Selected Acquisition Report (SAR)

RCS: DD-A&T(Q&A)823-223

CVN 78 CLASS

As of December 31, 2011

Defense Acquisition Management
Information Retrieval
(DAMIR)

Table of Contents

Program Information

Designation And Nomenclature (Popular Name)

GERALD R. FORD CLASS Nuclear Aircraft Carrier (CVN 78 CLASS)

DoD Component

Navy

Responsible Office

Responsible Office

CAPT Chris Meyer
Program Executive Office (PEO) Aircraft Carriers
PMS 378
614 Sicard Street SE Stop 7007
Washington, DC 20376-7007
chris.meyer@navy.mil

Phone 202-781-3969
Fax 202-781-4684
DSN Phone 326-3969
DSN Fax 326-4684

Date Assigned June 9, 2011

References

SAR Baseline (Development Estimate)

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated April 23, 2004

Approved APB

Defense Acquisition Executive (DAE) Approved Acquisition Program Baseline (APB) dated November 21, 2007

Mission and Description

The Future Aircraft Carrier GERALD R. FORD Class (CVN 78) is the planned successor to the NIMITZ-class (CVN 68) aircraft carrier. The CVN 78 mission is to provide credible, sustainable, independent forward presence during peacetime without access to land bases; operate as the cornerstone of a joint and/or allied maritime expeditionary force in response to crisis; and carry the war to the enemy through joint multi-mission offensive operations by: (a) being able to operate and support aircraft in attacks on enemy forces ashore, afloat, or submerged independent of forward-based land facilities, (b) protecting friendly forces from enemy attack through the establishment and maintenance of battle space dominance independent of forward-based land facilities, and (c) engaging in sustained operations in support of the United States and its allies independent of forward-based land facilities.

The CVN 78 Class Aircraft Carrier program includes major efforts for Nuclear Propulsion/Electric Plant Design, Electromagnetic Aircraft Launch System (EMALS) and all electric auxiliary systems. Additional design features and new technologies have been added, including a new/enlarged flight deck, improved weapons handling capabilities, and improved survivability.

Executive Summary

The FY 2007 National Defense Appropriations Act (NDAA) provided contract authority for the construction of the CVN 21 Class (subsequently re-designated the CVN 78 Class) aircraft carriers designated CVN 78, CVN 79, and CVN 80. In addition, the Navy received authority for the ships to be split funded across four years. In conjunction with the release of the FY 2010 President's Budget (PB), the Department of Defense (DoD) placed the CVN 78 program on 5-year intervals for construction contract awards. This decision shifted the Detail Design and Construction (DD&C) contract award for the CVN 79 from FY 2012 to FY 2013, and the CVN 80 DD&C contract award from FY 2016 to FY 2018. The FY 2012 NDAA extended the Full Funding period for CVN 79 from four years to five years and directed Electromagnetic Aircraft Launch System (EMALS) be designated as a major subprogram. PB 2013 extends CVN 79 Full Funding (FF) to FY 2018 and shifts a substantial amount of funding from FY 2013 and FY 2014 to later years. The Navy will submit a legislative proposal to Congress requesting to extend the FF period from five years to six years to best support the current funding profile. In addition, PB 2013 removed CVN 80 Research Development Test and Evaluation (RDT&E) funds within the Future Years Defense Program (FYDP).

Design and integration efforts for the CVN 78 Class began in FY 2000 with the Integrated Product and Process Development contract. These efforts continued with the Construction Preparation contract in FY 2004, which included Long Lead Time Material (LLTM) procurement, advanced construction, and further design and development efforts. The CVN 78 Detail Design and Construction (DD&C) contract was awarded on September 10, 2008. The shipbuilder reports negative cumulative cost and schedule variances on DD&C efforts. Cost growth on the DD&C contract is due to material and labor factors. The material variances are due to market forces, unanticipated impacts of a "first of class" specification on contractor furnished material costs (e.g. valves, electrical components, steel and other commodities), and refined understanding of material requirements as the ship design matured. Labor inefficiencies are the result of "first of class" challenges including producibility issues (e.g. thin plate steel, weld distortion, and the increase use of temporary structure and rigging) and the availability of new developmental components (e.g. valves, actuators). Additionally, increased supervision has been required to manage the above challenges and a developing workforce. The schedule variance is due to inefficiencies associated the material availability and "first of class" producibility issues described above, and delays in the release of engineering products required to develop construction work packages. As of December 31, 2011, the construction effort for the CVN 78 is 33.9% complete.

The Navy is aggressively working with the shipbuilder to drive improvements to material and construction performance. These efforts to control cost are producing favorable results. Significant changes include designation of a Senior Vice President and a Total Ship Construction Superintendent for oversight of CVN 78 construction and changes in material management. The shipbuilder has established specific labor cost targets for key manufacturing and construction areas and implemented cost control initiatives to meet these goals. Specific initiatives include more effective coordination between engineering and production trades, extending Earned Value Management (EVM) targets throughout all levels of leadership, improving work control processes, the use of bulk material ordering where possible, and methods to more quickly resolve waterfront issues. In addition, the Navy has partnered with the shipbuilder to consider changes to specifications and modify them where appropriate to lower cost and schedule risk. On July 29, 2011, the Program awarded a new contract structure for non-recurring engineering (NRE) by transitioning from a Cost Plus Fixed Fee (CPFF) Level of Effort (LOE) to a Cost Plus Incentive Fee (CPIF) to complete the remaining NRE work.

Senator John McCain's letter of August 11, 2011 to Secretary of the Navy, Raymond Mabus, addressed cost performance of the detail design and construction of the CVN 78. As a result, the Navy is submitting monthly reports to the four defense committees. In the Secretary of the Navy's response letter dated August 29, 2011, the Secretary directed the Assistant Secretary of the Navy (ASN) Research Development and Acquisition (RDA) to conduct a detailed review of the CVN 78 program build plan to improve end-to-end aircraft carrier design, material procurement, production planning, build and test. The Navy completed the assessment December 2011. The Navy is implementing recommendations from this report to both improve CVN 78 contract performance, and to drive further improvements in the upcoming CVN 79 DD&C contract.

Advance Procurement for the follow ship JOHN F. KENNEDY (CVN 79) Long Lead Time Material began in FY 2007. Congress authorized advanced construction efforts for the CVN 79 in the FY 2010 NDAA. The Construction Preparation (CP) contract for the CVN 79 advance procurement, research, design, and engineering was awarded on January 15, 2009 for FY 2009 and FY 2010 efforts. On December 8, 2010, a contract extension was awarded to continue CP efforts with the contractor. The CVN 79 DD&C contract is expected to be awarded in FY 2013.

The FY 2012 NDAA designated EMALS as a major subprogram of the CVN 78 FORD-Class aircraft carrier Major Defense Acquisition Program (MDAP). As a result, the CVN 78 Class Acquisition Program Baseline (APB) will be revised to reflect this directive. EMALS is an advanced technology electrically generated aircraft launching system that uses a moving electromagnetic field to propel aircraft to launch speed. EMALS is comprised of six primary sub-systems: energy storage, power conditioning, launch motor, prime power interface, launch control, and energy distribution. Benefits over the current C13 steam catapults include reduced weight and volume, greater launch flexibility for future aircraft, improved control, and reduced manning workload. EMALS System Development and Demonstration (SDD) Program is greater than 86% complete. Since December 2010, EMALS successfully performed Aircraft Compatibility Testing Phase 1 consisting of 129 aircraft launches. In November 2011, an F-35C was successfully launched.

There are no significant software-related issues with this program at this time.

Threshold Breaches

APB Breaches		
Schedule		☑
Performance		☐
Cost	RDT&E	☐
	Procurement	☐
	MILCON	☐
	Acq O&M	☐
Unit Cost	PAUC	☐
	APUC	☐

Nunn-McCurdy Breaches		
Current UCR Baseline		
	PAUC	None
	APUC	None
Original UCR Baseline		
	PAUC	None
	APUC	None

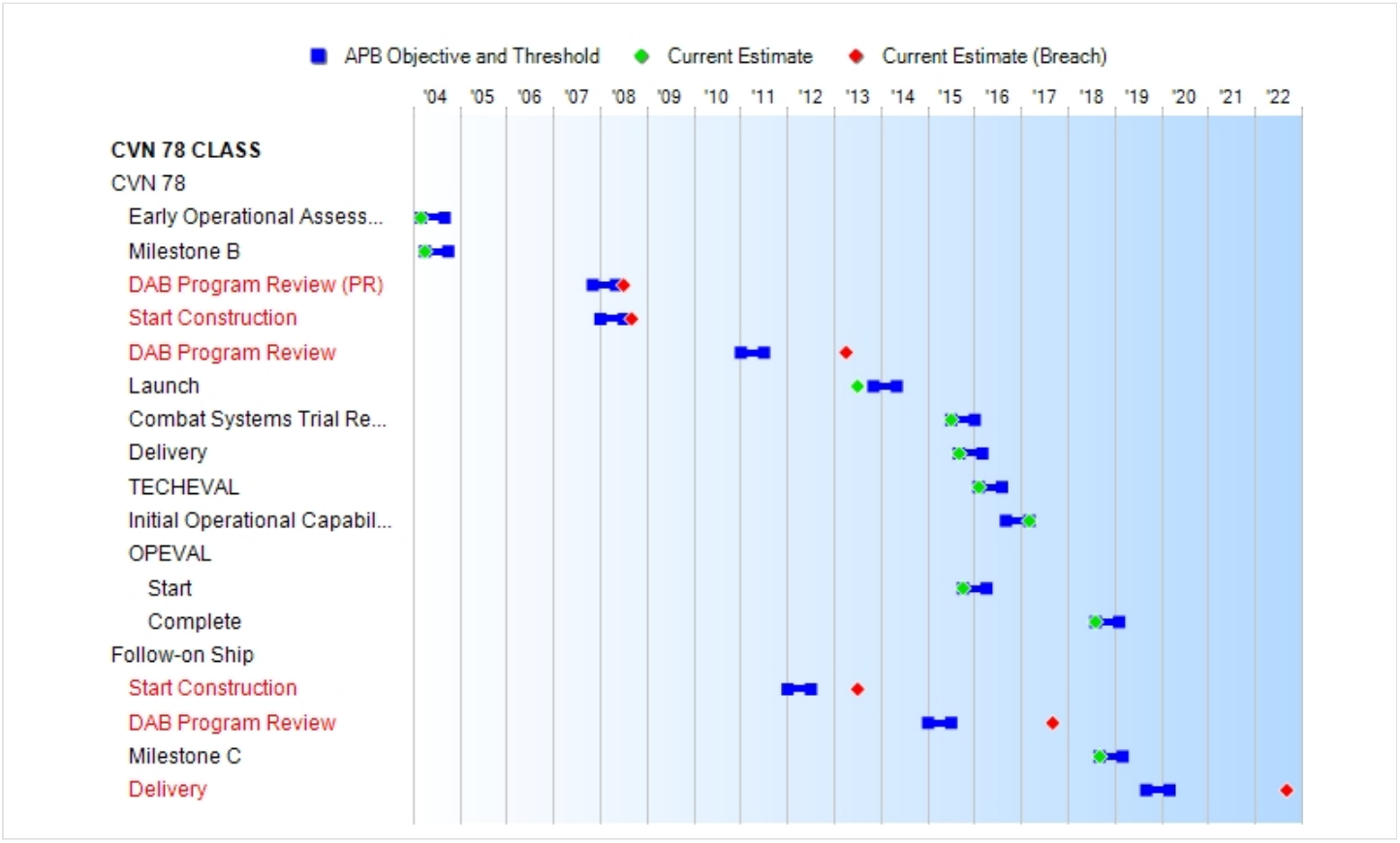
Explanation of Breach

The CVN 78 Class Aircraft Carrier Program has experienced schedule changes associated with the lead ship (CVN 78) Detail Design and Construction (DD&C) contract award date and other schedule changes outside of the Program Manager's control.

The Program Office previously submitted a Program Deviation Report (PDR) to the Assistant Secretary of the Navy (ASN) (Research Development and Acquisition (RDA)) (1) submitting notification of the contract award change, and (2) incorporating the change to Five Year Build Centers.

Due to the FY 2012 National Defense Authorization Act (NDAA) designating Electromagnetic Aircraft Launch System (EMALS) as a major subprogram of the CVN 78 FORD-Class aircraft carrier Major Defense Acquisition Program (MDAP), the Acquisition Program Baseline (APB) will be updated to reflect this designation. At the time of this update, all schedule changes will be updated.

Schedule


APB Objective and Threshold
Current Estimate
Current Estimate (Breach)
'04
'05
'06
'07
'08
'09
'10
'11
'12
'13
'14
'15
'16
'17
'18
'19
'20
'21
'22
CVN 78 CLASS
CVN 78
Early Operational Assess...
Milestone B
DAB Program Review (PR)
Start Construction
DAB Program Review
Launch
Combat Systems Trial Re...
Delivery
TECHEVAL
Initial Operational Capabil...
OPEVAL
Start
Complete
Follow-on Ship
Start Construction
DAB Program Review
Milestone C
Delivery

Milestones	SAR Baseline Dev Est	Current APB Development Objective/Threshold		Current Estimate	
CVN 78					
Early Operational Assessment	MAR 2004	MAR 2004	SEP 2004	MAR 2004	
Milestone B	APR 2004	APR 2004	OCT 2004	APR 2004	
DAB Program Review (PR)	JAN 2006	NOV 2007	MAY 2008	**JUL 2008**[1]	
Start Construction	JAN 2007	JAN 2008	JUL 2008	**SEP 2008**[1]	
DAB Program Review	JAN 2010	JAN 2011	JUL 2011	**APR 2013**[1]	(Ch-1)
Launch	NOV 2012	NOV 2013	MAY 2014	JUL 2013	
Combat Systems Trial Rehearsal (CSTR)	JUL 2014	JUL 2015	JAN 2016	JUL 2015	
Delivery	SEP 2014	SEP 2015	MAR 2016	SEP 2015	
TECHEVAL	FEB 2015	FEB 2016	AUG 2016	FEB 2016	
Initial Operational Capability (IOC)	SEP 2015	SEP 2016	MAR 2017	MAR 2017	(Ch-2)
OPEVAL					
Start	OCT 2014	OCT 2015	APR 2016	OCT 2015	
Complete	SEP 2017	AUG 2018	FEB 2019	AUG 2018	
Follow-on Ship					
Start Construction	JAN 2011	JAN 2012	JUL 2012	**JUL 2013**[1]	(Ch-1)
DAB Program Review	JAN 2015	JAN 2015	JUL 2015	**SEP 2017**[1]	(Ch-1)
Milestone C	MAR 2017	SEP 2018	MAR 2019	SEP 2018	
Delivery	SEP 2018	SEP 2019	MAR 2020	**SEP 2022**[1]	(Ch-1)

[1] *APB Breach*

Acronyms And Abbreviations

DAB - Defense Acquisition Board
OPEVAL - Operational Evaluation
TECHEVAL - Technical Evaluation

Change Explanations

(Ch-1) Incorporates changes based on the FY 2013 President's Budget (PB13) for CVN 79 and CVN 80: Follow-on Ship (CVN 79) Start Construction from December 2012 to July 2013; Follow-on Ship (CVN 79) Defense Acquisition Board (DAB) Program Review from July 2012 to April 2013; Follow-on Ship (CVN 80) DAB Program Review from January 2017 to September 2017; and Follow-on Ship (CVN 79) Delivery from September 2020 to September 2022.

(Ch-2) Initial Operational Capability (IOC) estimated date was adjusted to allow for required Operational Testing (OT) completion from September 2016 to March 2017.

Memo

The second Defense Acquisition Board (DAB) Program Review listed under the CVN 78 is for the CVN 79 Detail Design and Construction (DD&C) efforts.

The DAB Program Review listed under the Follow-on Ship is for the CVN 80 DD&C efforts.

Due to the FY 2012 NDAA designating Electromagnetic Aircraft Launch System (EMALS) as a major subprogram of the CVN 78 FORD-Class aircraft carrier MDAP, the APB will be updated to reflect this designation. At the time of this update, all schedule changes will be updated.

Electromagnetic Aircraft Launch System (EMALS) Schedule:

- System Development and Demonstration (SDD) Program is greater than 86% complete.
- Highly Accelerated Life Tests (HALT) I was completed September 2011.
- Aircraft Compatibility Testing Phase I (129 aircraft launches) was completed October 2011.
- High Cycle Tests (HCT) II is scheduled to be completed July 2012.

Completed Calendar Year (CY) 2011 EMALS Milestones:

- January 2011 - Delivered EMALS Shipboard Certification Manual
- July 2011 - Completed Aircraft Compatibility Testing Phase 1A of F/A-18E, C-2A and T-45C
- July 2011 - Qualified Production Block Switch design at HALT
- September 2011 - Loaded first Energy Storage Subsystem (ESS) generator in CVN 78 Superlift 4929
- October 2011 - Completed Aircraft Compatibility Testing Phase 1B (F/A-18E, C-2A, E-2D and T-45C)
- November 2011 - Completed risk mitigation launch and Electromagnetic Compatibility testing of F-35C

Required In-Yard (RIY) dates for EMALS systems components:

All CY 2011 equipment was delivered on schedule:

- June 2011 - Energy Storage Subsystem Motor Generators for Groups 1 & 2
- June 2011 - Power Conversion System Inverters
- November 2011 - Energy Storage Subsystem Motor Generators for Group 3
- November 2011 - Power Conversion System Rectifiers
- November 2011 - Prime Power Interface Subsystem Transformer/Rectifier
- December 2011 - Energy Distribution Subsystem Cabling

Future equipment RIY schedule:

- February 2012 - Launch Motor Subsystem (LMS) Stator Cooling Pumps
- February 2012 - Power Conditioning Subsystem (PCS) Rectifiers Group 1
- April 2012 - Prime Power Interface Subsystem (PPIS) Transformer/Rectifier Unit 1
- April 2012 - Power Conditioning Subsystem (PCS) Rectifiers Group 2
- August 2012 - Prime Power Interface Subsystem (PPIS) Transformer/Rectifier Unit 2 & 3
- September 2013 - Launch Motor Subsystem Footstool Assemblies
- December 2013 - Launch Motor Subsystem Guiderails and Support Structure

Performance

Characteristics	SAR Baseline Dev Est	Current APB Development Objective/Threshold		Demonstrated Performance	Current Estimate	
CVN 78						
Interoperability	Note 2	N/A	N/A	TBD	N/A	
Sustained Sortie Rate	220	220	160	TBD	172	
Surge Sortie Rate	310	310	270	TBD	284	
Ship Service Electrical Generating Capacity (times NIMITZ Class capacity in MW)	3.0	3.0	2.5	TBD	2.7	
Weight Service Life Allowance (% of full load displacement in long tons)	7.5	7.5	5.0	TBD	5.6	(Ch-1)
Stability Service Life Allowance (feet)	2.5	2.5	1.5	TBD	1.52	(Ch-1)
Ship's Force Manpower (billets)	2391	2391	2791	TBD	2628	(Ch-1)
Follow-on Ship						
Interoperability	Note 2	N/A	N/A	TBD	N/A	
Sustained Sortie Rate	220	220	160	TBD	172	
Surge Sortie Rate	310	310	270	TBD	284	
Service Electrical Generating Capacity (times NIMITZ Class capacity in MW)	3.0	3.0	2.5	TBD	2.7	
Weight Service Life Allowance (% of full load displacement in long tons)	7.5	7.5	5.0	TBD	5.6	(Ch-2)
Stability Service Life Allowance (feet)	2.5	2.5	1.5	TBD	1.52	(Ch-2)
Ship's Force Manpower (billets)	2391	2391	2791	TBD	2628	(Ch-2)
Force Protection and Survivability in an Asymmetric Threat Environment						
Survivability	N/A	Level III as defined by OPNAV	Level II as defined by OPNAV	TBD	Level II as defined by OPNAV	

		Instruction 9070.1	Instruction 9070.1 with the exception of Collective Protection System		Instruction 9070.1 with the exception of Collective Protection System
Survivability (low/slow flyer)	N/A	X1 probability of mission kill per low/slow flyer (>1 square meter target raid of Y1 low/slow flyer threats by Z1 yards from the ship.	X probability of mission kill per low/slow flyer (>1 square meter target raid of Y1 low/slow flyer threats by Z1 yards from the ship.	TBD	X probability of mission kill per low/slow flyer (>1 square meter target raid of Y1 low/slow flyer threats by Z1 yards from the ship.
Survivability (Small boat defense)	N/A	X1 probability of mission kill per boat (>20 square meter target), against a target raid of Y1 small boat threats by Z1 yards from ship.	X probability of mission kill per boat (>20 square meter target), against a target raid of Y1 small boat threats by Z1 yards from ship.	TBD	X probability of mission kill per boat (>20 square meter target), against a target raid of Y1 small boat threats by Z1 yards from ship.
Force Protection (CBR)	N/A	Provide individual protection (suits and masks from chemical, biological,and radiological agents for 100% of shipboard personnel and provide a toxic free	Provide individual protection (suits and masks from chemical, biological,and radiological agents for 100% of shipboard personnel.	TBD	Provide individual protection (suits and masks from chemical, biological, and radiological agents for 100% of shipboard personnel.

		environment for XX% of shipboard personnel where it is not necessary to wear protective clothing and masks.			
Net-Ready	N/A	Meets 100% of top level IERs	Meets 100% of top level IERs designated as critical	TBD	Meets 100% of top level IERs designated as critical

Requirements Source: Operational Requirements Document (ORD) dated April 20, 2004, Joint Requirements Oversight Council (JROC) validated January 27, 2004.

Acronyms And Abbreviations

IER - Interoperability Exchange Requirement
MW - Megawatt

Change Explanations

(Ch-1) The following performance characteristics current estimates for the lead ship were updated based on current engineering analysis:
Weight Service Life Allowance updated from 5.28 to 5.6
Stability Service Life Allowance (feet) updated from 1.58 to 1.52
Ship's Force Manpower updated from 2567 to 2628

(Ch-2) The following performance characteristics current estimates refer to the Follow-on Ship which is a repeat hull. All Lead Ship estimates are applicable to Follow-on Ships. The estimates were also updated based on current engineering analysis:
Weight Service Life Allowance (Follow-on Ship) updated from 5.28 to 5.6
Stability Service Life Allowance (feet) (Follow-on Ship) updated from 1.58 to 1.52
Ship's Force Manpower (Follow-on Ship) updated from 2567 to 2628

Memo

Key Performance Parameters (KPP) are contained in the Future Aircraft Carrier (CVN 78 Class) Operational Requirements Document (ORD) Change 2 dated June 22, 2007.

References for Change Data:
1) CVN 78 Quarterly Weight Report #11, October 26, 2011
2) Preliminary Manpower Ship Document (PMSD), May 19, 2011

Track To Budget

RDT&E

APPN 1319	BA 04	PE 0603512N	(Navy)	
	Project 10C098	Composite Mast for CVN's		(Sunk)
	Project 2208	CVN 21		
	Project 2678	Tech Insertion		(Sunk)
	Project 2693	Ship System Definition		(Sunk)
	Project 4004	EMALS		
	Project 4006	CVN 79		(Sunk)
	Project 9181	Adv Battlestations/DSS		(Sunk)
	Project 9349	Aviation Ship Integration Center		(Sunk)
	Project 9516	Surface Ship Composite Moisture Seperators		(Sunk)
	Project 9B57A	Carrier Plant Automation and Manning Reduction		(Sunk)
	Project 9B58A	Improved Corrosion Protection for EMALS		(Sunk)
	Project 9D24A	EMALS Congressional Add		(Sunk)
APPN 1319	BA 04	PE 0603564N	(Navy)	
	Project 22300	CV Feasibility Studies		(Sunk)
	Project 42300	CVNX 1		(Sunk)
APPN 1319	BA 04	PE 0603570N	(Navy)	
	Project 2692	Advance Nuclear Power System/CVN 21 Propulsion Plant Development		
APPN 1319	BA 05	PE 0604567N	(Navy)	
	Project 2301	Contract Design		(Sunk)
	Project 3179	CVN 79 Total Ship Integration		
	Project 4007	CVN 21 LFT&E		
	Project 4008	CVN 21 Total Ship Integration		(Sunk)
	Project 9C20A	Automated Fiber Optic Manufacturing Initiative		(Sunk)

PB13 removed all RDT&E funds for Account 1319, BA 05 PE 0604567N Project 3108 CVN 80 Total Ship Integration in the Future Year Defense Plan (FYDP). Therefore, the line item was deleted.

Procurement

APPN 1611	BA 02	PE 0204112N	(Navy)
	ICN 2001	Carrier Replacement Program	
APPN 1611	BA 05	PE 0204112N	(Navy)
	ICN 5110	Outfitting and Post Delivery	(Shared)
	ICN 5300	Completion of Prior Year Shipbuilding	

PB 13 provided funds for CVN 78 Cost to Complete in FY 2014 and FY 2015, therefore Account 1611 BA 05 PE 0204112N ICN 5300 for Completion of Prior Year was added.

MILCON

APPN 1205	BA 01	PE 0203176N	(Navy)
	Project 62688500	Pier 11 CVN-78 Power Booms	
APPN 1205	BA 01	PE 0702776N	(Navy)
	Project 32443998	Drydock 8 Electrical Distribution Upgrade	

Cost and Funding

Cost Summary

Total Acquisition Cost and Quantity

	BY2000 $M			BY2000 $M	TY $M		
Appropriation	SAR Baseline Dev Est	Current APB Development Objective/Threshold		Current Estimate	SAR Baseline Dev Est	Current APB Development Objective	Current Estimate
RDT&E	3875.3	3872.4	4259.6	3656.5	4333.4	4433.3	4192.6
Procurement	24825.9	23334.0	25667.4	24158.2	31748.7	31579.9	38297.2
Flyaway	24825.9	--	--	24158.2	31748.7	--	38297.2
Recurring	24825.9	--	--	20982.6	31748.7	--	33717.1
Non Recurring	0.0	--	--	3175.6	0.0	--	4580.1
Support	0.0	--	--	0.0	0.0	--	0.0
Other Support	0.0	--	--	0.0	0.0	--	0.0
Initial Spares	0.0	--	--	0.0	0.0	--	0.0
MILCON	0.0	0.0	--	29.3	0.0	0.0	38.7
Acq O&M	0.0	0.0	--	0.0	0.0	0.0	0.0
Total	28701.2	27206.4	N/A	27844.0	36082.1	36013.2	42528.5

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

Cost and Funding

Funding Summary

Appropriation and Quantity Summary
FY2013 President's Budget / December 2011 SAR (TY$ M)

Appropriation	Prior	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017	To Complete	Total
RDT&E	3429.0	136.9	173.4	137.9	117.0	61.1	61.3	76.0	4192.6
Procurement	14285.4	554.8	608.2	1143.4	3464.3	1695.6	2899.7	13645.8	38297.2
MILCON	0.0	0.0	32.7	6.0	0.0	0.0	0.0	0.0	38.7
Acq O&M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PB 2013 Total	17714.4	691.7	814.3	1287.3	3581.3	1756.7	2961.0	13721.8	42528.5
PB 2012 Total	17735.5	691.7	2127.2	2327.2	3816.6	2647.0	915.9	10034.2	40295.3
Delta	-21.1	0.0	-1312.9	-1039.9	-235.3	-890.3	2045.1	3687.6	2233.2

Quantity	Undistributed	Prior	FY2012	FY2013	FY2014	FY2015	FY2016	FY2017	To Complete	Total
Development	0	0	0	0	0	0	0	0	0	0
Production	0	1	0	1	0	0	0	0	1	3
PB 2013 Total	0	1	0	1	0	0	0	0	1	3
PB 2012 Total	0	1	0	1	0	0	0	0	1	3
Delta	0	0	0	0	0	0	0	0	0	0

Cost and Funding

Annual Funding By Appropriation

Annual Funding TY$
1319 | RDT&E | Research, Development, Test, and Evaluation, Navy

Fiscal Year	Quantity	End Item Recurring Flyaway TY $M	Non End Item Recurring Flyaway TY $M	Non Recurring Flyaway TY $M	Total Flyaway TY $M	Total Support TY $M	Total Program TY $M
1997	--	--	--	--	--	--	0.9
1998	--	--	--	--	--	--	46.1
1999	--	--	--	--	--	--	83.3
2000	--	--	--	--	--	--	177.8
2001	--	--	--	--	--	--	230.5
2002	--	--	--	--	--	--	281.5
2003	--	--	--	--	--	--	316.7
2004	--	--	--	--	--	--	305.9
2005	--	--	--	--	--	--	349.7
2006	--	--	--	--	--	--	302.4
2007	--	--	--	--	--	--	337.6
2008	--	--	--	--	--	--	232.0
2009	--	--	--	--	--	--	315.0
2010	--	--	--	--	--	--	270.5
2011	--	--	--	--	--	--	179.1
2012	--	--	--	--	--	--	136.9
2013	--	--	--	--	--	--	173.4
2014	--	--	--	--	--	--	137.9
2015	--	--	--	--	--	--	117.0
2016	--	--	--	--	--	--	61.1
2017	--	--	--	--	--	--	61.3
2018	--	--	--	--	--	--	23.3
2019	--	--	--	--	--	--	21.3
2020	--	--	--	--	--	--	20.2
2021	--	--	--	--	--	--	11.0
2022	--	--	--	--	--	--	0.2
Subtotal	**--**	**--**	**--**	**--**	**--**	**--**	**4192.6**

Annual Funding BY$
1319 | RDT&E | Research, Development, Test, and Evaluation, Navy

Fiscal Year	Quantity	End Item Recurring Flyaway BY 2000 $M	Non End Item Recurring Flyaway BY 2000 $M	Non Recurring Flyaway BY 2000 $M	Total Flyaway BY 2000 $M	Total Support BY 2000 $M	Total Program BY 2000 $M
1997	--	--	--	--	--	--	0.9
1998	--	--	--	--	--	--	46.9
1999	--	--	--	--	--	--	83.7
2000	--	--	--	--	--	--	176.1
2001	--	--	--	--	--	--	225.1
2002	--	--	--	--	--	--	272.2
2003	--	--	--	--	--	--	301.8
2004	--	--	--	--	--	--	283.6
2005	--	--	--	--	--	--	315.9
2006	--	--	--	--	--	--	264.9
2007	--	--	--	--	--	--	288.7
2008	--	--	--	--	--	--	194.8
2009	--	--	--	--	--	--	261.2
2010	--	--	--	--	--	--	220.9
2011	--	--	--	--	--	--	143.5
2012	--	--	--	--	--	--	107.8
2013	--	--	--	--	--	--	134.3
2014	--	--	--	--	--	--	105.0
2015	--	--	--	--	--	--	87.5
2016	--	--	--	--	--	--	44.9
2017	--	--	--	--	--	--	44.2
2018	--	--	--	--	--	--	16.5
2019	--	--	--	--	--	--	14.8
2020	--	--	--	--	--	--	13.8
2021	--	--	--	--	--	--	7.4
2022	--	--	--	--	--	--	0.1
Subtotal	**--**	**--**	**--**	**--**	**--**	**--**	**3656.5**

Electromagnetic Aircraft Launch System (EMALS) Research, Development, Test, and Evaluation (RDT&E) Cost and Funding:

APPN 1319 CVN 78 (FY 2000 - 2017): $836.9M
EMALS RDT&E efforts are funded in the following Program Element (PE) and Project Units (PU):
PE 0603512N PU 44004: $686.1M
PE 0603512N PU 42208: $123.0M
PE 0603512N PU 9D24A: $23.9M (EMALS Congressional Add)
PE 0603512N PU 9B58A: $3.9M (Improved Corrosion Protection for EMALS Congressional Add)

Annual Funding TY$
1611 | Procurement | Shipbuilding and Conversion, Navy

Fiscal Year	Quantity	End Item Recurring Flyaway TY $M	Non End Item Recurring Flyaway TY $M	Non Recurring Flyaway TY $M	Total Flyaway TY $M	Total Support TY $M	Total Program TY $M
2001	--	21.7	--	--	21.7	--	21.7
2002	--	135.3	--	--	135.3	--	135.3
2003	--	243.7	--	151.8	395.5	--	395.5
2004	--	955.2	--	207.7	1162.9	--	1162.9
2005	--	274.4	--	348.7	623.1	--	623.1
2006	--	241.6	--	377.3	618.9	--	618.9
2007	--	364.1	--	424.5	788.6	--	788.6
2008	1	1797.9	--	1010.7	2808.6	--	2808.6
2009	--	3840.2	--	54.9	3895.1	--	3895.1
2010	--	968.9	--	251.0	1219.9	--	1219.9
2011	--	2167.2	--	448.6	2615.8	--	2615.8
2012	--	410.5	--	144.3	554.8	--	554.8
2013	1	485.0	--	123.2	608.2	--	608.2
2014	--	801.0	--	342.4	1143.4	--	1143.4
2015	--	3364.4	--	99.9	3464.3	--	3464.3
2016	--	1635.3	--	60.3	1695.6	--	1695.6
2017	--	2836.5	--	63.2	2899.7	--	2899.7
2018	1	3186.7	--	200.5	3387.2	--	3387.2
2019	--	1984.6	--	141.8	2126.4	--	2126.4
2020	--	2685.2	--	18.3	2703.5	--	2703.5
2021	--	2705.9	--	18.5	2724.4	--	2724.4
2022	--	1597.7	--	48.2	1645.9	--	1645.9
2023	--	733.7	--	44.3	778.0	--	778.0
2024	--	--	--	--	--	--	--
2025	--	44.9	--	--	44.9	--	44.9
2026	--	77.6	--	--	77.6	--	77.6
2027	--	140.2	--	--	140.2	--	140.2
2028	--	17.7	--	--	17.7	--	17.7
Subtotal	**3**	**33717.1**	**--**	**4580.1**	**38297.2**	**--**	**38297.2**

Annual Funding BY$
1611 | Procurement | Shipbuilding and Conversion, Navy

Fiscal Year	Quantity	End Item Recurring Flyaway BY 2000 $M	Non End Item Recurring Flyaway BY 2000 $M	Non Recurring Flyaway BY 2000 $M	Total Flyaway BY 2000 $M	Total Support BY 2000 $M	Total Program BY 2000 $M
2001	--	19.7	--	--	19.7	--	19.7
2002	--	122.0	--	--	122.0	--	122.0
2003	--	207.7	--	129.4	337.1	--	337.1
2004	--	785.7	--	170.9	956.6	--	956.6
2005	--	216.1	--	274.7	490.8	--	490.8
2006	--	183.8	--	287.1	470.9	--	470.9
2007	--	265.3	--	309.2	574.5	--	574.5
2008	1	1269.7	--	713.7	1983.4	--	1983.4
2009	--	2640.3	--	37.8	2678.1	--	2678.1
2010	--	650.4	--	168.5	818.9	--	818.9
2011	--	1426.9	--	295.4	1722.3	--	1722.3
2012	--	265.7	--	93.4	359.1	--	359.1
2013	1	308.6	--	78.4	387.0	--	387.0
2014	--	500.7	--	214.0	714.7	--	714.7
2015	--	2065.8	--	61.4	2127.2	--	2127.2
2016	--	986.4	--	36.3	1022.7	--	1022.7
2017	--	1680.6	--	37.5	1718.1	--	1718.1
2018	1	1854.7	--	116.7	1971.4	--	1971.4
2019	--	1134.7	--	81.0	1215.7	--	1215.7
2020	--	1508.1	--	10.3	1518.4	--	1518.4
2021	--	1492.8	--	10.2	1503.0	--	1503.0
2022	--	865.9	--	26.1	892.0	--	892.0
2023	--	390.6	--	23.6	414.2	--	414.2
2024	--	--	--	--	--	--	--
2025	--	23.1	--	--	23.1	--	23.1
2026	--	39.2	--	--	39.2	--	39.2
2027	--	69.5	--	--	69.5	--	69.5
2028	--	8.6	--	--	8.6	--	8.6
Subtotal	**3**	**20982.6**	**--**	**3175.6**	**24158.2**	**--**	**24158.2**

Electromagnetic Aircraft Launch System (EMALS) Shipbuilding and Conversion, Navy (SCN) Cost and Funding:

EMALS Procurement (SCN) efforts are funded in PE 0204112N and ICN 2001 as follows:

APPN 1611 CVN 78 $754.8M
APPN 1611 CVN 79 $846.6M
APPN 1611 CVN 80 $975.0M

Cost Quantity Information
1611 | Procurement | Shipbuilding and Conversion, Navy

Fiscal Year	Quantity	End Item Recurring Flyaway (Aligned with Quantity) BY 2000 $M
2001	--	--
2002	--	--
2003	--	--
2004	--	--
2005	--	--
2006	--	--
2007	--	--
2008	1	6524.0
2009	--	--
2010	--	--
2011	--	--
2012	--	--
2013	1	6759.2
2014	--	--
2015	--	--
2016	--	--
2017	--	--
2018	1	7699.4
2019	--	--
2020	--	--
2021	--	--
2022	--	--
2023	--	--
2024	--	--
2025	--	--
2026	--	--
2027	--	--
2028	--	--
Subtotal	**3**	**20982.6**

Annual Funding TY$
1205 | MILCON | Military Construction, Navy and Marine Corps

Fiscal Year	Total Program TY $M
2013	32.7
2014	6.0
Subtotal	**38.7**

Annual Funding BY$
1205 | MILCON | Military Construction, Navy and Marine Corps

Fiscal Year	Total Program BY 2000 $M
2013	24.8
2014	4.5
Subtotal	**29.3**

Low Rate Initial Production

	Initial LRIP Decision	Current Total LRIP
Approval Date	4/26/2004	4/26/2004
Approved Quantity	3	3
Reference	Milestone B ADM	Milestone B ADM
Start Year	2004	2004
End Year	2018	2018

A low rate initial production quantity not to exceed three ships was approved in the April 26, 2004 Acquisition Decision Memorandum (ADM), which is more than 10%.

Foreign Military Sales

None

Nuclear Cost

Nuclear Research and Development (R&D) and Reactor Plant Government Furnished Equipment (GFE) costs are included within the program costs in this report; however, Department of Energy (DoE) nuclear costs are not included in this report.

Shipbuilding and Conversion, Navy (SCN) Nuclear Propulsion Equipment Cost is $6,464.4M for the CVN 78 Class Aircraft Carriers (CVN 78-80).

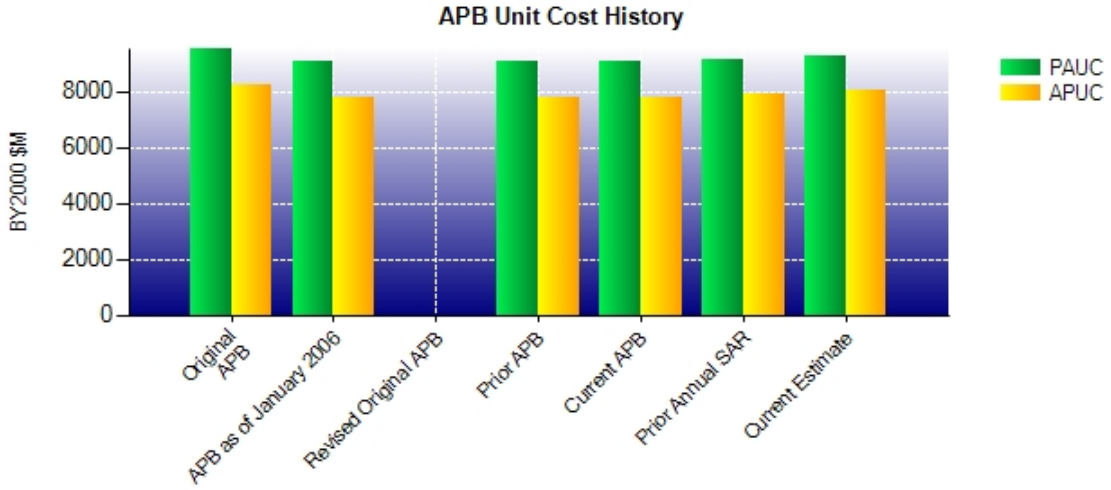
Unit Cost

Unit Cost Report

Unit Cost	BY2000 $M Current UCR Baseline (NOV 2007 APB)	BY2000 $M Current Estimate (DEC 2011 SAR)	BY % Change
Program Acquisition Unit Cost (PAUC)			
Cost	27206.4	27844.0	
Quantity	3	3	
Unit Cost	9068.800	9281.333	+2.34
Average Procurement Unit Cost (APUC)			
Cost	23334.0	24158.2	
Quantity	3	3	
Unit Cost	7778.000	8052.733	+3.53

Unit Cost	BY2000 $M Original UCR Baseline (APR 2004 APB)	BY2000 $M Current Estimate (DEC 2011 SAR)	BY % Change
Program Acquisition Unit Cost (PAUC)			
Cost	28701.2	27844.0	
Quantity	3	3	
Unit Cost	9567.067	9281.333	-2.99
Average Procurement Unit Cost (APUC)			
Cost	24825.9	24158.2	
Quantity	3	3	
Unit Cost	8275.300	8052.733	-2.69

Unit Cost History



		BY2000 $M		TY $M	
	Date	PAUC	APUC	PAUC	APUC
Original APB	APR 2004	9567.067	8275.300	12027.367	10582.900
APB as of January 2006	AUG 2005	9068.800	7778.000	12004.400	10526.633
Revised Original APB	N/A	N/A	N/A	N/A	N/A
Prior APB	AUG 2005	9068.800	7778.000	12004.400	10526.633
Current APB	NOV 2007	9068.800	7778.000	12004.400	10526.633
Prior Annual SAR	DEC 2010	9142.000	7892.333	13431.767	11997.967
Current Estimate	DEC 2011	9281.333	8052.733	14176.167	12765.733

SAR Unit Cost History

Current SAR Baseline to Current Estimate (TY $M)

Initial PAUC Dev Est	Changes								PAUC Current Est
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
12027.367	1911.067	0.000	279.833	-50.867	8.767	0.000	0.000	2148.800	14176.167

Current SAR Baseline to Current Estimate (TY $M)

Initial APUC Dev Est	Changes								APUC Current Est
	Econ	Qty	Sch	Eng	Est	Oth	Spt	Total	
10582.900	1867.967	0.000	222.467	109.167	-16.767	0.000	0.000	2182.834	12765.733

SAR Baseline History

Item/Event	SAR Planning Estimate (PE)	SAR Development Estimate (DE)	SAR Production Estimate (PdE)	Current Estimate
Milestone I	N/A	N/A	N/A	N/A
Milestone B	N/A	APR 2004	N/A	APR 2004
Milestone C	N/A	MAR 2017	N/A	SEP 2018
IOC	N/A	SEP 2015	N/A	MAR 2017
Total Cost (TY $M)	N/A	36082.1	N/A	42528.5
Total Quantity	N/A	3	N/A	3
Prog. Acq. Unit Cost (PAUC)	N/A	12027.367	N/A	14176.167

Cost Variance

Cost Variance Summary

Summary Then Year $M				
	RDT&E	Proc	MILCON	Total
SAR Baseline (Dev Est)	4333.4	31748.7	--	36082.1
Previous Changes				
Economic	+113.9	+4668.3	--	+4782.2
Quantity	--	--	--	--
Schedule	+172.1	+667.4	--	+839.5
Engineering	-480.1	-483.5	--	-963.6
Estimating	+162.1	-607.0	--	-444.9
Other	--	--	--	--
Support	--	--	--	--
Subtotal	-32.0	+4245.2	--	+4213.2
Current Changes				
Economic	+15.4	+935.6	--	+951.0
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	+811.0	--	+811.0
Estimating	-124.2	+556.7	+38.7	+471.2
Other	--	--	--	--
Support	--	--	--	--
Subtotal	-108.8	+2303.3	+38.7	+2233.2
Total Changes	-140.8	+6548.5	+38.7	+6446.4
CE - Cost Variance	4192.6	38297.2	38.7	42528.5
CE - Cost & Funding	4192.6	38297.2	38.7	42528.5

Summary Base Year 2000 $M				
	RDT&E	Proc	MILCON	Total
SAR Baseline (Dev Est)	3875.3	24825.9	--	28701.2
Previous Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	+120.2	--	--	+120.2
Engineering	-352.4	-336.5	--	-688.9
Estimating	+105.9	-812.4	--	-706.5
Other	--	--	--	--
Support	--	--	--	--
Subtotal	-126.3	-1148.9	--	-1275.2
Current Changes				
Economic	--	--	--	--
Quantity	--	--	--	--
Schedule	--	--	--	--
Engineering	--	+503.0	--	+503.0
Estimating	-92.5	-21.8	+29.3	-85.0
Other	--	--	--	--
Support	--	--	--	--
Subtotal	-92.5	+481.2	+29.3	+418.0
Total Changes	-218.8	-667.7	+29.3	-857.2
CE - Cost Variance	3656.5	24158.2	29.3	27844.0
CE - Cost & Funding	3656.5	24158.2	29.3	27844.0

Previous Estimate: December 2010

RDT&E	$M	
Current Change Explanations	**Base Year**	**Then Year**
Revised escalation indices. (Economic)	N/A	+15.4
Adjustment for current and prior escalation. (Estimating)	-4.1	-5.1
Decrease to CVN 80 due to removal of Research, Development, Test, and Evaluation (RDT&E) funds in the Future Years Defense Program (FYDP). (Estimating)	-176.6	-236.2
Decrease to CVN 78 Class Small Business Innovative Research (SBIR)/Small Business Technology Transfer (STTR) Assessment, Working Capital Fund (WCF) Adjustments, and miscellaneous adjustments due to program inflation/rate adjustments. (Estimating)	-9.5	-12.2
Increase due to first ship of class testing requirements. (Estimating)	+29.8	+41.2
Increase to Electromagnetic Aircraft Launch System (EMALS) due to completing the System Functional Demonstration (SFD), Aircraft Compatibility Testing (ACT), Highly Accelerated Life Testing (HALT), High Cycle Testing (HCT) and Environmental Qualification Testing (EQT) of the EMALS system and components. (Estimating)	+67.9	+88.1
RDT&E Subtotal	-92.5	-108.8

Procurement	$M	
Current Change Explanations	**Base Year**	**Then Year**
Revised escalation indices. (Economic)	N/A	+935.6
Adjustment for current and prior escalation. (Estimating)	-152.4	-225.0
Decrease to CVN 80 due to realignment of funds reducing FY 2014 through FY 2019. (Estimating)	-2634.9	-4422.9
Increase to CVN 80 due to funding profile shift from FYDP to outyears, and increased estimates to material and labor projections for Non-Recurring Engineering (NRE) ($26.3M), and Basic Construction and Government Furnished Equipment (GFE) by SEA 05C Cost Engineering and Industrial Analysis Division. (Estimating)	+2630.6	+4807.7
Revised estimate to reflect application of new outyear escalation indices. (Estimating)	-420.8	-710.5
Decrease to CVN 78 Class Aircraft Carrier due to Strategic Sourcing (commodities and services efficiencies). (Estimating)	-17.5	-28.8
Decrease to CVN 78 Class Outfitting and Post Delivery (OF/PD) due to revised cost estimates. (Estimating)	-24.9	-26.3
Decrease to CVN 78 Class due to FY 2011 P.L. 112-10 Sec 8117 to reflect revised economic assumptions. (Estimating)	-9.6	-14.5
Decrease to CVN 78 due to Congressional reduction on Surface Electronic Warfare Improvement (SEWIP). (Estimating)	-3.2	-4.9
Decrease to CVN 78 due to Congressional reduction on Consolidated Afloat Navy Enterprise System (CANES). (Estimating)	-1.7	-2.6
Decrease to CVN 78 due to Congressional reduction on Identification Friend or Foe (IFF) Interrogator System AN/UPX-29. (Estimating)	-1.2	-1.8
Revised estimate for CVN 78 Non-Recurring Engineering ($330M), Dual Band Radar ($208M), and construction performance variance ($273M). (Engineering)	+503.0	+811.0
Increase to CVN 79 due to increased estimates to material and labor projections for Non-Recurring Engineering (NRE) ($401.7), and Basic Construction and Government Furnished Equipment (GFE) ($208.6M) (TY$), Overhead and Industrial Base impacts ($175M) (TY$), and Inflation ($401M) (TY$) by SEA 05C Cost Engineering and Industrial Analysis Division. (Estimating)	+613.8	+1186.3

Procurement Subtotal	+481.2	+2303.3

MILCON	$M	
Current Change Explanations	**Base Year**	**Then Year**
Increase to CVN 78 Class Aircraft Carriers due to Norfolk Naval Shipyard (NNSY) Drydock #8 electrical distribution upgrades for 13.8kV shore power capability (Estimating)	+24.8	+32.7
Increase to CVN 78 Class Aircraft Carriers due to 13.8kV power boom upgrades to Norfolk Pier 11 which is needed to reach shipboard connection locations without striking aircraft elevators (Estimating)	+4.5	+6.0
MILCON Subtotal	+29.3	+38.7

Contracts

Appropriation: Procurement	
Contract Name	**CVN 78 DETAIL DESIGN & CONSTRUCTION**
Contractor	Huntington Ingalls Industries (HII) Newport News Shipbuilding (NNS)
Contractor Location	4101 Washington Avenue Newport News, VA 23607-2734
Contract Number, Type	N00024-08-C-2110, CPAF/CPIF/CPFF
Award Date	September 10, 2008
Definitization Date	September 10, 2008

Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
4910.5	N/A	1	5899.5	N/A	1	6370.9	6595.6

Variance	Cost Variance	Schedule Variance
Cumulative Variances To Date	-436.2	-221.5
Previous Cumulative Variances	-311.1	-178.1
Net Change	-125.1	-43.4

Cost And Schedule Variance Explanations

The unfavorable net change in the cost variance is due to material cost growth (66%), labor inefficiencies (28%) and increases in non-recurring engineering (6%). The material variances are due to market forces, unanticipated impacts of a "first of class" specification on contractor furnished material costs (e.g. valves, electrical components, steel and other commodities), and refined understanding of material requirements as the ship design matured. Labor inefficiencies are the result of "first of class" challenges including producibility issues (e.g. thin plate steel, weld distortion, and the increase use of temporary structure and rigging) and the availability of new developmental components (e.g. valves, actuators). Additionally, increased supervision has been required to manage the above challenges and a developing workforce.

The unfavorable net change in the schedule variance is due to to inefficiencies associated the material availability and "first of class" producibility issues described above, and delays in the release of engineering products required to develop construction work packages.

Contract Comments

The difference between the initial contract price target and the current contract price target is due to the award of a new contract structure for Non-Recurring Engineering (NRE) and adjudicated change orders, procurement of special tooling and test equipment, and NRE associated with design and integration of developmental systems.

The Program Manger’s (PM) Estimated Price at Completion of $6,595.6M less the current contract Target Price of $5,899.5M is $696.1M. This price variance at completion of $696.1M includes $6.4M of authorized work that has not been adjudicated resulting in government liability of $689.7M.

The PM’s Estimated Price At Completion increased from $5,723.5M (December 31, 2010 SAR) to $6,595.6M consisting of $738.2M due to contract actions, $127.5M of construction inefficiencies, and $6.4M of authorized work that has not been adjudicated. The Government Liability has increased from $562.2M (December 31, 2010 SAR) to $689.7M, reflecting the $127.5M of construction inefficiencies. The PM’s Variance at Completion (VAC) increased from $650M (December 31, 2010 SAR) to $884.7M. The government liability of the $884.7M VAC is $689.7M based on the contract shareline ratios which reduces the contractors target fee as cost growth increases.

Appropriation: RDT&E

Contract Name	**CVN 79 Construction Preparation (CP)**
Contractor	Huntington Ingalls Industries (HII) Newport News Shipbuilding (NNS)
Contractor Location	4101 Washington Avenue Newport News, VA 23607-2734
Contract Number, Type	N00024-09-C-2116, CPFF/CPIF
Award Date	January 15, 2009
Definitization Date	December 08, 2010

Initial Contract Price ($M)			Current Contract Price ($M)			Estimated Price At Completion ($M)	
Target	Ceiling	Qty	Target	Ceiling	Qty	Contractor	Program Manager
373.5	N/A	N/A	1119.5	N/A	N/A	1119.5	1119.5

Variance	Cost Variance	Schedule Variance
Cumulative Variances To Date	+0.3	-2.4
Previous Cumulative Variances	-0.1	0.0
Net Change	+0.4	-2.4

Cost And Schedule Variance Explanations

The favorable net change in the cost variance is due to man-hour variance with favorable rates in Propulsion Plant Engineering Services.

The unfavorable net change in the schedule variance is due to man-hour variance with unfavorable rates in Non-Propulsion Plant Long Lead Time Material and Platform Engineering Services.

Contract Comments

The difference between the initial contract price target and the current contract price target is due to award of the CVN 79 Construction Preparation (CP) contract extension on December 8, 2010 for FY 2011 effort and FY 2012 options.

The CVN 79 CP extension contract for FY 2011 efforts and FY 2012 options was awarded on December 8, 2010. The FY 2012 Options were awarded December 21, 2011 in the amount of $103.5M for CVN 79 platform and propulsion engineering services, and CVN 78 Class Lead Yard Services (LYS) and Integrated Logistics Support (ILS).

The CP contract is 32.1% complete based on dollars. The Advanced Construction effort is 10.9% complete on a dollar basis and 5.4% complete on a man-hour basis.

At this early stage of the contract, the PM Estimated Price at Completion is the Current Contract Price Target.

Deliveries and Expenditures

Deliveries To Date	Plan To Date	Actual To Date	Total Quantity	Percent Delivered
Development	0	0	0	--
Production	0	0	3	0.00%
Total Program Quantities Delivered	0	0	3	0.00%

Expenditures and Appropriations (TY $M)			
Total Acquisition Cost	42528.5	Years Appropriated	16
Expenditures To Date	12693.0	Percent Years Appropriated	50.00%
Percent Expended	29.85%	Appropriated to Date	18406.1
Total Funding Years	32	Percent Appropriated	43.28%

The information in this section is current as of February 3, 2012.

Operating and Support Cost

Assumptions And Ground Rules

Operations and Support (O&S) costs are developed at the ship level, on an annual cost per ship basis by cost category and appropriation, with total and annual average cost over the ship's expected service life. Costs are estimated for all categories listed in the Operations & Support Cost Estimating Guide using historical data from operating carrier classes. Maintenance and Personnel costs are the major contributors to the total O&S Program. Total CVN 78 Class O&S costs are derived by multiplying planned quantity of ship (11 ships) by a 50 year service life and average annual cost per ship. (Program Office/NAVSEA 05C Cost Engineering and Industrial Analysis Division cost estimate dated January 26, 2012.)

The source of antecedent data is the Visibility and Management of Operating and Support Cost (VAMOSC) data for NIMITZ Class (CVN 68) aircraft carriers. Antecedent Total O&S costs are based on a 10 ship quantity for the NIMITZ class.

Costs BY2000 $M		
Cost Element	CVN 78 CLASS Average Annual Cost Per Ship	CVN 68 Class Average Annual Cost Per Ship
Unit-Level Manpower	115.139	142.513
Unit Operations	0.000	0.000
Maintenance	117.733	144.927
Sustaining Support	24.439	23.919
Continuing System Improvements	15.416	16.876
Indirect Support	109.266	135.244
Other	0.000	0.000
Total Unitized Cost (Base Year 2000 $)	381.993	463.479

Total O&S Costs $M	CVN 78 CLASS	CVN 68 Class
Base Year	210095.9	231739.7
Then Year	231349.1	255470.1

2011 SAR Cost data reflects the following changes from previous SARs:

- The CVN 78 Class Program which is based on a 11 ship quantity (previously 12 ship quantity).
- Manpower Cost reflects 663 billet reduction (previously 789 billet reduction)
- Added Indirect Support (indirect manpower) costs. Indirect manpower costs include costs such as recruiting, training through the first duty station, base support, administrative support, and medical support.
- Data excludes the Inactivation Cost estimate of $408M (BY2000$) per FORD hull, and $558M (BY2000$) per NIMITZ hull (not part of the SAR cost element structure).
- Data excludes Disposal Costs.