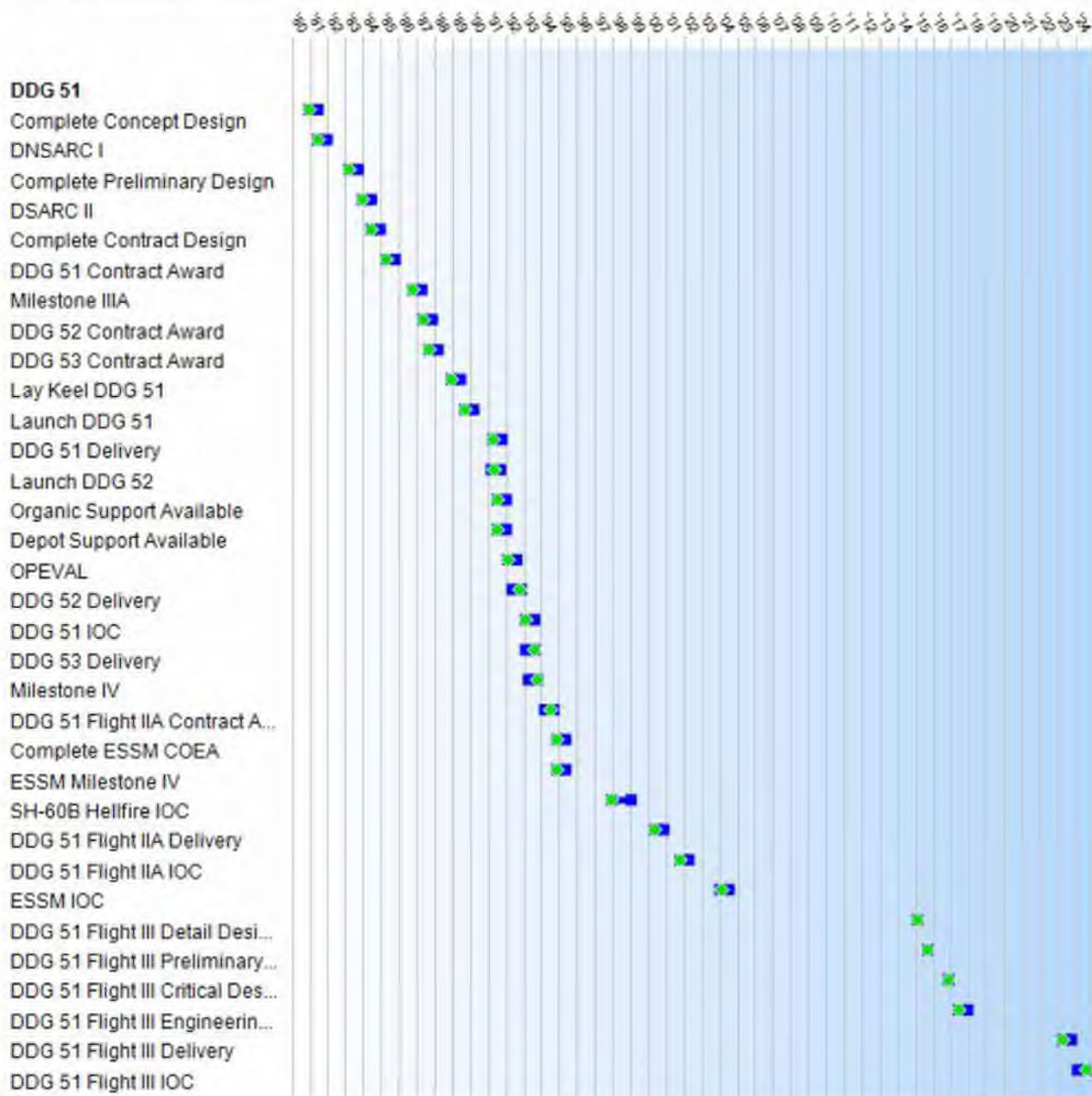
The program is updating a previously submitted Program Deviation Report.

#### Nunn-McCurdy Breaches

<b>Current UCR Baseline</b>		
	PAUC	None
	APUC	None
<b>Original UCR Baseline</b>		
	PAUC	None
	APUC	None

# Schedule

● SAR Baseline Current Objective  
 ■ AFB 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: November 2020 / March 2022

DDG 119: April 2020 / August 2021

DDG 120: July 2021 / October 2022

DDG 121: February 2021 / May 2022

DDG 122: January 2022 / April 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 / September 2028

DDG 137: September 2027 / December 2028

Notes:

DDG 126 – DDG 134 reflect contract milestone dates, DDG 135 reflects notional dates, and DDG 136 – DDG 137 reflect contract milestone 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	PHALANX	PHALANX	(Ch-1)
<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

(Ch-1) The Anti-Air Warfare Guns Demonstrated Performance and Current Estimate changed from 2 PHALANX to PHALANX to remove the quantity number.

**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 (Shared)	
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	3841.9	916.6	4915.6	5638.8
Procurement	15948.3	64949.2	71444.1	69514.9	19173.1	106171.0	118815.5
Flyaway	--	--	--	69514.9	--	--	118815.5
Recurring	--	--	--	68409.8	--	--	117270.1
Non Recurring	--	--	--	1105.1	--	--	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	73394.4	20117.5	111131.1	124498.8

#### 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

CAPE Cost Risks: No cost estimate for the program has been completed in the previous year.

Total Quantity			
Quantity	SAR Baseline Production Estimate	Current APB Production	Current Estimate
RDT&E	0	0	0
Procurement	23	89	95
Total	23	89	95

## 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	4291.8	208.0	249.3	265.2	248.1	205.2	171.2	0.0	5638.8
Procurement	92217.2	5895.7	3213.4	3728.7	2490.8	4138.5	2055.4	5075.8	118815.5
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 2021 Total	96553.5	6103.7	3462.7	3993.9	2738.9	4343.7	2226.6	5075.8	124498.8
PB 2020 Total	96778.3	5640.1	3762.0	3885.3	6428.7	5916.7	4067.2	167.3	126645.6
Delta	-224.8	463.6	-299.3	108.6	-3689.8	-1573.0	-1840.6	4908.5	-2146.8

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	0	0	0	0	0	0	0	0	0	0
Production	0	82	3	2	2	1	2	1	2	95
PB 2021 Total	0	82	3	2	2	1	2	1	2	95
PB 2020 Total	0	82	3	2	2	3	3	2	0	97
Delta	0	0	0	0	0	-2	-1	-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	--	--	--	--	--	--	208.0
2021	--	--	--	--	--	--	249.3
2022	--	--	--	--	--	--	265.2
2023	--	--	--	--	--	--	248.1
2024	--	--	--	--	--	--	205.2
2025	--	--	--	--	--	--	171.2
Subtotal	--	--	--	--	--	--	5638.8

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	--	--	--	--	--	--	96.6
2019	--	--	--	--	--	--	97.0

2020	--	--	--	--	--	--	104.4
2021	--	--	--	--	--	--	122.7
2022	--	--	--	--	--	--	127.9
2023	--	--	--	--	--	--	117.3
2024	--	--	--	--	--	--	95.1
2025	--	--	--	--	--	--	77.8
Subtotal	--	--	--	--	--	--	3841.9

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	--	331.1	--	--	331.1	--	331.1
2010	1	2192.4	--	121.8	2314.2	--	2314.2
2011	2	2277.0	--	11.6	2288.6	--	2288.6
2012	1	1663.1	--	120.2	1783.3	--	1783.3
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	3986.0	--	230.2	4216.2	--	4216.2
2017	2	3734.8	--	10.0	3744.8	--	3744.8
2018	2	3566.3	--	--	3566.3	--	3566.3
2019	3	5979.9	--	--	5979.9	--	5979.9
2020	3	5895.7	--	--	5895.7	--	5895.7
2021	2	3213.4	--	--	3213.4	--	3213.4
2022	2	3728.7	--	--	3728.7	--	3728.7
2023	1	2490.8	--	--	2490.8	--	2490.8

2024	2	4138.5	--	--	4138.5	--	4138.5
2025	1	2055.4	--	--	2055.4	--	2055.4
2026	2	4325.8	--	--	4325.8	--	4325.8
2027	--	265.0	--	--	265.0	--	265.0
2028	--	234.2	--	--	234.2	--	234.2
2029	--	133.1	--	--	133.1	--	133.1
2030	--	88.4	--	--	88.4	--	88.4
2031	--	29.3	--	--	29.3	--	29.3
Subtotal	95	117270.1	--	1545.4	118815.5	--	118815.5

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	--	171.5	--	--	171.5	--	171.5
2010	1	1097.7	--	61.0	1158.7	--	1158.7
2011	2	1103.8	--	5.6	1109.4	--	1109.4
2012	1	788.2	--	57.0	845.2	--	845.2
2013	3	2076.9	--	13.8	2090.7	--	2090.7
2014	1	950.7	--	--	950.7	--	950.7
2015	2	1308.8	--	--	1308.8	--	1308.8
2016	3	1742.1	--	100.6	1842.7	--	1842.7
2017	2	1598.8	--	4.3	1603.1	--	1603.1
2018	2	1495.7	--	--	1495.7	--	1495.7
2019	3	2459.0	--	--	2459.0	--	2459.0
2020	3	2376.8	--	--	2376.8	--	2376.8
2021	2	1270.1	--	--	1270.1	--	1270.1
2022	2	1444.8	--	--	1444.8	--	1444.8
2023	1	946.2	--	--	946.2	--	946.2

2024	2	1541.3	--	--	1541.3	--	1541.3
2025	1	750.5	--	--	750.5	--	750.5
2026	2	1548.5	--	--	1548.5	--	1548.5
2027	--	93.0	--	--	93.0	--	93.0
2028	--	80.6	--	--	80.6	--	80.6
2029	--	44.9	--	--	44.9	--	44.9
2030	--	29.2	--	--	29.2	--	29.2
2031	--	9.5	--	--	9.5	--	9.5
Subtotal	95	68409.8	--	1105.1	69514.9	--	69514.9



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	982.2
2011	2	1412.4
2012	1	806.3
2013	3	2047.0
2014	1	813.3
2015	2	1389.5
2016	3	2127.4
2017	2	1492.0
2018	2	1460.0
2019	3	2251.9
2020	3	2270.5
2021	2	1577.9
2022	2	1556.8

2023	1	781.5
2024	2	1539.7
2025	1	769.9
2026	2	1532.4
2027	--	--
2028	--	--
2029	--	--
2030	--	--
2031	--	--
<hr/>		
Subtotal	95	68409.8

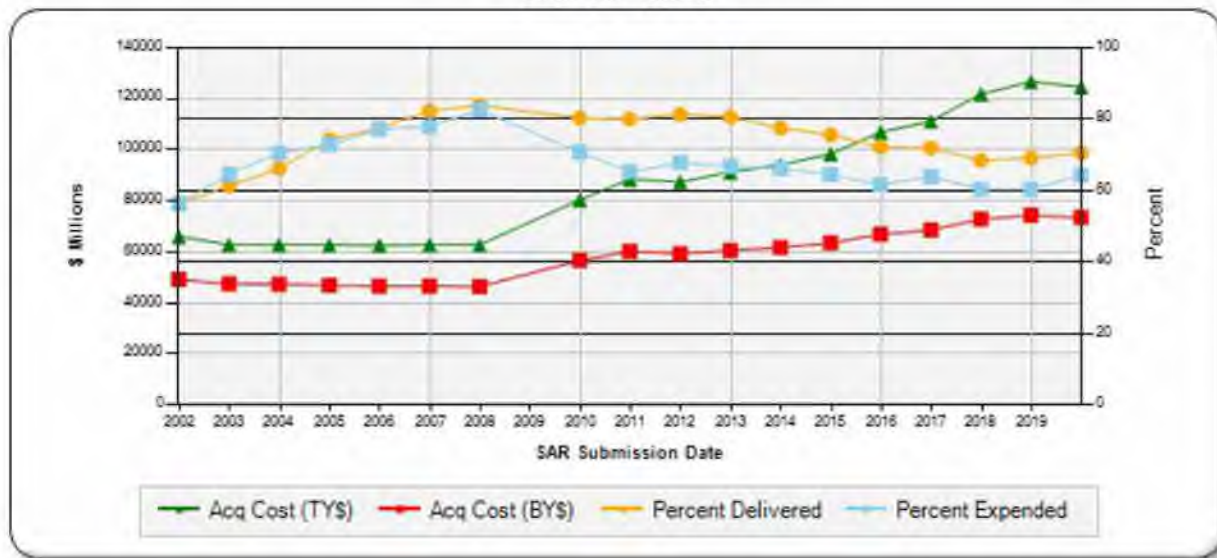
Annual Funding 1205   MILCON   Military Construction, Navy and Marine Corps	
Fiscal Year	TY \$M
	Total Program
1986	4.6
1987	--
1988	14.7
1989	8.5
1990	--
1991	--
1992	--
1993	--
1994	--
1995	--
1996	--
1997	--
1998	13.2
1999	--
2000	--
2001	3.5
Subtotal	44.5

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

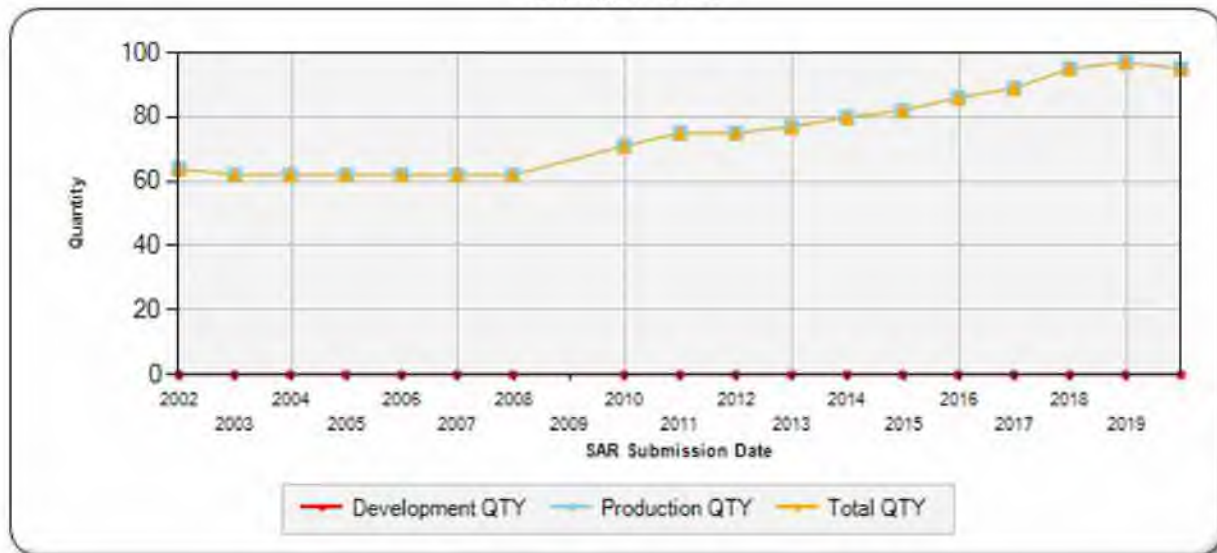
Charts

DDG 51 first began SAR reporting in December 1997

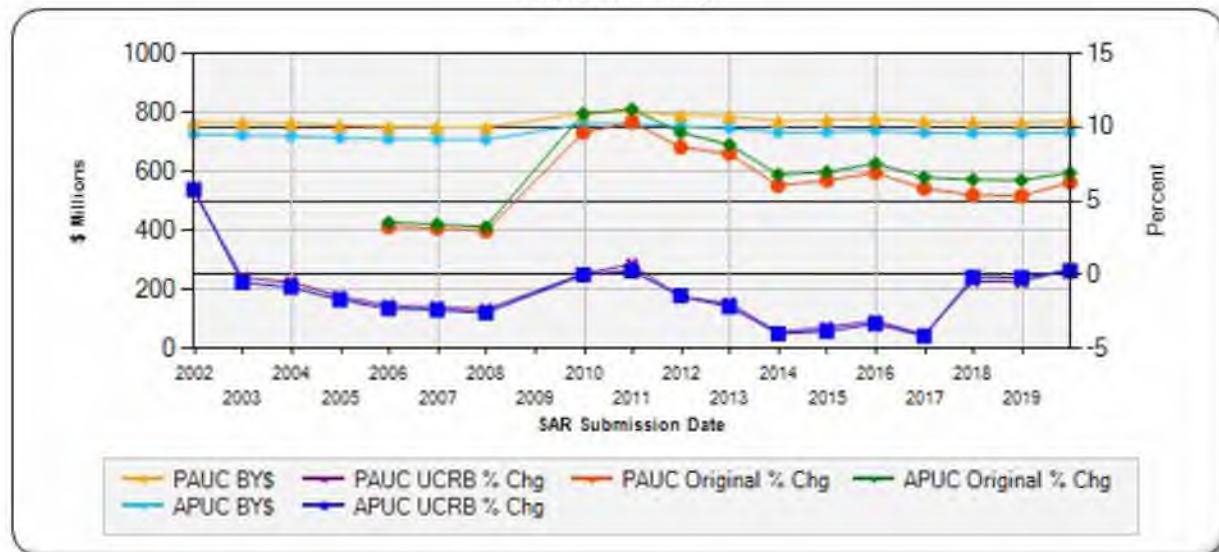
Program Acquisition Cost - DDG 51  
Base Year 1987 \$M



Quantity - DDG 51



Unit Cost - DDG 51  
Base Year 1987 \$M



## Risks

### Significant Schedule and Technical Risks

Significant Schedule and Technical Risks	
Current Estimate (December 2019)	
1.	In accordance with Section 830(a)(2) of the FY 2020 National Defense Authorization Act, which requires a SAR to be submitted "in unclassified form without any designation relating to dissemination control" this SAR section has omitted information that is <del>For Official Use Only</del> .

## Risks

### Risk and Sensitivity Analysis

Risks and Sensitivity Analysis	
<b>Current Baseline Estimate (October 2017)</b>	
1.	In accordance with Section 830(a)(2) of the FY 2020 National Defense Authorization Act, which requires a SAR to be submitted "in unclassified form without any designation relating to dissemination control" this SAR section has omitted information that is <del>For Official Use Only</del> .
<b>Original Baseline Estimate (February 1988)</b>	
1.	In accordance with Section 830(a)(2) of the FY 2020 National Defense Authorization Act, which requires a SAR to be submitted "in unclassified form without any designation relating to dissemination control" this SAR section has omitted information that is <del>For Official Use Only</del> .
<b>Revised Original Estimate (N/A)</b>	
1.	N/A
<b>Current Procurement Cost (December 2019)</b>	
1.	In accordance with Section 830(a)(2) of the FY 2020 National Defense Authorization Act, which requires a SAR to be submitted "in unclassified form without any designation relating to dissemination control" this SAR section has omitted information that is <del>For Official Use Only</del> .



**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
Japan	10/5/2019	148	6869.0	Date cited is date of last case sale.
Spain	5/28/2019	10	2007.0	Date cited is date of last case sale.
Norway	12/31/2018	15	426.0	Date cited is date of last case sale.
South Korea	12/12/2017	13	3123.0	Date cited is date of last case sale.
Australia	2/5/2016	7	1697.0	Date cited is date of last case sale.

### Notes

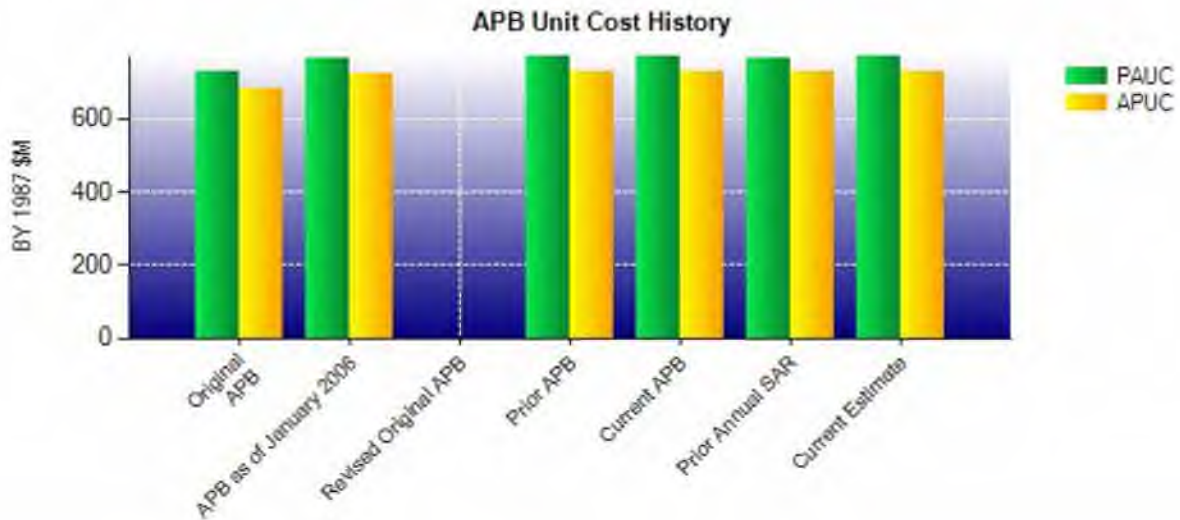
Quantity numbers above reflect FMS cases, rather than ships. Cases are agreements between the United States and an eligible foreign country to provide defense articles, training, and/or services for purchase. Cases can be related to procurements (e.g., Ordalt or standard missile), training (e.g., AEGIS 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 2019 SAR)	
<b>Program Acquisition Unit Cost</b>			
Cost	68490.9	73394.4	
Quantity	89	95	
Unit Cost	769.561	772.573	+0.39
<b>Average Procurement Unit Cost</b>			
Cost	64949.2	69514.9	
Quantity	89	95	
Unit Cost	729.766	731.736	+0.27
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 2019 SAR)	
<b>Program Acquisition Unit Cost</b>			
Cost	16723.8	73394.4	
Quantity	23	95	
Unit Cost	727.122	772.573	+6.25
<b>Average Procurement Unit Cost</b>			
Cost	15745.3	69514.9	
Quantity	23	95	
Unit Cost	684.578	731.736	+6.89



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 2018	765.861	728.374	1305.625	1252.390
Current Estimate	Dec 2019	772.573	731.736	1310.514	1250.689

**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	-29.299	136.008	23.973	114.715	190.443	0.000	0.000	435.840	1310.514	

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	-28.094	167.127	22.553	91.639	163.851	0.000	0.000	417.076	1250.689	

<b>SAR Baseline History</b>				
<b>Item</b>	<b>SAR Planning Estimate</b>	<b>SAR Development Estimate</b>	<b>SAR Production Estimate</b>	<b>Current Estimate</b>
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	124498.8
Total Quantity	9	14	23	95
PAUC	1217.056	1065.043	874.674	1310.514

**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	-118.0	-2746.5	+0.1	-2864.4
Quantity	--	+78619.8	--	+78619.8
Schedule	+134.9	+1962.9	--	+2097.8
Engineering	+1656.0	+9125.1	+16.7	+10797.8
Estimating	+2529.8	+15347.4	-0.1	+17877.1
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+4202.7	+102308.7	+16.7	+106528.1
Current Changes				
Economic	+3.4	+77.6	--	+81.0
Quantity	--	-2722.5	--	-2722.5
Schedule	--	+179.6	--	+179.6
Engineering	+519.5	-419.4	--	+100.1
Estimating	-3.4	+218.4	--	+215.0
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+519.5	-2666.3	--	-2146.8
Total Changes	+4722.2	+99642.4	+16.7	+104381.3
Current Estimate	5638.8	118815.5	44.5	124498.8

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	--	+42514.6	--	+42514.6
Schedule	+83.9	+709.3	--	+793.2
Engineering	+913.6	+4354.4	+11.9	+5279.9
Estimating	+1621.3	+7125.7	+0.1	+8747.1
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+2618.8	+54704.0	+12.0	+57334.8
Current Changes				
Economic	--	--	--	--
Quantity	--	-994.1	--	-994.1
Schedule	--	-34.9	--	-34.9
Engineering	+245.0	-152.8	--	+92.2
Estimating	-1.7	+44.4	--	+42.7
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+243.3	-1137.4	--	-894.1
Total Changes	+2862.1	+53566.6	+12.0	+56440.7
Current Estimate	3841.9	69514.9	37.6	73394.4

Previous Estimate: December 2018



RDT&E	\$M	
	Base Year	Then Year
<b>Current Change Explanations</b>		
Revised escalation indices. (Economic)	N/A	+3.4
Additional funding for future Aegis Baseline 10 requirements to include simultaneous Anti-Air Warfare (AAW) and Ballistic Missile Defense (BMD) engagements. (Engineering)	+74.1	+163.1
Additional funding in FY 2020 - FY 2025 for Aegis Baseline 9 upgrades to include Integrated Air and Missile Defense (IAMD) capability incorporating BMD 5.0 and Naval Integrated Fire Control-Counter Air (NIFC-CA). (Engineering)	+159.4	+332.1
Additional funding in FY 2021 - FY 2025 for Test and Evaluation requirements for DDG-51 Flight III ships. (Engineering)	+11.5	+24.3
Adjustment for current and prior escalation. (Estimating)	-0.9	-1.8
Revised estimates to reflect application of new outyear inflation indices. (Estimating)	-0.8	-1.6
<b>RDT&amp;E Subtotal</b>	<b>+243.3</b>	<b>+519.5</b>

Procurement	\$M	
	Base Year	Then Year
<b>Current Change Explanations</b>		
Revised escalation indices. (Economic)	N/A	+77.6
Total Quantity variance resulting from a decrease of 2 DDGs from 97 to 95. (Subtotal)	-1463.6	-4008.4
Quantity variance resulting from a decrease of 2 ships from 97 to 95. (Quantity)	(-994.1)	(-2722.5)
Allocation to Schedule resulting from Quantity change. (Schedule) (QR)	(-34.9)	(-95.6)
Allocation to Engineering resulting from Quantity change. (Engineering) (QR)	(-162.1)	(-443.9)
Allocation to Estimating resulting from Quantity change. (Estimating) (QR)	(-272.5)	(-746.4)
Stretch-out of procurement buy profile from FY 2023 to FY 2026. (Schedule)	0.0	+275.2
Additional funding in FY 2021 – FY 2025 to incorporate physical throttles and hardware/software modifications to bridge and navigation system for FY 2016 – FY 2018 and FY 2021 – FY 2025 ships. (Engineering)	+9.3	+24.5
Adjustment due to Congressional add in FY 2020 for Advance Procurement for FY 2021 Flight III ships, and revised adjustment for Advance Procurement in FY 2023 - FY 2025. (Estimating)	+101.9	+243.3
Adjustment due to Congressional add in FY 2020 Advance Procurement for Surface Combatant Supplier Base. (Estimating)	+52.4	+130.0
Adjustment for Congressional rescission in FY 2012. (Estimating)	-21.1	-44.5
Adjustment to reflect prior year actuals. (Estimating)	-76.5	-157.8
Revised estimate to reflect refinement of FY 2019 - FY 2026 shipbuilding estimates. (Estimating)	+35.4	+118.3
Adjustment for Congressional reductions in FY 2020 for Basic Construction excess growth, Electronics excess growth, and Outfitting excess to need. (Estimating)	-16.0	-39.6
Revised estimate to reflect refinement of Outfitting and Post-Delivery requirements. (Estimating)	+265.4	+776.8
Adjustment for Navy-wide funding adjustments. (Estimating)	+6.3	+15.9
Adjustment for current and prior escalation. (Estimating)	-15.8	-37.7
Revised estimates to reflect application of new outyear inflation indices. (Estimating)	-15.1	-39.9
<b>Procurement Subtotal</b>	<b>-1137.4</b>	<b>-2666.3</b>

(QR) Quantity Related

## Contracts

### General Notes

In accordance with Section 830(a)(2) of the FY 2020 National Defense Authorization Act, which requires a SAR to be submitted "in unclassified form without any designation relating to dissemination control" this SAR section has omitted information that is ~~For Official Use Only~~.

### 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

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

### Cost and Schedule Variance Explanations

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

### 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.

In accordance with Section 830(a)(2) of the FY 2020 National Defense Authorization Act, which requires a SAR to be submitted "in unclassified form without any designation relating to dissemination control" this SAR section has omitted information that is ~~For Official Use Only~~.

**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

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

**Cost and Schedule Variance Explanations**

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

**Notes**

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

DDG 119 was damaged when a heavy lift ship delivering Ingalls' new dry dock made contact with a test barge docked next to DDG 119; allision repairs have been completed.

In accordance with Section 830(a)(2) of the FY 2020 National Defense Authorization Act, which requires a SAR to be submitted "in unclassified form without any designation relating to dissemination control" this SAR section has omitted information that is ~~For Official Use Only~~.

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

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

**Cost and Schedule Variance Explanations**

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

**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.

In accordance with Section 830(a)(2) of the FY 2020 National Defense Authorization Act, which requires a SAR to be submitted "in unclassified form without any designation relating to dissemination control" this SAR section has omitted information that is ~~For Official Use Only~~.

**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

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

**Cost and Schedule Variance Explanations**

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

**Notes**

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

In accordance with Section 830(a)(2) of the FY 2020 National Defense Authorization Act, which requires a SAR to be submitted "in unclassified form without any designation relating to dissemination control" this SAR section has omitted information that is ~~For Official Use Only~~.

**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

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

**Cost and Schedule Variance Explanations**

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

**Notes**

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

In accordance with Section 830(a)(2) of the FY 2020 National Defense Authorization Act, which requires a SAR to be submitted "in unclassified form without any designation relating to dissemination control" this SAR section has omitted information that is ~~For Official Use Only~~.

**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

**Contract Price**

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

**Cost and Schedule Variance Explanations**

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

**Notes**

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

In accordance with Section 830(a)(2) of the FY 2020 National Defense Authorization Act, which requires a SAR to be submitted "in unclassified form without any designation relating to dissemination control" this SAR section has omitted information that is ~~For Official Use Only~~.



## Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	0	0	0	--
Production	67	67	95	70.53%
Total Program Quantity Delivered	67	67	95	70.53%

Expended and Appropriated (TY \$M)			
Total Acquisition Cost	124498.8	Years Appropriated	41
Expended to Date	80094.1	Percent Years Appropriated	78.85%
Percent Expended	64.33%	Appropriated to Date	102657.2
Total Funding Years	52	Percent Appropriated	82.46%

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

## Operating and Support Cost

### Cost Estimate Details

<b>Date of Estimate:</b>	February 06, 2020
<b>Source of Estimate:</b>	NAVSEA 05C
<b>Quantity to Sustain:</b>	95
<b>Unit of Measure:</b>	Ship
<b>Service Life per Unit:</b>	45.00 Years
<b>Fiscal Years in Service:</b>	FY 1992 - FY 2076

Estimates are based on a service life of 45 years for 21 Flight I ships, seven Flight II ships, 47 Flight IIA ships, and 20 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 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 (VAMOSOC) 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	10.051	10.106
Unit Operations	4.268	4.932
Maintenance	7.555	8.401
Sustaining Support	1.391	1.344
Continuing System Improvements	5.075	4.172
Indirect Support	6.399	7.118
Other	0.000	0.000
<b>Total</b>	<b>34.739</b>	<b>36.073</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>148509.2<sup>1</sup></b>	33295.0
<b>Then Year</b>	326443.0	N/A	467693.1	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 95 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)  
 (95 ships X \$34.739M X 45 years) = \$148,509.2M

CG 47 (Ship quantity X Avg. Annual Cost per Ship, per Year X Ship Service Life)  
 (11 ships X \$36.073M X 40 years) + (11 ships X \$36.073M X 35 years) + (1 ship X \$36.073M X 21 years) + (2 ships X \$36.073M X 20 years) + (1 ship X \$36.073M X 19 years) + (1 ship X \$36.073M X 18 years) = \$33,295M

O&S Cost Variance		
Category	BY 1987 \$M	Change Explanations
Prior SAR Total O&S Estimates - Dec 2018 SAR	127968.0	
Programmatic/Planning Factors	17965.1	Removal of two ships, and service life updated from 35 years for Flt I and Flt II and 40 years for Flt IIA and Flt III to 45 years for all ships.
Cost Estimating Methodology	0.0	
Cost Data Update	2576.1	Updated per ship average based on VAMOSOC actual data as of January 2020.
Labor Rate	0.0	
Energy Rate	0.0	
Technical Input	0.0	
Other	0.0	
<b>Total Changes</b>	<b>20541.2</b>	
Current Estimate	148509.2	

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

#### Disposal Estimate Details

Date of Estimate: February 06, 2020

<b>Source of Estimate:</b>	NAVSEA 05C
<b>Disposal/Demilitarization Total Cost (BY 1987 \$M):</b>	245.0

The DDG 51 Class remains in full rate production and continues to be upgraded in new construction. In-service ships are modernizing with newer technologies which will inevitably change the cost of inactivation and disposal of the class. The ship disposal methodology reflects the NAVSEA Update of Conventional Surface Ship Environmental and Disposal Liability Estimate (October 2017).