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DDG 1000 Zumwalt Class Destroyer (DDG 1000)

As of FY 2021 President's Budget

Defense Acquisition Management
Information Retrieval
(DAMIR)

UNCLASSIFIED

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Common Acronyms and Abbreviations for MDAP Programs

Acq O&M - Acquisition-Related Operations and Maintenance
ACAT - Acquisition Category
ADM - Acquisition Decision Memorandum
APB - Acquisition Program Baseline
APPN - Appropriation
APUC - Average Procurement Unit Cost
\$B - Billions of Dollars
BA - Budget Authority/Budget Activity
Blk - Block
BY - Base Year
CAPE - Cost Assessment and Program Evaluation
CARD - Cost Analysis Requirements Description
CDD - Capability Development Document
CLIN - Contract Line Item Number
CPD - Capability Production Document
CY - Calendar Year
DAB - Defense Acquisition Board
DAE - Defense Acquisition Executive
DAMIR - Defense Acquisition Management Information Retrieval
DoD - Department of Defense
DSN - Defense Switched Network
EMD - Engineering and Manufacturing Development
EVM - Earned Value Management
FOC - Full Operational Capability
FMS - Foreign Military Sales
FRP - Full Rate Production
FY - Fiscal Year
FYDP - Future Years Defense Program
ICE - Independent Cost Estimate
IOC - Initial Operational Capability
Inc - Increment
JROC - Joint Requirements Oversight Council
\$K - Thousands of Dollars
KPP - Key Performance Parameter
LRIP - Low Rate Initial Production
\$M - Millions of Dollars
MDA - Milestone Decision Authority
MDAP - Major Defense Acquisition Program
MILCON - Military Construction
N/A - Not Applicable
O&M - Operations and Maintenance
ORD - Operational Requirements Document
OSD - Office of the Secretary of Defense
O&S - Operating and Support
PAUC - Program Acquisition Unit Cost

PB - President's Budget
PE - Program Element
PEO - Program Executive Officer
PM - Program Manager
POE - Program Office Estimate
RDT&E - Research, Development, Test, and Evaluation
SAR - Selected Acquisition Report
SCP - Service Cost Position
TBD - To Be Determined
TY - Then Year
UCR - Unit Cost Reporting
U.S. - United States
USD(AT&L) - Under Secretary of Defense (Acquisition, Technology and Logistics)
USD(A&S) - Under Secretary of Defense (Acquisition and Sustainment)

Program Information

Program Name

DDG 1000 Zumwalt Class Destroyer (DDG 1000)

DoD Component

Navy

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References

SAR Baseline (Development Estimate)

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated November 23, 2005

Approved APB

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated March 25, 2011

Mission and Description

After a comprehensive review of Zumwalt class requirements, the Navy decided in November 2017 to refocus the primary mission of the Zumwalt Class Destroyers from Land Attack to Offensive Surface Strike. This advanced warship will provide credible forward naval presence while operating independently or as an integral part of Naval, Joint, or Combined Expeditionary Strike Forces. Armed with an array of weapons, DDG 1000 will provide offensive, distributed, and precision firepower at long ranges.

Executive Summary

Program Highlights Since Last Report

Lead ship USS ZUMWALT (DDG 1000) has been completing combat system stage testing, as well as post-delivery test and trials, in support of reaching final delivery in March 2020. At final delivery, Zumwalt's combat system will be ready for developmental, integrated and operational testing. Following final delivery, Zumwalt will enter an extensive test period to demonstrate combat system capability in support of reaching Initial IOC in September 2021.

USS MICHAEL MONSOOR (DDG 1001) continues to progress towards completion of her combat availability in 2nd Quarter FY 2020. DDG 1001 will enter her combat activation period upon completing combat availability.

Construction of Lyndon B. Johnson (DDG 1002), the third and final ship of the class, is 91% complete as measured by labor hours. The contractual Hull Mechanical & Electrical (HM&E) delivery date is December 2020.

The Program Office plans to release a Request for Proposal (RFP) in 2nd Quarter FY 2020 for the DDG 1002 combat availability effort. Unlike, DDGs 1000 and 1001, the Navy will not crew DDG 1002 until final delivery to achieve better efficiency of production without a crew onboard. This final crew will be resequenced appropriately on a more traditional shipbuilding delivery schedule.

The program conducted two live missile firing events against threat representative targets from the Self Defense Test Ship (SDTS) installed with the Zumwalt Combat System in June 2019. In August 2019, a single live missile firing was also conducted from the SDTS. The program is also working through prior test failures and the test plan remains executable to support DDG 1000's planned IOC in September 2021.

Funding Status

The SPY-3 Radar onboard the Zumwalt class and CVN 78 faces a range of obsolescence and sustainment issues. Hardware and software is beyond end of life and requires \$113.0M in FY21 dollars to maintain AAW and self-defense capabilities. This is the Navy's number one readiness priority put forth in the PB21 Unfunded Priorities List (UPL).

PB21 provides \$1.2B (FYDP) to address reliability, sustainment, and modernization needs to provide a deployable class of ships that includes \$567.9M in OMN not otherwise included in this report. Additionally, \$684M pays for Total Ship's Computing Environment (TSCE), Cyber, and C4I modernization, sustainment, and upgrades.

History of Significant Developments Since Program Initiation	
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History of Significant Developments Since Program Initiation	
Date	Significant Development Description
January 1995	The program achieved Milestone 0 and started the Cost and Operational Effectiveness Analysis for the surface combatant for the twenty-first century (SC 21), comprised of destroyers (DD 21) and cruisers (CG 21). The DD 21 was intended to replace the DDG 51 by providing advanced land attack and multi-mission capabilities.
January 1998	The program achieved Milestone I for DD 21 and proceeded into the Program Definition and Risk Reduction phase. Primary Milestone I risks identified were a ship with a new hull form, several new combat system elements, significantly reduced manning level, very low signatures, and at lower costs than DDG 51. In order to maintain competitive cost pressure and to maintain technical competition, the Navy awarded Phase I and II concept development contracts to two industry teams
November 2001	The DD 21 program was restructured into the DD(X) program.
April 2002	Phase II concept development concluded and the Navy competitively selected and awarded a Design and Development contract to Northrop Grumman (NG) Ship systems (now Huntington Ingalls Shipbuilding – HII). The NG team was subsequently expanded to a DD(X) "national" team that also included Bath Iron Works (BIW), Lockheed Martin, and Boeing. The NG concept required RDT&E increases for many of the new technologies including integrated electric drive, radars, software development, optimized manning, the advanced gun, and munitions. To reduce risk, the Navy contracted for Engineering Development Models (EDMs) for 10 subsystems.
January 2005	The 10 EDMs completed testing and reached sufficient technical maturity to support a Critical Design Review. At that point, DD(X) was programmed to consist of 10 highly automated, reduced signature, reduced manning electric drive ships. DD(X)'s major new systems included Dual Band Radar (DBR), and Advanced Gun System (AGS) with a Long Range Land Attack Projectile (LRLAP).
November 2005	The program achieved Milestone B. Major outstanding risks at Milestone B were related to the schedule and cost of software development and the integration and test of Mission Systems, as well as the costs of shipbuilder construction, DBR and AGS.
April 2006	The DD(X) program was renamed DDG 1000 and detail design contracts for the dual lead ships were awarded to BIW and Northrop Grumman Shipbuilding (NGSB) (formerly ISI).
December 2007	The ADM was issued authorizing the Navy to enter Production Phase for DDG 1000.
February 2008	The DoD approved Low Rate Initial Production for seven ships, and lead ship construction contracts were awarded to BIW and NGSB.
July 2008	The Navy provided testimony to the House Armed Services Committee Seapower and Expeditionary Forces Subcommittee requesting Congressional support to truncate the DDG 1000 program and restart the DDG 51 program.
February 2010	The PB FY2011 budget submission confirmed the reduction of the DDG 1000 Program to three ships as a result of the Future Surface Combatant Radar Hull Study in which the Navy concluded a modified DDG 51 with an Advanced Missile Defense Radar was the most cost-effective solution to fleet air and missile defense requirements.
February 2010	The Secretary of the Navy notified Congress of a critical DDG 1000 program Nunn-McCurdy breach to the PAUC and APUC. This breach was due to the change in ship procurement quantity, not program performance.
June 2010	The USD (AT&L) certified a restructured three-ship program that included removal of the Volume Search Radar from the ship design, changed the IOC from FY 2015 to FY 2016, and revised test

	and evaluation requirements
October 2010	Milestone B prime was achieved for the restructured program following the Nunn-McCurdy certification.
March 2011	The APB for the restructured DDG 1000 Program was approved.
March 2013	Due to the FY 2013 sequestration impacts commencing during the execution year, the program experienced budget reductions of approximately \$70.2M of Shipbuilding and Conversion, Navy (SCN) and \$10.3M of RDT&E. The approximate \$70.2M FY 2013 SCN sequester prevented the award of a \$145M FY 2013 option to Raytheon for remaining Mission Systems Equipment (MSE) efforts for DDG 1000, 1001, and 1002, necessitating restructuring of the FY 2013, FY 2014, and FY 2015 options. A Below Threshold Reprogramming for \$9.999M of RDT&E was approved to continue LRLAP guided flight tests and combat systems development.
August 2013	The Navy awarded a contract modification for the design and construction of a steel deckhouse, hangar, and Aft Peripheral Vertical Launch System (PVLS) for DDG 1002 to BIW. The award occurred after the DDG 1002 sole source negotiation with HII for the procurement of the DDG 1002 composite deckhouse, composite hangar, and Aft PVLS did not reach an affordable solution and deliveries of these components for DDG 1002 were becoming time critical. The Navy concurrently pursued a steel deckhouse, hangar, and Aft PVLS using limited competition.
April 2014	DDG 1000 was christened at BIW in Bath, ME.
December 2015	Raytheon was awarded a contract for remaining DDG 1002 MSE.
April 2016	DDG 1000 completed acceptance trials off the coast of Bath, ME.
May 2016	DDG 1000 delivered to the Navy (Hull, Mechanical & Electrical (HM&E) delivery).
June 2016	DDG 1001 was christened at BIW in Bath, ME. DDG 1001 floated off in Bath, ME.
September 2016	DDG 1000 sailed away from BIW en route to its homeport of San Diego, CA.
October 2016	DDG 1000 was commissioned in Baltimore, MD.
November 2016	BAE was awarded the \$192 million contract for post-delivery execution yard efforts to install combat systems, as well as to complete Post Shakedown Availabilities on DDG 1000 and DDG 1001. The work will be executed at British Aerospace's (BAE) San Diego, CA facility near the ships' homeport at Naval Station San Diego and will be overseen by Naval Sea Systems Command (NAVSEA).
December 2016	DDG 1000 arrived at its homeport of San Diego.
January 2017	DDG 1002 keel laid at the BIW facility in Bath, ME.
March 2017	DDG 1000 entered Combat Availability at the BAE shipyard in San Diego, CA.
November 2017	Navy redefined the primary mission of the Zumwalt Class Destroyers from Land Attack to Offensive Surface Strike.
January 2018	DDG 1001 completed builder's trials and acceptance trials off the coast of Bath, ME.
April 2018	DDG 1001 HM&E Delivery.
September 2018	DDG 1000 completed Combat Availability and entered Combat Testing.
November 2018	DDG 1001 Sail-away.
December 2018	DDG 1000 Class Planning Yard Services contract was awarded to BIW.
December 2018	DDG 1001 arrived at its homeport of San Diego, CA.
December 2018	DDG 1002 was launched at BIW.
January 2019	DDG 1001 commissioned in San Diego, CA.

Threshold Breaches

APB Breaches

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

Explanation of Breach

The schedule breach was first reported in the December 2014 SAR and was due to technical risk, shipyard production and test challenges, and shipyard workforce constraints.

Nunn-McCurdy Breaches

Current UCR Baseline

PAUC	None
APUC	None

Original UCR Baseline

PAUC	None
APUC	None

Schedule



Schedule Events				
Events	SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Current Estimate
Milestone B	Nov 2005	Nov 2005	May 2006	Nov 2005
Lead Ship Awards	Jan 2006	Aug 2006	Feb 2007	Aug 2006
Milestone B Re-approval	N/A	Sep 2010	Mar 2011	Oct 2010
First Ship Delivery	Sep 2012	Apr 2014	Oct 2014	Mar 2020 [†]
OPEVAL	Sep 2013	Oct 2015	Apr 2016	Sep 2021 [†]
IOC	Jan 2014	Apr 2016	Oct 2016	Sep 2021 [†]
Milestone C	Mar 2015	Apr 2016	Oct 2016	Sep 2021 [†]

[†] APB Breach

Change Explanations

None

Notes

First ship HM&E delivery occurred in May 2016 marking completion of DDG 1000 at point of pre-mission systems activation. FY 2017 NDAA language recommended a provision that would require the Secretary of the Navy to deem ship delivery to occur at completion of the final phases of construction.

Final DDG 1000 delivery was previously reported in the December 2018 SAR as September 2019, and has moved to March 2020. The shift in date is driven by first-in-class combat systems shipboard test, integration, and activation, to include operational demonstrations.

Since all three ships of the class are under contract, IOC is used as the Milestone C date.

DDG 1000 Final Delivery - Mar 2020 - OWLD - Mar 2021

DDG 1001 Final Delivery - Sep 2020 - OWLD - Sep 2021

DDG 1002 Final Delivery - Sep 2022 - OWLD - Sep 2023

Acronyms and Abbreviations

HM&E - Hull, Mechanical, and Electrical

NDAA - National Defense Authorizations Act

OPEVAL - Operational Evaluation

Performance

Performance Characteristics				
SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Demonstrated Performance	Current Estimate
Number of Advanced Gun Systems				
2	2	2	N/A	DDG 1000 ORD Change 2, dated July 16, 2018, deletes the Advanced Gun Systems from the DDG 1000 Class Performance Characteristics. (Ch-1)
Number of Advanced Vertical Launch Cells				
128	128	80	TBD	80
Total Ship Advanced Gun System Magazine Capacity				
1200 rounds (600 rounds per magazine)	1200 rounds (600 rounds per magazine)	600 rounds total ship magazine capacity	TBD	DDG 1000 ORD Change 2, dated July 16, 2018, deletes the Total Ship Advanced Gun System Magazine Capacity from the DDG 1000 Class Performance Characteristics. (Ch-2)
Number of ship's company personnel (helicopter detachment included)				
125	125	175	TBD	217 (Ch-3)
Operational Availability (Ao) for mission critical systems:				
Ao for 120-day wartime profile				
0.95	0.95	0.90	TBD	0.95
Ao for 18 month extended forward deployment				
0.95	0.95	0.90	TBD	0.95
Interoperability: All top-level IERs will be satisfied to the standards specified in the Threshold and Objective values.				
Achieve 100% of top-level IERs. DD(X) joint tactical battle management and command and control computer programs shall conform to the SIAP System Engineer's	Achieve 100% of top-level IER. DD(X) joint tactical battle management and command and control computer programs shall conform to the SIAP System Engineer's	Achieve 100% top-level IER designated as critical. DD(X) joint tactical battle management and command and control computer programs shall conform to the SIAP	TBD	Achieve 100% of interfaces; services; policy-enforcement controls; and data correctness, availability and processing requirements designated as (Ch-4)

<p>Integrated Architecture and Integrated Architecture Behavior Model now being developed. DD (X) will remain in compliance with CJCSI 6212.01 (Series), Interoperability and Support-ability of IT and NSS, including future updates.</p>	<p>Integrated Architecture and Integrated Architecture Behavior Model now being developed. DD (X) will remain in compliance with CJCSI 6212.01 (Series), Interoperability and Support-ability of Information Technology and National Security Systems (IT and NSS), including future updates.</p>	<p>System Engineer's Integrated Architecture and Integrated Architecture Behavior Model for Track Management now being developed. DD (X) will remain in compliance with CJCSI 6212.0 (Series), Interoperability and Support-ability of Information Technology and National Security Systems (IT and NSS), Including future updates.</p>	<p>enterprise-level or critical in the Joint integrated architecture. This includes the ORD threshold requirements for meeting the IERs which are listed in DDG 1000 ORD Rev 15 (Table B) and the DDG 1000 TEMP Rev E (Table D-3).</p>
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Classified Performance information is provided in the classified annex to this submission.

Requirements Reference

DDX ORD Change 1 dated January 23, 2006

Change Explanations

(Ch-1) DDG 1000 ORD Change 2, dated 16 July 2018, deletes the Advanced Gun Systems from the DDG 1000 Class Performance Characteristics.

(Ch-2) DDG 1000 ORD Change 2, dated July 16, 2018, deletes the Total Ship Advanced Gun System Magazine Capacity from the DDG 1000 Class Performance Characteristics.

(Ch-3) In accordance with change 2 to the DDG 1000 ORD, ships crew has been increased to 217.

(Ch-4) DDG 1000 TEMP Rev D had been updated to DDG 1000 TEMP Rev E.

Notes

DDG 1000 ORD Change 2 dated July 16, 2018

JROCM 015-13 dated January 23, 2013

Acronyms and Abbreviations

CJCSI - Chairman of the Joint Chiefs of Staff Instruction
CNO - Chief of Naval Operations
IER - Information Exchange Requirement
IT - Information Technology
NSS - National Security System
Rev - Revision
SIAP - Single Integrated Air Picture
TEMP - Test and Evaluation Master Plan

Track to Budget

RDT&E

Appn	BA	PE		
Navy	1319	05	0204202N	
			Project	Name
			2464	DDG 1000 System Design, Development and Integration
			4009	Advanced Gun System on DDG 1000 (Sunk)
Navy	1319	04	0603513N	
			Project	Name
			2465	DC Survivability (Shared) (Sunk)
			2467	Advanced Gun System (Shared) (Sunk)
			2468	Undersea Warfare (Shared) (Sunk)
			2469	Open System Architecture (Shared) (Sunk)
			2470	Integrated Topside Design (Shared) (Sunk)
			2471	Integrated Power System (Shared) (Sunk)
			4019	Radar Upgrades (Shared) (Sunk)
Navy	1319	05	0604300N	
			Project	Name
			2463	DD(X) Construction (Shared) (Sunk)
			2464	DD(X) Sys Design, Dev & Integration (Shared) (Sunk)
			2465	DC Survivability (Shared) (Sunk)
			2466	MFR Development (Shared) (Sunk)
			2735	Volume Search Radar (Shared) (Sunk)
			4009	Advanced Gun System (Shared) (Sunk)
			4010	Integrated Power System on DD (X) (Shared) (Sunk)
Navy	1319	05	0604366N	
			Project	Name
			0439	Standard Missile Improvement: DDG 1000 (Shared) (Sunk)
Navy	1319	05	0604755N	
			Project	Name
			2735	Volume Search Radar (Sunk)

Procurement

Appn	BA	PE		
Navy	1611	02	0204202N	
			Line Item	Name
			2119	DDG 1000
Navy	1611	02	0204228N	
			Line Item	Name
			2119	DDG 1000 (Sunk)

Navy 1611 02 0204222N

Line Item	Name
2119	DDG 1000

(Sunk)

Navy 1611 02 0702898N

Line Item	Name
2119	Management Headquarters

Navy 1611 05 0204222N

Line Item	Name
5110	Outfitting
5300	Destroyers - Missile

(Shared)

(Sunk)

Navy 1810 01 0204202N

Line Item	Name
0947	DDG 1000 Class Support Equipment

Cost and Funding

Cost Summary

Total Acquisition Cost							
Appropriation	BY 2005 \$M			BY 2005 \$M	TY \$M		
	SAR Baseline Development Estimate	Current APB Development Objective/Threshold		Current Estimate	SAR Baseline Development Estimate	Current APB Development Objective	Current Estimate
RDT&E	8313.2	8994.0	9893.4	9342.1	8483.0	9325.5	9848.5
Procurement	23234.7	10195.3	11214.8	11001.9	27813.3	12497.8	14332.2
Flyaway	--	--	--	11001.9	--	--	14332.2
Recurring	--	--	--	9988.5	--	--	13172.2
Non Recurring	--	--	--	1013.4	--	--	1160.0
Support	--	--	--	0.0	--	--	0.0
Other Support	--	--	--	0.0	--	--	0.0
Initial Spares	--	--	--	0.0	--	--	0.0
MILCON	0.0	0.0	--	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	--	0.0	0.0	0.0	0.0
Total	31547.9	19189.3	N/A	20344.0	36296.3	21823.3	24180.7

Cost Notes

No cost estimate for the program has been completed in the previous year.

Total Quantity				
Quantity	SAR Baseline Development Estimate	Current APB Development	Current Estimate	
RDT&E		0	0	0
Procurement		10	3	3
Total		10	3	3

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	9391.0	111.4	208.5	90.9	30.3	12.1	4.3	0.0	9848.5
Procurement	13329.3	227.4	159.7	169.2	206.0	199.6	41.0	0.0	14332.2
MILCON	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB 2021 Total	22720.3	338.8	368.2	260.1	236.3	211.7	45.3	0.0	24180.7
PB 2020 Total	22761.9	340.2	185.8	116.8	71.0	71.8	0.0	0.0	23547.5
Delta	-41.6	-1.4	182.4	143.3	165.3	139.9	45.3	0.0	633.2

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	3	0	0	0	0	0	0	0	3
PB 2021 Total	0	3	0	0	0	0	0	0	0	3
PB 2020 Total	0	3	0	0	0	0	0	0	0	3
Delta	0	0	0	0	0	0	0	0	0	0

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
1995	--	--	--	--	--	--	7.0
1996	--	--	--	--	--	--	10.0
1997	--	--	--	--	--	--	12.0
1998	--	--	--	--	--	--	53.5
1999	--	--	--	--	--	--	215.1
2000	--	--	--	--	--	--	281.2
2001	--	--	--	--	--	--	532.4
2002	--	--	--	--	--	--	490.4
2003	--	--	--	--	--	--	895.4
2004	--	--	--	--	--	--	1002.2
2005	--	--	--	--	--	--	1120.2
2006	--	--	--	--	--	--	1040.6
2007	--	--	--	--	--	--	755.8
2008	--	--	--	--	--	--	516.5
2009	--	--	--	--	--	--	431.2
2010	--	--	--	--	--	--	503.8
2011	--	--	--	--	--	--	347.9
2012	--	--	--	--	--	--	249.8
2013	--	--	--	--	--	--	120.8
2014	--	--	--	--	--	--	189.6
2015	--	--	--	--	--	--	197.0
2016	--	--	--	--	--	--	101.7
2017	--	--	--	--	--	--	45.2
2018	--	--	--	--	--	--	134.7
2019	--	--	--	--	--	--	137.0
2020	--	--	--	--	--	--	111.4
2021	--	--	--	--	--	--	208.5
2022	--	--	--	--	--	--	90.9
2023	--	--	--	--	--	--	30.3
2024	--	--	--	--	--	--	12.1
2025	--	--	--	--	--	--	4.3
Subtotal	--	--	--	--	--	--	9848.5

Annual Funding							
1319 RDT&E Research, Development, Test, and Evaluation, Navy							
Fiscal Year	Quantity	BY 2005 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
1995	--	--	--	--	--	--	8.0
1996	--	--	--	--	--	--	11.3
1997	--	--	--	--	--	--	13.4
1998	--	--	--	--	--	--	59.1
1999	--	--	--	--	--	--	234.8
2000	--	--	--	--	--	--	302.6
2001	--	--	--	--	--	--	565.1
2002	--	--	--	--	--	--	515.3
2003	--	--	--	--	--	--	927.3
2004	--	--	--	--	--	--	1009.8
2005	--	--	--	--	--	--	1099.7
2006	--	--	--	--	--	--	990.7
2007	--	--	--	--	--	--	702.4
2008	--	--	--	--	--	--	471.4
2009	--	--	--	--	--	--	388.5
2010	--	--	--	--	--	--	447.2
2011	--	--	--	--	--	--	301.6
2012	--	--	--	--	--	--	213.1
2013	--	--	--	--	--	--	102.0
2014	--	--	--	--	--	--	157.8
2015	--	--	--	--	--	--	161.9
2016	--	--	--	--	--	--	82.1
2017	--	--	--	--	--	--	35.8
2018	--	--	--	--	--	--	104.3
2019	--	--	--	--	--	--	104.1
2020	--	--	--	--	--	--	83.0
2021	--	--	--	--	--	--	152.2
2022	--	--	--	--	--	--	65.1
2023	--	--	--	--	--	--	21.3
2024	--	--	--	--	--	--	8.3
2025	--	--	--	--	--	--	2.9
Subtotal	--	--	--	--	--	--	9342.1

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
2005	--	--	--	304.0	304.0	--	304.0
2006	--	--	--	706.2	706.2	--	706.2
2007	2	2587.6	--	--	2587.6	--	2587.6
2008	--	3009.9	--	149.8	3159.7	--	3159.7
2009	1	1504.3	--	--	1504.3	--	1504.3
2010	--	1378.5	--	--	1378.5	--	1378.5
2011	--	247.1	--	--	247.1	--	247.1
2012	--	512.6	--	--	512.6	--	512.6
2013	--	676.7	--	--	676.7	--	676.7
2014	--	281.0	--	--	281.0	--	281.0
2015	--	521.8	--	--	521.8	--	521.8
2016	--	478.9	--	--	478.9	--	478.9
2017	--	309.8	--	--	309.8	--	309.8
2018	--	255.8	--	--	255.8	--	255.8
2019	--	314.2	--	--	314.2	--	314.2
2020	--	218.9	--	--	218.9	--	218.9
2021	--	117.4	--	--	117.4	--	117.4
2022	--	44.2	--	--	44.2	--	44.2
2023	--	64.3	--	--	64.3	--	64.3
2024	--	19.3	--	--	19.3	--	19.3
Subtotal	3	12542.3	--	1160.0	13702.3	--	13702.3

Annual Funding 1611 Procurement Shipbuilding and Conversion, Navy							
Fiscal Year	Quantity	BY 2005 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2005	--	--	--	275.1	275.1	--	275.1
2006	--	--	--	617.3	617.3	--	617.3
2007	2	2162.4	--	--	2162.4	--	2162.4
2008	--	2432.5	--	121.0	2553.5	--	2553.5
2009	1	1179.6	--	--	1179.6	--	1179.6
2010	--	1044.7	--	--	1044.7	--	1044.7
2011	--	181.3	--	--	181.3	--	181.3
2012	--	367.7	--	--	367.7	--	367.7
2013	--	475.8	--	--	475.8	--	475.8
2014	--	193.8	--	--	193.8	--	193.8
2015	--	352.5	--	--	352.5	--	352.5
2016	--	316.8	--	--	316.8	--	316.8
2017	--	200.7	--	--	200.7	--	200.7
2018	--	162.4	--	--	162.4	--	162.4
2019	--	195.6	--	--	195.6	--	195.6
2020	--	133.6	--	--	133.6	--	133.6
2021	--	70.2	--	--	70.2	--	70.2
2022	--	25.9	--	--	25.9	--	25.9
2023	--	37.0	--	--	37.0	--	37.0
2024	--	10.9	--	--	10.9	--	10.9
Subtotal	3	9543.4	--	1013.4	10556.8	--	10556.8

Cost Quantity Information		
1611 Procurement Shipbuilding and Conversion, Navy		
Fiscal Year	Quantity	End Item Recurring Flyaway (Aligned With Quantity) BY 2005 \$M
2005	--	--
2006	--	--
2007	2	6775.8
2008	--	--
2009	1	2767.6
2010	--	--
2011	--	--
2012	--	--
2013	--	--
2014	--	--
2015	--	--
2016	--	--
2017	--	--
2018	--	--
2019	--	--
2020	--	--
2021	--	--
2022	--	--
2023	--	--
2024	--	--
Subtotal	3	9543.4

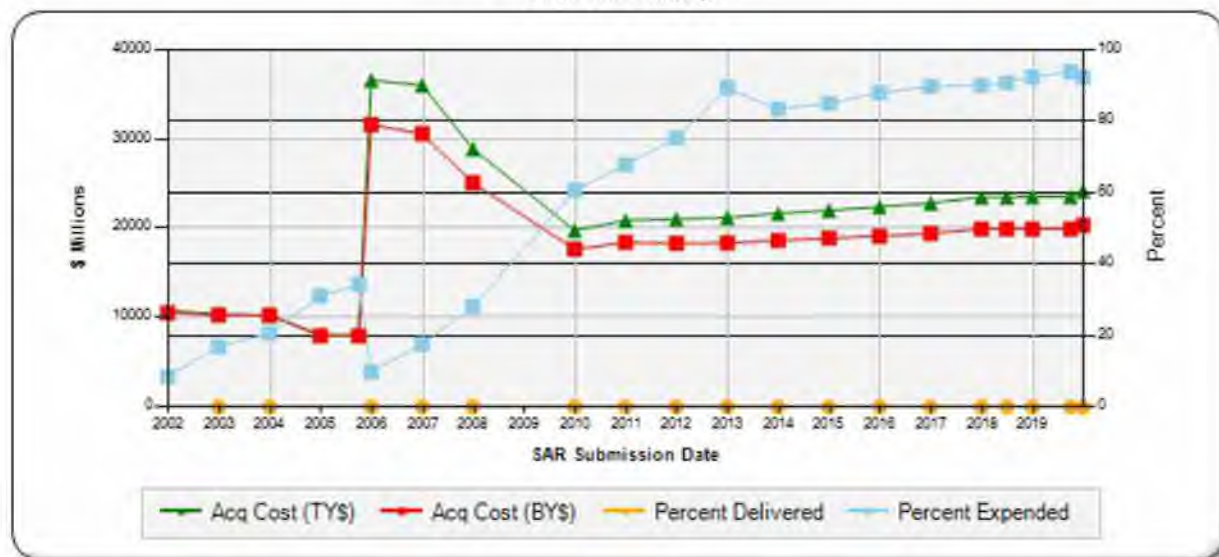
Annual Funding 1810 Procurement Other Procurement, Navy							
Fiscal Year	Quantity	TY \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2017	--	--	33.4	--	33.4	--	33.4
2018	--	--	--	--	--	--	--
2019	--	--	57.7	--	57.7	--	57.7
2020	--	--	8.5	--	8.5	--	8.5
2021	--	--	42.3	--	42.3	--	42.3
2022	--	--	125.0	--	125.0	--	125.0
2023	--	--	141.7	--	141.7	--	141.7
2024	--	--	180.3	--	180.3	--	180.3
2025	--	--	41.0	--	41.0	--	41.0
Subtotal	--	--	629.9	--	629.9	--	629.9

Annual Funding 1810 Procurement Other Procurement, Navy							
Fiscal Year	Quantity	BY 2005 \$M					
		End Item Recurring Flyaway	Non End Item Recurring Flyaway	Non Recurring Flyaway	Total Flyaway	Total Support	Total Program
2017	--	--	26.2	--	26.2	--	26.2
2018	--	--	--	--	--	--	--
2019	--	--	43.5	--	43.5	--	43.5
2020	--	--	6.3	--	6.3	--	6.3
2021	--	--	30.7	--	30.7	--	30.7
2022	--	--	88.9	--	88.9	--	88.9
2023	--	--	98.8	--	98.8	--	98.8
2024	--	--	123.2	--	123.2	--	123.2
2025	--	--	27.5	--	27.5	--	27.5
Subtotal	--	--	445.1	--	445.1	--	445.1

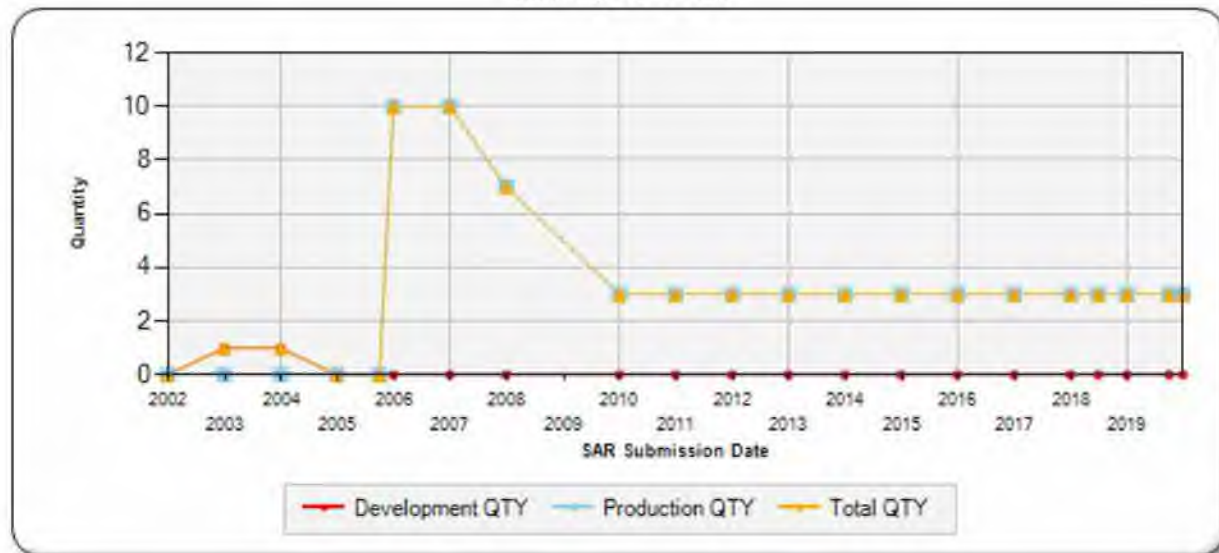
Charts

DDG 1000 first began SAR reporting in June 1998

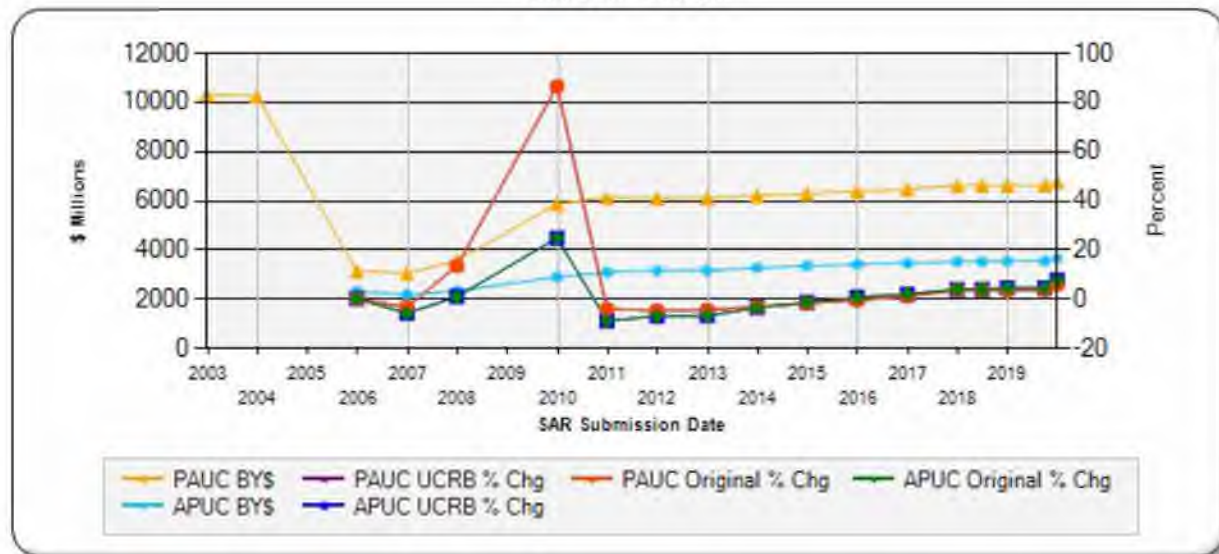
Program Acquisition Cost - DDG 1000
Base Year 2005 \$M



Quantity - DDG 1000



Unit Cost - DDG 1000
Base Year 2005 \$M



Risks

Significant Schedule and Technical Risks

Significant Schedule and Technical Risks	
Milestone B (November 2005)	
1.	Risk: Negotiation of shipbuilder construction contracts to within budget; November 2005 Milestone B ADM required construction contracts to be within budget prior to award. Mitigation: Face-to-face fact finding and alpha contracting approach. Risk mitigated through August 8, 2006 award to Bath Iron Works (BIW) and August 31, 2008 award to Northrop Grumman Ship Systems (now Huntington Ingalls Industries) for Detail Design and option for Construction.
2.	Risk: Software Development and Integration Mitigation: Close monitoring of monthly metrics by PM and quarterly metrics submission to OSD. Risk mitigated through oversight and program no longer required to submit quarterly software metrics.
3.	Risk: Addition of Force Protection and Survivability Key Performance Parameters (KPPs) into the ORD. Risk closed with ORD Change 1 Approved January 23, 2006.
Revised Milestone B (October 2010)	
1.	Schedule: Schedule adjustment in accordance with Nunn-McCurdy Certification. Mitigation: Schedule adjustment shifts IOC to FY 2016 via Milestone B ADM. Risk mitigated through adjustment to APB, and realized through BIW and Navy evaluation of yard-wide performance, identified in Current (December 2014) Risks.
2.	Technical: Certification of the wave piercing hull form with a Safe Operating Envelope (SOE). Mitigation: Complete SOE criteria, perform hull form model testing and simulations to predict ship motions, conduct full scale heavy weather trials. Risk identified in Current (December 2014) Risks and scheduled for closure third Quarter FY 2015.
3.	Technical: Meeting Advanced Gun System (AGS) Insensitive Munitions (IM) requirements. Mitigation: Conduct prequalification rocket motor cook-off tests, propelling charge IM tests, warhead sympathetic detonation tests. Completed Engineering Demonstration Model Phase Guided Flight Tests in first quarter FY 2014.
Current Estimate (December 2019)	
1.	Cost – DDG 1002 emergent work or unforeseen issues introduce change that could significantly increase construction costs. Only changes with significant impact on safety of ship or ability to meet critical capabilities are being considered.
2.	Program - Management of new mission requirements to the DDG 1000 class to avoid cost and schedule impacts. Navy has a cross program team evaluating each element of the mission change and identifying a path to complete development and integrate each system into the DDG 1000 class. The team is working to identify the most cost effective point of incorporation for each system across the three hulls within the class. Program of Record systems have been identified for use to meet the mission requirements, in order to minimize technical risk and cost associated with fielding on each ship in the class.
3.	Program – If the DDG 1000 class construction program office does not actively prepare to support all required in-service actions then vital post Obligation Work Limiting Date (OWLD) maintenance and modernization milestones will not be met. Teams are working closely with the lifecycle program offices to implement best practices and lessons learned as it pertains to contract structure, planning, execution, and reporting efforts. The critical engineering and technical resources within the new construction program office are involved in evaluating all planned readiness and modernization work for the class, required for completion

post-OWLD. Focus is on acquisition planning.

4. Testing - First of class complex Combat Test Plan. Developed integrated DDG 1000 test schedule to maximize ship underway periods to streamline and reduce testing and combat systems activation events. Combat testing on DDG 1000 has been prioritized to achieve IOC by September 2021. The San Diego waterfront team is managing at the work package level and Navy and Industry executives meet weekly to capture progress to schedule; lessons learned implemented on DDG 1001.

Risks

Risk and Sensitivity Analysis

Risks and Sensitivity Analysis	
Current Baseline Estimate (March 2011)	
1.	The USD (AT&L) directed the restructured DDG 1000 program to be funded to the CAPE estimate in FY 2011-2015 and the Navy estimate in FY 2016 and later. The cost risk is the difference in the cost estimates and resource requirements in FY 2016 and beyond, which total approximately \$1.2 billion (Then Year \$).
Original Baseline Estimate (November 2005)	
1.	The Cost Analysis Improvement Group (CAIG) and Navy cost estimating differences are attributable in two major areas: Mission Systems Procurement Cost, the CAIG noted rarely seeing significant cost reductions from Non-Recurring Engineering (NRE) investments when quantities are few; and Construction (of 10 ships), the CAIG assumption for DD(X) now DDG 1000 program, is a new ship of radically different design, while Navy predicted incurred DDG 51 Flight IIA productivity improvements
Revised Original Estimate (March 2011)	
1.	The USD (AT&L) directed the restructured DDG 1000 program to be funded to the CAPE estimate in FY 2011-2015 and the Navy estimate in FY 2016 and later. The cost risk is the difference in the cost estimates and resource requirements in FY 2016 and beyond, which total approximately \$1.2 billion (Then Year \$).
Current Procurement Cost (December 2019)	
1.	The Current Procurement Cost remains below the threshold of the Revised Original Estimate (March 2011). Please see above for details.

Low Rate Initial Production

Item	Initial LRIP Decision	Current Total LRIP
Approval Date	11/22/2005	10/8/2010
Approved Quantity	8	3
Reference	Milestone B ADM	Milestone B ADM
Start Year	2007	2007
End Year	2014	2009

The Current Total LRIP Quantity is more than 10% of the total production quantity due to the revised Milestone B ADM of October 8, 2010 reducing the LRIP quantity to three ships, which represents the total quantity of the program.

Foreign Military Sales

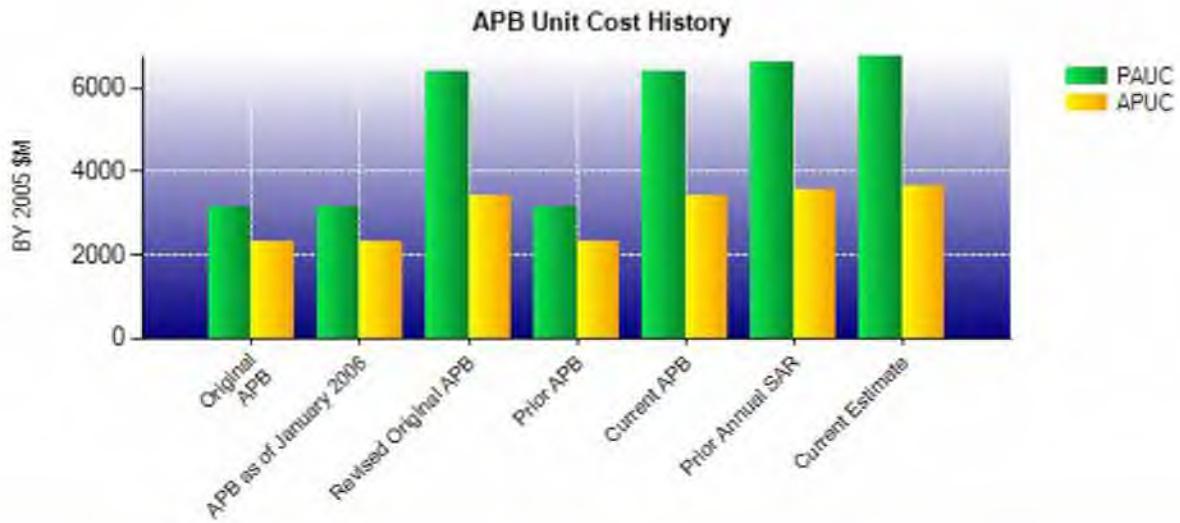
None

Nuclear Costs

None

Unit Cost

Current UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2005 \$M	BY 2005 \$M	% Change
	Current UCR Baseline (Mar 2011 APB)	Current Estimate (Dec 2019 SAR)	
Program Acquisition Unit Cost			
Cost	19189.3	20344.0	
Quantity	3	3	
Unit Cost	6396.433	6781.333	+6.02
Average Procurement Unit Cost			
Cost	10195.3	11001.9	
Quantity	3	3	
Unit Cost	3398.433	3667.300	+7.91
Original UCR Baseline and Current Estimate (Base-Year Dollars)			
Item	BY 2005 \$M	BY 2005 \$M	% Change
	Revised Original UCR Baseline (Mar 2011 APB)	Current Estimate (Dec 2019 SAR)	
Program Acquisition Unit Cost			
Cost	19189.3	20344.0	
Quantity	3	3	
Unit Cost	6396.433	6781.333	+6.02
Average Procurement Unit Cost			
Cost	10195.3	11001.9	
Quantity	3	3	
Unit Cost	3398.433	3667.300	+7.91



APB Unit Cost History					
Item	Date	BY 2005 \$M		TY \$M	
		PAUC	APUC	PAUC	APUC
Original APB	Nov 2005	3154.790	2323.470	3629.620	2781.320
APB as of January 2006	Nov 2005	3154.790	2323.470	3629.620	2781.320
Revised Original APB	Mar 2011	6396.433	3398.433	7274.433	4165.933
Prior APB	Nov 2005	3154.790	2323.470	3629.620	2781.320
Current APB	Mar 2011	6396.433	3398.433	7274.433	4165.933
Prior Annual SAR	Dec 2018	6637.367	3556.067	7849.167	4612.233
Current Estimate	Dec 2019	6781.333	3667.300	8060.233	4777.400

SAR Unit Cost History

Current SAR Baseline to Current Estimate (TY \$M)									
PAUC Development Estimate	Changes								PAUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
3629.630	617.633	2104.836	17.767	184.067	1506.300	0.000	0.000	4430.603	8060.233

Current SAR Baseline to Current Estimate (TY \$M)									
Initial APUC Development Estimate	Changes								APUC Current Estimate
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
2781.330	612.900	125.470	24.767	-105.200	1338.133	0.000	0.000	1996.070	4777.400

SAR Baseline History				
Item	SAR Planning Estimate	SAR Development Estimate	SAR Production Estimate	Current Estimate
Milestone I	N/A	N/A	N/A	N/A
Milestone B	Nov 2005	Nov 2005	N/A	Nov 2005
Milestone C	Mar 2015	Mar 2015	N/A	Sep 2021
IOC	Jan 2014	Jan 2014	N/A	Sep 2021
Total Cost (TY \$M)	36296.2	36296.3	N/A	24180.7
Total Quantity	10	10	N/A	3
PAUC	3629.620	3629.630	N/A	8060.233

Cost Variance

Summary TY \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Development Estimate)	8483.0	27813.3	--	36296.3
Previous Changes				
Economic	+12.4	+1835.5	--	+1847.9
Quantity	--	-19092.9	--	-19092.9
Schedule	-21.0	+74.3	--	+53.3
Engineering	+867.8	-315.6	--	+552.2
Estimating	+368.6	+3522.1	--	+3890.7
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+1227.8	-13976.6	--	-12748.8
Current Changes				
Economic	+1.8	+3.2	--	+5.0
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+135.9	+492.3	--	+628.2
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+137.7	+495.5	--	+633.2
Total Changes	+1365.5	-13481.1	--	-12115.6
Current Estimate	9848.5	14332.2	--	24180.7

Summary BY 2005 \$M				
Item	RDT&E	Procurement	MILCON	Total
SAR Baseline (Development Estimate)	8313.2	23234.7	--	31547.9
Previous Changes				
Economic	--	--	--	--
Quantity	--	-14646.0	--	-14646.0
Schedule	-16.5	+76.9	--	+60.4
Engineering	+698.6	-323.5	--	+375.1
Estimating	+248.6	+2326.1	--	+2574.7
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+930.7	-12566.5	--	-11635.8
Current Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	--	--	--
Estimating	+98.2	+333.7	--	+431.9
Other	--	--	--	--
Support	--	--	--	--
Subtotal	+98.2	+333.7	--	+431.9
Total Changes	+1028.9	-12232.8	--	-11203.9
Current Estimate	9342.1	11001.9	--	20344.0

Previous Estimate: September 2019

RDT&E	\$M	
	Base Year	Then Year
Current Change Explanations		
Revised escalation indices. (Economic)	N/A	+1.8
Revised estimate for Small Business Innovation Research adjustment. (Estimating)	-2.5	-3.3
Revised estimate for Component Shock Hardening Certification (Estimating)	+11.7	+16.0
Revised estimate for Test and Evaluation Management Plan 1560 Test and Evaluation (Estimating)	+38.0	+52.1
Revised estimate for Maritime Strike Tomahawk MK57 Integration (IWS 3.0) (Estimating)	+4.9	+6.5
Revised estimate for Overall Combat System Operability Test (OSCOT) (Estimating)	+9.8	+13.6
Revised estimate for SM-6 Integration (Estimating)	+6.4	+8.8
Revised estimate for Sustainment and Modernization solutions to address Class technical issues. (Estimating)	+24.1	+33.1
Revised estimate for under-execution Review (Estimating)	-0.3	0.0
Revised estimate for miscellaneous rate adjustments (Estimating)	-0.1	-0.2
Revised estimate for Maritime Targeting Cell-Afloat (MTC-A) and Surface Strike. (Estimating)	+7.0	+10.4
Adjustment for current and prior escalation. (Estimating)	-0.8	-1.1
RDT&E Subtotal	+98.2	+137.7

Procurement	\$M	
	Base Year	Then Year
Current Change Explanations		
Revised escalation indices. (Economic)	N/A	+3.2
Revised estimate to support CVN shortfall (SCN) (Estimating)	-0.8	-1.4
Revised estimate to fund DDG 1000 Combat Systems Activation (SCN) (Estimating)	+34.2	+58.7
Revised estimate to properly price FY2009 - FY2020 shipbuilding program (SCN) (Estimating)	+13.0	+21.9
Revised estimate for Inflation Rates for Non-pay and Non-fuel Purchases (SCN) (Estimating)	-0.3	-0.3
Revised estimate for Post Delivery adjustments (SCN) (Estimating)	+15.2	+25.2
Revised estimate for Post Delivery reduction of excess (SCN) (Estimating)	-11.7	-20.8
Revised estimate for Naval Working Capital Fund miscellaneous adjustments (SCN) (Estimating)	+1.7	+3.0
Revised estimate to fund Data Center Lab (Combat system maintenance and hardware) (OPN) (Estimating)	+20.0	+28.0
Revised estimate to fund Total Ship Computing Environment Diminishing Manufacturing Sources and Material Shortages(OPN) (Estimating)	+39.2	+56.4
Revised estimate to fund sustainment and modernization solutions to address class technical issues (OPN) (Estimating)	+36.2	+51.2
Revised estimate to fund Total Ship Computing Environment Modernization (OPN) (Estimating)	+199.2	+287.5
Revised estimate for under-execution (OPN) (Estimating)	-0.1	0.0
Revised estimate for miscellaneous rate adjustments (OPN) (Estimating)	+0.2	+0.3
Revised estimate for DDG 1000 Class Product Improvement (OPN) (Estimating)	+15.2	+22.5

Revised estimate for data correction to match Program Budget Information System in FY 2013/FY2014 (SCN) (Estimating)	-25.4	-36.8
Revised estimate for MDAP Penalty Tax (SCN) (Estimating)	-0.1	-0.1
Adjustment for current and prior escalation. (Estimating)	-2.0	-3.0
<hr/> Procurement Subtotal	<hr/> +333.7	<hr/> +495.5

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: Phase IV BIW Construction (DDG 1002 Steel Superstructure (Deckhouse))
Contractor: General Dynamics
Contractor Location: 700 Washington Street
 Bath, ME 04530
Contract Number: N00024-11-C-2306/882
Contract Type: Fixed Price Incentive(Firm Target) (FPIF)
Award Date: August 02, 2013
Definitization Date: August 02, 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

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

Contract Identification

Appropriation: Procurement
Contract Name: Phase IV BIW Construction (DDG 1002)
Contractor: General Dynamics
Contractor Location: 700 Washington Street
 Bath, ME 04530
Contract Number: N00024-11-C-2306/881
Contract Type: Fixed Price Incentive (Successive Targets) (FPIS), Firm Fixed Price (FFP)
Award Date: September 15, 2011
Definitization Date: September 15, 2011

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 (FPIS/FFP) contract.

Notes

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

Deliveries and Expenditures

Deliveries				
Delivered to Date	Planned to Date	Actual to Date	Total Quantity	Percent Delivered
Development	0	0	0	--
Production	0	0	3	0.00%
Total Program Quantity Delivered	0	0	3	0.00%

Expended and Appropriated (TY \$M)			
Total Acquisition Cost	24180.7	Years Appropriated	26
Expended to Date	22279.9	Percent Years Appropriated	83.87%
Percent Expended	92.14%	Appropriated to Date	23059.1
Total Funding Years	31	Percent Appropriated	95.36%

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

Notes

In accordance with 10 U.S. Code § 2432(g), SAR is no longer required after a program achieves 90% planned expenditures. As this Code applies to the DDG 1000 Program, the Program Office, PEO, and Deputy Assistant Secretary of the Navy - Acquisition Policy and Budget all agree that SAR reporting will continue beyond the 90% expenditure threshold until at least 2 ships of the 3 ship class acquisition achieve final delivery.

Operating and Support Cost

Cost Estimate Details

Date of Estimate:	June 02, 2015
Source of Estimate:	Service ICE
Quantity to Sustain:	3
Unit of Measure:	Ship
Service Life per Unit:	35.00 Years
Fiscal Years in Service:	FY 2016 - FY 2051

O&S cost estimates are based on the 2015 Gate 6 Review of DDG 1000 Class. Costs are shown in BY 2005 dollars. The estimate is based on an average unit cost of three ships with an average 35 year service life. The estimate includes separately priced mission system equipment sustainment cost. Mid-life modernization is not included.

The O&S costs are provided in revised cost elements based on the CAPE 2014 O&S Cost-Estimating Guide. NAVSEA Cost & Estimating group reported no changes to DDG 1000 O&S costs associated with the current schedule and with the redefinition of the Zumwalt Class Destroyer primary mission from Land Attack to Offensive Surface Strike.

The DDG 1000 cost estimates have been validated by NAVSEA 05C to reflect the surface strike mission and manning requirements. There are no actuals for the DDG 1000 class as the first ship delivery is scheduled for March 2020.

Sustainment Strategy

DDG 1000 maintenance is apportioned to either the ship or a land-based facility. There are two levels of maintenance planned for the DDG 1000 ship class: "on-ship" - accomplished by ship's force and "off-ship" - accomplished through maintenance support contracts in addition to the legacy Navy maintenance infrastructure. Maintenance support contracts similar to legacy Multi Ship/Multi Option contracting strategy for repairs and overhauls are planned. The DDG 1000 program provides Integrated Logistics Support 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 DDG 51 ship class. The DDG 1000 and DDG 51 ships differ in various aspects that make comparison difficult. Considerations include new technologies, size difference, and an all electric ship design.

The 2019 unit cost of the DDG 51 (Antecedent) is derived using the Naval Visibility and Management of Operating and Support Costs database and is shown in BY 2005 \$M. DDG 51 estimates are based on a service life of 35 years for the 28 Flight I and Flight II ships and 40 years for the 54 Flight IIA and Flight III ships. The DDG 51 costs shown in this SAR are identical to those in the DDG 51 December 2019 SAR converted into BY 2005 \$M.

Annual O&S Costs BY2005 \$M			
Cost Element	DDG 1000		DDG 51 (Antecedent)
	Average Annual Cost Per Ship		Average Annual Cost Per Ship
Unit-Level Manpower	12.776		18.884
Unit Operations	8.603		6.736
Maintenance	22.197		11.369
Sustaining Support	8.131		2.093
Continuing System Improvements	15.368		7.559
Indirect Support	6.623		10.668
Other	0.000		0.000
Total	73.698		57.309

Item	Total O&S Cost \$M			
	DDG 1000			DDG 51 (Antecedent)
	Current Development APB Objective/Threshold		Current Estimate	
Base Year	7744.4	8518.8	7738.3	216667.7
Then Year	15245.3	N/A	14946.0	N/A

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

Equation to Translate Annual Cost to Total Cost

The equation that links the unitized cost to the total cost for DDG 1000 is Total Cost = average annual cost per ship * number of ships * service life = \$73.7M per Ship x 3 Ships x 35 year (service life) = \$7,738.3M (BY 2005)

O&S Cost Variance		
Category	BY 2005 \$M	Change Explanations
Prior SAR Total O&S Estimates - Sep 2019 SAR	7738.3	
Programmatic/Planning Factors	0.0	
Cost Estimating Methodology	0.0	
Cost Data Update	0.0	
Labor Rate	0.0	
Energy Rate	0.0	
Technical Input	0.0	
Other	0.0	
Total Changes	0.0	
Current Estimate	7738.3	

Disposal Estimate Details

Date of Estimate: June 02, 2015

Source of Estimate:	Service ICE
Disposal/Demilitarization Total Cost (BY 2005 \$M):	53.7

O&S Baseline data is from Milestone B recertification Program Life Cycle Cost Estimates.