Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Navy											DATE: April 2013	
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 ITEM NOMENCLATURE PE 0603573N: *Advanced Surface Machinery Sys*							
COST ($ in Millions)	**All Prior Years**	**FY 2012**	**FY 2013#**	**FY 2014 Base**	**FY 2014 OCO ##**	**FY 2014 Total**	**FY 2015**	**FY 2016**	**FY 2017**	**FY 2018**	**Cost To Complete**	**Total Cost**
Total Program Element	72.343	17.721	29.897	27.154	-	27.154	29.167	23.955	22.064	20.407	Continuing	Continuing
2471: *Integrated Power Systems (IPS)*	72.343	17.721	29.897	27.154	-	27.154	29.167	23.955	22.064	20.407	Continuing	Continuing

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

A. Mission Description and Budget Item Justification

This PE includes the development of advanced surface ship hull, mechanical, and electrical (HM&E) components and systems for all future ships and back-fit ships where appropriate. This PE is managed by PMS-320, the Electric Ships Office, located organizationally within PEO SHIPS, with responsibility for developing Naval Power Systems that focus on energy efficiency, providing power to mission systems, and platform integration of those components and systems. The mission of PMS 320 is to develop and provide smaller, simpler, more affordable and more capable electric power systems for all Navy platforms and focus Navy and industry investments.

This PE is the bridge between Science and Technology (S&T) and ship platform and mission systems acquisition programs by identifying prospective applications for S&T research, advanced development, and performing additional product development and qualification when necessary to meet platform or mission system requirements.

In October 2009, SECNAV outlined a set of specific objectives supporting U.S. Navy energy reform including several aimed at significantly reducing Fleet fuel consumption and improving our energy security posture. PMS-320 supports the DON Energy Goals by employing an integrated approach to develop and transition more affordable technologies that satisfy increasing shipboard power demands and high operational tempo while improving energy efficiency, reducing fuel consumption, and reducing Total Ownership Cost.

Exhibit R-2, RDT&E Budget Item Justification: PB 2014 Navy					DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*			R-1 ITEM NOMENCLATURE PE 0603573N: *Advanced Surface Machinery Sys*		
B. Program Change Summary ($ in Millions)	**FY 2012**	**FY 2013**	**FY 2014 Base**	**FY 2014 OCO**	**FY 2014 Total**
Previous President's Budget	18.239	29.897	35.568	-	35.568
Current President's Budget	17.721	29.897	27.154	-	27.154
Total Adjustments	-0.518	0.000	-8.414	-	-8.414
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-0.518	0.000			
• Program Adjustments	0.000	0.000	-7.000	-	-7.000
• Rate/Misc Adjustments	0.000	0.000	-1.414	-	-1.414

Change Summary Explanation

FY14 Change of (-$8.414M) was due primarily to issue 18017 which rephased DDG-51 FLT III upgraded power interface Power Conversion Module (PCM) development. Other issues included: Issue 64103 - Underexecution, Procurement and RDT&E Programs; Issue 62246 - Standard Procurement System Replacement Strategy; Issue 62283 Naval Innovative Science and Engineering (Section 219) Program Funding Mechanism; Issue 63389 DON NWCF RATE ADJUSTMENTS; and, Issue 64195 - EA-011 Working Capital Fund Rates and Prices.

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy			DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603573N: *Advanced Surface Machinery Sys*	PROJECT 2471: *Integrated Power Systems (IPS)*	

COST ($ in Millions)	All Prior Years	FY 2012	FY 2013#	FY 2014 Base	FY 2014 OCO ##	FY 2014 Total	FY 2015	FY 2016	FY 2017	FY 2018	Cost To Complete	Total Cost
2471: *Integrated Power Systems (IPS)*	72.343	17.721	29.897	27.154	-	27.154	29.167	23.955	22.064	20.407	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0		0	0	0	0	0		

FY 2013 Program is from the FY 2013 President's Budget, submitted February 2012

The FY 2014 OCO Request will be submitted at a later date

A. Mission Description and Budget Item Justification

This project supports the development and transition strategy of Navy Power and Propulsion Systems including power generation, power conversion, power distribution, energy storage, power utilization and automation and control functions for fully integrated electric propulsion (such as T-AKE -1 class or DDG 1000 class), hybrid electric propulsion (such as LHD 8 and LHA(R) class), as well as legacy mechanical propulsion ships (such as DDG 51 class). This project supports optimized integration of mission systems, appropriate component and system controls, integration of components and systems into future and current ships, and providing power system solution alternatives to new and existing platforms.

Project developments are aligned with the Navy's 30 year shipbuilding plan via the Naval Power Systems Technology Development Roadmap, which outlines the way ahead for future developments and provides a basis for coordinated planning and investment by the Navy and private industry.

This project develops and transitions products that increase energy efficiency (and thereby create fewer greenhouse gas emissions and reduce dependence upon foreign petroleum sources), provide additional power to mission systems, and integrates those components and systems into ship platforms.

DON Energy Initiatives - Energy Storage Module (ESM) Increment 1, Advanced Power Generation Module (APGM), and Gas Turbine (GT) Efficiency Upgrades: This project supports the DON Energy Initiative designed to reduce ship energy consumption and increase mission effectiveness through longer time on station. The ESM will achieve fuel savings by de-risking single generator operations. APGM will provide increased power to meet power requirements for advanced sensors and future weapons with reduction in life cycle costs through increased fuel efficiency over legacy gas turbine generator sets. GT Efficiency Upgrades will provide fuel efficiency improvements to existing gas turbine engines for both backfit and new construction ships.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2012	FY 2013	FY 2014
Title: Energy Efficiency	12.500	19.600	17.340
Articles:	0	0	0
FY 2012 Accomplishments: Accepted transition of the ONR Swampworks Energy Storage Module (ESM) Proof of Concept (POC). Initiated testing of the ESM POC which validated interface requirements, employed an open architecture, and utilized components from multiple sources.			

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy		DATE: April 2013
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2012	FY 2013	FY 2014
Continued to develop technical and operational concepts for improving shipboard energy management utilizing energy storage modules. Completed Industry studies, specifications, initial requirements documents, and interface control documents in support of Advanced Power Generation Module (APGM) and ESM Increment 1. Released draft Request For Proposals (RFPs) for ESM Increment 1. Released RFP to the Original Equipment Manufacturer (OEM) for improvement validation studies and preliminary design concepts for Gas Turbine (GT) Specific Fuel Consumption (SFC) improvement initiatives. The projects included: High Pressure Turbine Cooling Air Modulation (Reduced Bleed Air at part power) and Variable Stator Vane (VSV) Optimization (Vane Schedule revision at part power). These initial efforts focused on defining the test profiles for the design concepts and included initial testing. Continued to improve baseline power system energy efficiency performance by performing analysis, modeling and simulation, life cycle cost analysis, producibility studies, module development, and ship integration studies and planning. Continued to determine alternatives for energy management and fuel efficiency improvement options. ***FY 2013 Plans:*** Complete testing of the ESM POC. Award contracts for APGM, GT Efficiency Upgrades, and ESM increment 1 and commence design. Order Long Lead Time Material (LLTM) and initiate ESM Increment 1 test planning. Continue design concepts for Gas Turbine (GT) specific Fuel Consumption (SFC) improvement initiatives. Develop software design specification and code for VSV angle optimization. Manufacture prototype hardware and conduct testing including SFC validation testing at OEM facility and at the DDG 51 Land Based Engineering Site (LBES) in Philadelphia. Assess performance improvements, evaluate prototype hardware under test conditions and determine whether component redesign is required to optimize efficiency gains. Define fielding plan for DDG 51 and CG 47 Class ships for LM2500 engines with digital fuel control configuration. Continue to improve baseline power system energy efficiency performance by performing analysis, modeling and simulation, life cycle cost analysis, producibility studies, module development, and ship integration studies and planning. Continue to determine alternatives for energy management and fuel efficiency improvement options. ***FY 2014 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy		DATE: April 2013
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2012	FY 2013	FY 2014
Complete design and commence production of APGM and ESM Increment 1. Continue ESM test planning and commence test site modifications. Award contract and complete Gas Turbine efficiency upgrade OEM factory testing and issue test report including SFC validation data. Initiate LBES testing for GT efficiency upgrades. Define hardware kit contents for system configuration upgrade. Begin transition to hardware procurement and ship installation via OPN PE Continue to improve baseline power system energy efficiency performance by performing analysis, modeling and simulation, life cycle cost analysis, producibility studies, module development, and ship integration studies and planning. Continue to determine alternatives for energy management and fuel efficiency improvement options.			
Title: Mission Power	3.100	4.990	6.800
Articles:	0	0	0
FY 2012 Accomplishments: Conducted trade study and commenced design of a 450 VAC to 1000 VDC Power Converter Module (PCM) for multiple applications. Completed draft requirements of a PCM similar to the DDG 51 Flight III Air & Missile Defense Radar (AMDR) PCM. ***FY 2013 Plans:*** Develop DDG 51 Flight III AMDR power interface requirements for ship / radar electrical interface. Complete specification and release the AMDR PCM RFP. Develop and build Functional Equivalent Modules (FEMs) power converter modules in support of DDG 51 Flight III AMDR PCM. Accept transition of ONR developed Solid State Power Station (SSPS) 4160 VAC to 1000 VDC power converter. ***FY 2014 Plans:*** Award contract and commence design of DDG 51 Flight III AMDR PCM. Order LLTM. Accept transition of ONR developed compact power components, (Bi-direction Power Converter, Multi-Functional Power Converter, and Power Management Controller) per the signed Technology Transition Agreements (TTAs) between ONR and PMS 320. Continue testing efforts associated with ONR developed compact power components and SSPS. Continue testing of power converter module FEMs in support of DDG 51 Flight III AMDR PCM.			
Title: Naval Power Technology Development / Platform Integration & Transition	2.121	5.307	3.014

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy		DATE: April 2013
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2012	FY 2013	FY 2014
Articles:	0	0	0

FY 2012 Accomplishments:
Signed International Agreement for the Advanced Electric Power and Propulsion Systems Development Project (AEP3)Arrangement (PA) with the United Kingdom (UK). Commenced execution of the PA.

Continued to develop power and propulsion system configurations in support of future surface ship acquisition programs. Developed alternative power and propulsion solutions for future flights of the DDG 51 Class and LX(R). Continued to improve baseline power system performance by performing analysis, modeling and simulation, life cycle cost analysis, producibility studies, module development, and ship integration studies and planning. Continued to conduct land based testing in order to increase energy efficiency and fuel savings, improve survivability and enable advanced sensors and weapons (i.e., AMDR, Lasers). Continued to analyze alternatives for supplying power to advanced radars, combat systems, and electric weapons power demands and potential interfaces to develop optimum alternative solutions. Continued assessments of Naval Power System alternate architectures to best meet emerging ship requirements. Assessed future capability needs and developed derived electrical requirements, surveyed existing technologies and trends, and began writing the Naval Power Systems Technology Development Roadmap.

FY 2013 Plans:
Continue to execute the AEP3 US/UK PA.

Continue to develop power and propulsion system configurations in support of future surface ship acquisition programs. Develope alternative power and propulsion solutions for future surface combatants and amphibious ships. Continue to improve baseline power system performance by performing analysis, modeling and simulation, life cycle cost analysis, producibility studies, module development, and ship integration studies and planning. Continue to conduct land based testing in order to increase energy efficiency and fuel savings, improve survivability and enable advanced sensors and weapons (i.e., AMDR, Lasers). Continue to analyze alternatives for supplying power to advanced radars, combat systems, and electric weapons power demands and potential interfaces to develop optimum alternative solutions. Continue assessments of Naval Power System alternate architectures to best meet emerging ship requirements. Complete writing and issue the Naval Power Systems Technology Development Roadmap.

FY 2014 Plans:
Continue to execute the AEP3 US/UK PA.

Continue to develop power and propulsion system configurations in support of future surface ship acquisition programs. Develop alternative power and propulsion solutions for future surface combatants and amphibious ships. Continue to improve baseline

Exhibit R-2A, RDT&E Project Justification: PB 2014 Navy		DATE: April 2013
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2012	FY 2013	FY 2014
power system performance by performing analysis, modeling and simulation, life cycle cost analysis, producibility studies, module development, and ship integration studies and planning. Continue to conduct land based testing in order to increase energy efficiency and fuel savings, improve survivability and enable advanced sensors and weapons (i.e., AMDR, Lasers). Continue to analyze alternatives for supplying power to advanced radars, combat systems, and electric weapons power demands and potential interfaces to develop optimum alternative solutions. Continue assessments of Naval Power System alternate architectures to best meet emerging ship requirements. Commence bi-annual update of the Naval Power Systems Technology Development Roadmap.			
Accomplishments/Planned Programs Subtotals	17.721	29.897	27.154

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

This program develops and transitions higher performance and more affordable electric power and propulsion systems to both new construction and back fit ship applications using an evolutionary acquisition approach. Full and open competition is utilized to the maximum extent possible to provide maximum benefit to the Navy at the lowest possible cost to the taxpayer.

E. Performance Metrics

This project will execute 100% of the signed Technology Transition Agreements with ONR; complete 100% of the advanced developments currently planned for the Energy Storage Module and Power Generation Module; achieve 10% Specific Fuel Consumption (SFC) improvement for Advanced Power Generation Module; mature technology to Technology Readiness Level (TRL) 6 by milestone decisions for ship acquisition programs; and, realize a 3-5% improvement in existing gas turbine engine SFC over engine operating profile.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2014 Navy			DATE: April 2013
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Energy Efficiency	Various	Adv. PGM:Various	0.000	0.337	Nov 2011	12.500	Dec 2012	4.000	Jan 2014	-		4.000	Continuing	Continuing	Continuing
Energy Efficiency	Various	ESM:Various	0.000	0.000		4.000	Mar 2013	6.000	Oct 2013	-		6.000	Continuing	Continuing	Continuing
Missioin Power	C/CPFF	GE:Syracuse, NY	0.000	2.547	Aug 2012	0.000		0.000		-		0.000	Continuing	Continuing	Continuing
Mission Power	Various	AMDR PCM:Various	0.000	0.000		0.000		3.612	Dec 2013	-		3.612	Continuing	Continuing	Continuing
Power & Propuslion Systems	C/CPFF	Various:Various	18.575	5.441	Oct 2011	3.600	Oct 2012	3.600	Oct 2013	-		3.600	Continuing	Continuing	Continuing
Power & Propulsion Systems	C/CPFF	Syntek:Arlington, VA	0.900	3.998	Oct 2011	2.637	Oct 2012	2.500	Oct 2013	-		2.500	Continuing	Continuing	Continuing
Various	WR	NSWCCD-SSES:Phila, PA	28.828	5.198	Oct 2011	5.100	Oct 2012	4.842	Oct 2013	-		4.842	Continuing	Continuing	Continuing
		Subtotal	48.303	17.521		27.837		24.554		0.000		24.554			

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Power & Propuslion Systems	WR	NSWCCD-SSES:Phila, PA	24.040	0.200	Oct 2011	1.560	Oct 2012	1.600	Oct 2013	-		1.600	Continuing	Continuing	Continuing
		Subtotal	24.040	0.200		1.560		1.600		0.000		1.600			

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	All Prior Years	FY 2012 Cost	FY 2012 Award Date	FY 2013 Cost	FY 2013 Award Date	FY 2014 Base Cost	FY 2014 Base Award Date	FY 2014 OCO Cost	FY 2014 OCO Award Date	FY 2014 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Power & Propulsion Systems	C/CPFF	Various:Various	0.000	0.000		0.500	Jan 2013	1.000	Oct 2013	-		1.000	Continuing	Continuing	Continuing
		Subtotal	0.000	0.000		0.500		1.000		0.000		1.000			

Exhibit R-3, RDT&E Project Cost Analysis: PB 2014 Navy			DATE: April 2013
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	All Prior Years	FY 2012		FY 2013		FY 2014 Base		FY 2014 OCO		FY 2014 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	72.343	17.721		29.897		27.154		0.000		27.154			

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2014 Navy		DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603573N: *Advanced Surface Machinery Sys*	PROJECT 2471: *Integrated Power Systems (IPS)*

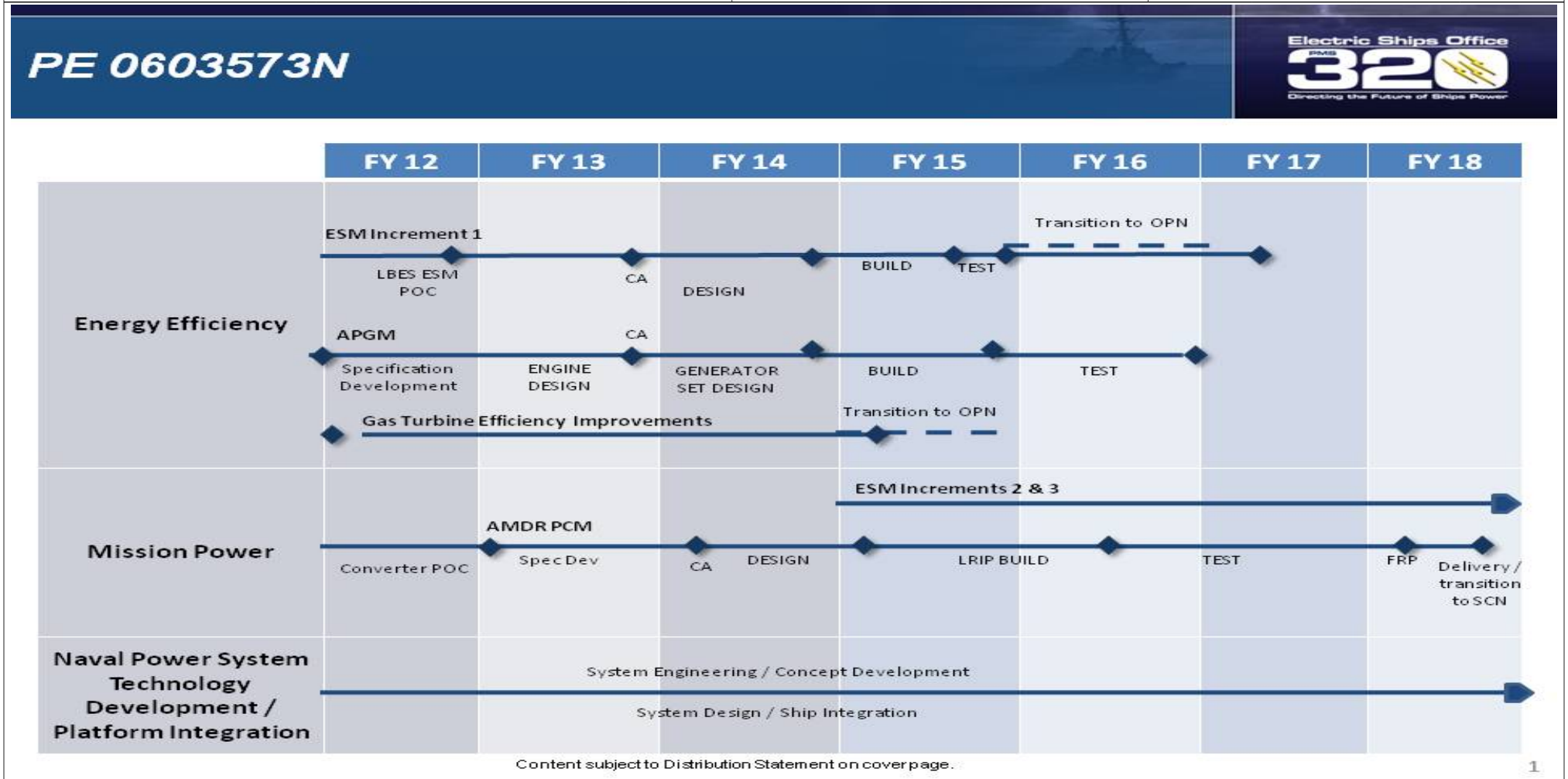

Exhibit R-4A, RDT&E Schedule Details: PB 2014 Navy		DATE: April 2013
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603573N: *Advanced Surface Machinery Sys*	**PROJECT** 2471: *Integrated Power Systems (IPS)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 2471				
System Engineering & Concept Development	1	2012	4	2018
System Design & Ship Integration	1	2012	4	2018
Advanced Power Generation	1	2012	4	2017
Energy Storage	1	2012	4	2018
Turbine Efficiency Upgrades	1	2012	4	2014
DDG51 Flight III Ship AMDR Electrical Interface	1	2013	4	2018