Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Navy										DATE: February 2011	
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 7: *Operational Systems Development*				R-1 ITEM NOMENCLATURE PE 0204228N: *Surface Support*							
COST ($ in Millions)	**FY 2010**	**FY 2011**	**FY 2012 Base**	**FY 2012 OCO**	**FY 2012 Total**	**FY 2013**	**FY 2014**	**FY 2015**	**FY 2016**	**Cost To Complete**	**Total Cost**
Total Program Element	-	-	3.377	-	3.377	4.173	2.974	2.773	2.376	Continuing	Continuing
3311: *Navigation Systems*	-	-	3.377	-	3.377	4.173	2.974	2.773	2.376	Continuing	Continuing

Note

This program is a new start in FY 2012.

A. Mission Description and Budget Item Justification

The Surface Support RDT&E funding will be used for the research, design, development, integration testing, and documentation of a new AN/WSN-7 Inertial Measuring Unit (IMU) to support the Ballistic Missile Defense (BMD) mission. The program will implement systems engineering processes to identify specific BMD performance requirements, investigate major navigation system error sources, define new IMU functions, research new INS technologies, algorithms, and techniques to improve system performance, conduct analyses of alternatives, create preliminary and final design concepts, develop new hardware components and associated software, and conduct land based and shipboard testing.

The AN/WSN-7(V) RLGN is a legacy, 1980's design that was first installed in 1998 and is now obsolete. The design is reaching its limit with respect to providing the high-accuracy navigation solution required to meet known and emerging mission requirements. Navigator of the Navy's Vision 2025 identifies emergent requirements with respect to improved navigation in a GPS denied environment, littoral warfare, mine countermeasures, and manned and unmanned vehicle operations that cannot be met with existing systems. The AN/WSN-7(V) Ring Laser Gyro Navigator (RLGN) system is a self-contained inertial navigator designed for U.S. Navy surface ships. The RLGN employs an Inertial Measuring Unit (IMU) with three single-axis ring laser gyros that allow the system to provide continuous and automatic data outputs of the ship's geographic position (latitude, longitude), horizontal and vertical linear velocity (Ve, Vn, Vv), attitude (heading, roll, and pitch) and attitude rates. The RLGN provides mission critical ship's position and attitude data to shipboard sensors (such as radars), combat systems, gun and missile systems. The RLGN uses data from the Global Positioning System (GPS) to periodically update (i.e., reset) its position and internal clock. The RLGN is the ship's primary position source in absence of GPS.

Exhibit R-2, RDT&E Budget Item Justification: PB 2012 Navy	DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 7: *Operational Systems Development*	**R-1 ITEM NOMENCLATURE** PE 0204228N: *Surface Support*

B. Program Change Summary ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total
Previous President's Budget	-	-	-	-	-
Current President's Budget	-	-	3.377	-	3.377
Total Adjustments	-	-	3.377	-	3.377
• Congressional General Reductions		-			
• Congressional Directed Reductions		-			
• Congressional Rescissions	-	-			
• Congressional Adds		-			
• Congressional Directed Transfers		-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-	-			
• Program Adjustments	-	-	3.379	-	3.379
• Rate/Misc Adjustments	-	-	-0.002	-	-0.002

Change Summary Explanation

Technical: New start in FY 2012.

Schedule: New start in FY 2012.

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy			DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 7: *Operational Systems Development*	R-1 ITEM NOMENCLATURE PE 0204228N: *Surface Support*	PROJECT 3311: *Navigation Systems*	

COST ($ in Millions)	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
3311: *Navigation Systems*	-	-	3.377	-	3.377	4.173	2.974	2.773	2.376	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

Note

This program is a new start in FY 2012.

A. Mission Description and Budget Item Justification

The Surface Support RDT&E funding will be used for the research, design, development, integration testing, and documentation of a new AN/WSN-7 Inertial Measuring Unit (IMU) to support the Ballistic Missile Defense (BMD) mission. The program will implement systems engineering processes to identify specific BMD performance requirements, investigate major navigation system error sources, define new IMU functions, research new INS technologies, algorithms, and techniques to improve system performance, conduct analyses of alternatives, create preliminary and final design concepts, develop new hardware components and associated software, and conduct land based and shipboard testing.

The AN/WSN-7(V) RLGN is a legacy, 1980's design that was first installed in 1998 and is now obsolete. The design is reaching its limit with respect to providing the high-accuracy navigation solution required to meet known and emerging mission requirements. Navigator of the Navy's Vision 2025 identifies emergent requirements with respect to improved navigation in a GPS denied environment, littoral warfare, mine countermeasures, and manned and unmanned vehicle operations that cannot be met with existing systems. The AN/WSN-7(V) Ring Laser Gyro Navigator (RLGN) system is a self-contained inertial navigator designed for U.S. Navy surface ships. The RLGN employs an Inertial Measuring Unit (IMU) with three single-axis ring laser gyros that allow the system to provide continuous and automatic data outputs of the ship's geographic position (latitude, longitude), horizontal and vertical linear velocity (Ve, Vn, Vv), attitude (heading, roll, and pitch) and attitude rates. The RLGN provides mission critical ship's position and attitude data to shipboard sensors (such as radars), combat systems, gun and missile systems. The RLGN uses data from the Global Positioning System (GPS) to periodically update (i.e., reset) its position and internal clock. The RLGN is the ship's primary position source in absence of GPS.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2010	FY 2011	FY 2012
Title: Systems Engineering	-	-	3.377
Articles:			0
FY 2012 Plans: Assess current AN/WSN-7(V) design, performance, and support gaps. Based on Request For Information/Request For Proposal (RFI/RFP) responses, identify modernization solutions and evaluate technology readiness levels.			
Accomplishments/Planned Programs Subtotals	-	-	3.377

Exhibit R-2A, RDT&E Project Justification: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 7: *Operational Systems Development*	R-1 ITEM NOMENCLATURE PE 0204228N: *Surface Support*	PROJECT 3311: *Navigation Systems*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2010	FY 2011	FY 2012 Base	FY 2012 OCO	FY 2012 Total	FY 2013	FY 2014	FY 2015	FY 2016	Cost To Complete	Total Cost
• OPN/0670: *Other Navigation*	38.580	23.167	22.982	0.000	22.982	24.206	29.390	28.886	30.357	0.000	197.568

D. Acquisition Strategy

Procurement of AN/WSN-7 modernization upgrades planned to begin in FY14.

E. Performance Metrics

FY12:
- Successfully complete AN/WSN-7(V) design, performance, and support gap analysis.
- Based on Request For Information/Request For Proposal (RFI/RFP) responses, identify modernization solutions.
- Evaluate technology readiness levels.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 7: *Operational Systems Development*	R-1 ITEM NOMENCLATURE PE 0204228N: *Surface Support*	PROJECT 3311: *Navigation Systems*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering	WR	SPAWAR Atlantic:Little Creek, VA	-	-		0.827	Oct 2011	-		0.827	0.000	0.827	
Systems Engineering	C/CPFF	Penn State/ ARL:Warminster, PA	-	-		0.250	Oct 2011	-		0.250	0.000	0.250	
Systems Engineering	C/CPFF	Northrop Grumman Sys Corp:Charlottesville, VA	-	-		0.800	Oct 2011	-		0.800	0.000	0.800	
Systems Engineering/Design	WR	SPAWAR, Atlantic:Little Creek, VA	-	-		0.200	Oct 2011	-		0.200	0.000	0.200	
Systems Engineering/Design	C/CPFF	Penn State/ ARL:Warminster, PA	-	-		0.200	Oct 2011	-		0.200	0.000	0.200	
Systems Engineering/Design	C/CPFF	Northrop Grumman Sys Corp:Charlottesville, VA	-	-		1.000	Apr 2012	-		1.000	0.000	1.000	
		Subtotal	-	-		3.277		-		3.277	0.000	3.277	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management	C/CPFF	BAH/Tech Marine:Wasington, DC	-	-		0.100	Dec 2011	-		0.100	0.000	0.100	
		Subtotal	-	-		0.100		-		0.100	0.000	0.100	

	Total Prior Years Cost	FY 2011 Cost	FY 2011 Award Date	FY 2012 Base Cost	FY 2012 Base Award Date	FY 2012 OCO Cost	FY 2012 OCO Award Date	FY 2012 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		3.377		-		3.377	0.000	3.377	

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 7: *Operational Systems Development*	**R-1 ITEM NOMENCLATURE** PE 0204228N: *Surface Support*	**PROJECT** 3311: *Navigation Systems*

Exhibit R-4A, RDT&E Schedule Details: PB 2012 Navy		DATE: February 2011
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 7: *Operational Systems Development*	**R-1 ITEM NOMENCLATURE** PE 0204228N: *Surface Support*	**PROJECT** 3311: *Navigation Systems*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3311				
Requirements Definition	1	2012	3	2012
Interface Requirements	2	2012	1	2013
Initial Architectural Design	3	2012	4	2012
Final Architectural Design	1	2013	2	2013
Modeling and Simulation	1	2013	3	2013
Coding and Test	2	2013	3	2014
Integration Testing	1	2014	1	2015
Land-Based Testing	1	2015	2	2015
Technical Evaluation	3	2015	3	2015
Operational Evaluation	4	2015	4	2015
Follow-on Development	1	2016	4	2016