Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Navy										DATE: February 2012	
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*				R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*							
COST ($ in Millions)	**FY 2011**	**FY 2012**	**FY 2013 Base**	**FY 2013 OCO**	**FY 2013 Total**	**FY 2014**	**FY 2015**	**FY 2016**	**FY 2017**	**Cost To Complete**	**Total Cost**
Total Program Element	115.072	84.962	34.085	-	34.085	30.931	41.509	46.968	45.898	Continuing	Continuing
2341: *METOC Data Acquisition*	14.719	6.073	6.702	-	6.702	6.724	6.886	6.845	6.958	Continuing	Continuing
2342.: *METOC Data Assimilation and Mod*	14.750	10.636	14.127	-	14.127	14.875	17.654	18.127	20.586	Continuing	Continuing
2343: *Tactical METOC Applications*	12.226	9.562	9.172	-	9.172	5.453	13.960	19.509	16.231	Continuing	Continuing
2344.: *Precise Timing and Astronomy*	1.973	1.025	3.043	-	3.043	2.814	1.923	1.382	0.999	Continuing	Continuing
3207: *Fleet Synthetic Training*	3.311	0.968	1.041	-	1.041	1.065	1.086	1.105	1.124	Continuing	Continuing
3229: *JMAPS*	68.093	56.698	-	-	-	-	-	-	-	0.000	124.791

A. Mission Description and Budget Item Justification

The Air Ocean Tactical Applications (AOTA) Program Element is fully aligned with the Navy's maritime strategy to enhance the future mission capabilities of the Navy-Marine Corps Team. New state-of-the art government and commercial technologies are identified, transitioned, demonstrated and then integrated into Combat Systems and programs of record and Tactical Decision Aids that determine in real-time and near-real-time the operational effects of the physical environment on the performance of combat forces and their new and emerging platforms, sensors, systems and munitions. The AOTA program element focuses on sensing and characterizing and predicting the littoral and deep-strike battlespace in the context of regional conflicts and crisis response scenarios. Projects in this program element transition state-of-the art sensing, assimilation, modeling and decision aid technologies from Government and commercial sources. Unique project development efforts include atmospheric and oceanographic data assimilation techniques, forecast models, data base management systems and associated software for use in mainframe, desktop and laptop computers. Model data, products and services can be used by forward-deployed personnel or in a reach-back mode to optimize sensor placement and force allocation decisions. Global Geospatial Information and Services efforts within this program address the bathymetric needs of the Navy. Also developed are algorithms to process new satellite sensor data for integration into Navy and Marine Corps decision support systems and for display as part of the common operational and tactical pictures. In addition, the projects provide for demonstration and validation of specialized atmospheric and oceanographic instrumentation and measurement techniques, new sensors, communications and interfaces. Included are new capabilities to assess, predict and enhance the performance of current and emerging undersea warfare and mine warfare weapons systems. AOTA capabilities are designed to support the latest versions of the Global Command and Control System and specific unit-level combat systems. Finally, this program develops technological upgrades for the U.S. Naval Observatory's Master Clock system to meet requirements with the demands of Department of Defense communications, cryptographic, intelligence, geolocation, and targeting systems; develops near-real-time earth orientation predictions; develops very precise determination of positions of both faint and bright stars; and supports satellite tracking and space debris studies.

Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Navy	DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*

Major emphasis areas include the Naval Integrated Tactical Environmental System Next Generation (NITES-Next) and the Meteorological and Oceanographic (METOC) Future Mission Capabilities, the METOC Space-Based Sensing Capabilities, the Precise Timing and Astrometry, the Fleet Synthetic Training, the Tactical Oceanographic Capabilities for Under Sea Warfare and the Earth System Prediction Capability projects.

B. Program Change Summary ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total
Previous President's Budget	123.331	94.972	61.382	-	61.382
Current President's Budget	115.072	84.962	34.085	-	34.085
Total Adjustments	-8.259	-10.010	-27.297	-	-27.297
• Congressional General Reductions	-	-0.010			
• Congressional Directed Reductions	-	-10.000			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-1.068	-			
• SBIR/STTR Transfer	-1.575	-			
• Program Adjustments	-	-	-26.764	-	-26.764
• Rate/Misc Adjustments	-	-	-0.533	-	-0.533
• Congressional General Reductions Adjustments	-0.616	-	-	-	-
• Congressional Directed Reductions Adjustments	-5.000	-	-	-	-

Change Summary Explanation

Technical: Beginning in FY13 the Navy will begin investment in the development of the Earth System Prediction Capability project.
The Navy has restored Naval Integrated Tactical Environmental System Next Generation (NITES-Next) program development efforts after FY13.
Schedule: A schedule for the ESPC project, beginning in FY13, has been added to project 2342 "METOC Data Assimilation & Modeling".
The schedule for the Naval Integrated Tactical Environmental System Next Generation (NITES-Next) program of record has been updated to reflect that the Navy has restored the programs development efforts after FY13.

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2341: *METOC Data Acquisition*	

COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
2341: *METOC Data Acquisition*	14.719	6.073	6.702	-	6.702	6.724	6.886	6.845	6.958	Continuing	Continuing
Quantity of RDT&E Articles	2	0	0	0	0	0	0	0	0		

Note

Littoral Battlespace Sensing, Unmanned Undersea Vehicles (LBS-UUV) FY 2012 efforts continued in PE 0604218N (Air/Ocean Equipment Engineering) project 2345 (Fleet METOC Equipment).

Quantity of 2 RDT&E Articles for FY 2011 represent Littoral Battlespace Sensing, Autonomous Undersea Vehicles (LBS-AUV) Engineering Design Models (EDMs).

A. Mission Description and Budget Item Justification

The major thrust of the Meteorology and Oceanography (METOC) Data Acquisition Project is to provide future mission capabilities to warfighters that will allow them to detect and monitor the conditions of the physical environment throughout the entire battlespace. New sensor technologies (including unmanned vehicles, tactical sensor exploitation, in-situ sensors) identified as the most promising candidates are transitioned from the government's and commercial industry's technology base. These new sensor technologies are demonstrated, validated and integrated into operational programs for warfighters. These new sensor capabilities provide timely and accurate METOC data and products to operational and tactical commanders. METOC data requirements have likewise evolved as the emphasis on naval warfare has evolved from blue water operations to the littoral and deep strike battlespace. The littoral and deep strike regions are dynamic and complex, characterized by strong and variable oceanographic and atmospheric conditions. The need to accurately characterize these conditions is more crucial than ever in planning and executing warfare operations and effectively allocating force weapon and sensor systems. Routinely available data sources, such as climatology, oceanographic and meteorological numerical models, and satellite remote sensing are necessary but not sufficient to support these warfare areas in the littoral and deep strike regions. Operational sensors are deployed great distances from the target area of interest. The challenge is to collect and disseminate METOC data in variable and dynamic littoral environmental conditions or in denied, remote or inaccessible areas over extended periods of time. This project: 1) provides the means to rapidly and automatically acquire a broad array of METOC data using both off-board and on-board sensors; 2) provides an on-scene assessment capability for the tactical commander; 3) provides the tactical commander with real-time METOC data and products for operational use; 4) demonstrates and validates the use of tactical workstations and desktop computers for processing and display of METOC data and products; 5) demonstrates and validates techniques which employ data compression, connectivity and interface technologies to obtain, store, process, distribute and display these METOC data and products; 6) develops new charting and bathymetric survey techniques necessary to reduce the existing shortfall in coastal hydrographic survey requirements; 7) develops an expanded database for predictive METOC models in areas of interest; and 8) supports the development of radar weather using through-the-sensor techniques.

Major emphasis areas include the Meteorological and Oceanographic Future Mission Capabilities (METOC FMC) and the Tactical Oceanographic Capabilities / Under Sea Warfare (TOC/USW) projects.

FY 2013 request provides for continued advanced software and hardware component and prototype efforts associated with acquiring environmental data, and METOC data transport, storage, delivery, design, development efforts, and develop METOC network integration capability.

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2341: *METOC Data Acquisition*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: Littoral Battlespace Sensing, Unmanned Undersea Vehicles (LBS-UUV)	2.465	-	-
Articles:	2		
FY 2011 Accomplishments: Updated Littoral Battlespace Sensing, Glider (LBS-G) engineering studies, and cost estimates for the LBS-G Engineering Change Proposals (ECPs) as required. Continued the Littoral Battlespace Sensing, Autonomous Undersea Vehicles (LBS-AUV) Engineering Manufacturing Development (EMD) (formerly SDD) phase (LBS-AUV Milestone C (MS-C) is scheduled for Q3/Q4 FY12). Developed the LBS-AUV Capability Production Document (CPD) and other required MS-C documentation. Conducted the LBS-AUV Critical Design Review (CDR). Developed two LBS-AUV EDMs and begin associated technical and engineering reviews. FY 2012 efforts continued in PE 0604218N (Air/Ocean Equipment Engineering) project 2345 (Fleet METOC Equipment).			
Title: Meteorological and Oceanographic (METOC) Future Mission Capabilities (FMC)	7.041	5.761	6.390
Articles:	0	0	0
FY 2011 Accomplishments: Continued advanced component and prototype efforts associated with acquiring environmental data. Continued development of advanced data measurement and survey techniques to improve survey planning and execution. Continued development of improved data quality control technologies and the automation of data acquisition processes. Continued to develop advanced technologies and techniques to improve Geospatial Information and Services (GI&S) capabilities within Navy Meteorology and Oceanography (METOC) production centers and throughout the fleet user base. Continued to implement Through The Sensor (TTS) technologies to use tactical detection systems to characterize undersea and atmospheric environment in the battlespace integrate with analysis, distribution, and tactical decision systems. Developed advanced data acquisition and data processing techniques for oceanographic and atmospheric data. ***FY 2012 Plans:*** Continue advanced component and prototype efforts associated with acquiring environmental data. Continue to develop advanced data measurement and survey techniques that capture measurement uncertainties in order to provide warfare commanders with an accurate assessment of uncertainty in sensor performance prediction products and services. Continue development of improved data quality control technologies and the automation of data acquisition processes. Continue to develop advanced technologies and techniques to improve Geospatial Information and Services (GI&S) capabilities within Navy METOC production centers and throughout the fleet user base. Develop advanced data acquisition, data processing and analysis techniques for GI&S, oceanographic and atmospheric data and information. Develop METOC data and product delivery technologies. ***FY 2013 Plans:*** Continue advanced component and prototype development efforts associated with acquiring environmental data and develop advanced techniques for data measurement and survey techniques that capture measurement uncertainties in order to provide			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2341: *METOC Data Acquisition*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
warfare commanders with an accurate assessment of uncertainty in sensor performance prediction products and services. Continue development of improved data quality control technologies and the automation of data acquisition processes and develop advanced technologies and techniques to improve Geospatial Information and Services (GI&S) capabilities within Navy METOC product production centers and throughout the fleet user base. Continue to develop Through-The-Sensor (TTS) technologies that use tactical detection systems where applicable to characterize undersea and atmospheric environment in the battlespace. Develop METOC network integration capability and continue to develop systems engineering plans, requirements, standards, studies, and other documentation supporting integration of these products.			
Title: Tactical Oceanography Capabilities / Undersea Warfare (USW)	5.213	0.312	0.312
Articles:	0	0	0
FY 2011 Accomplishments: Developed current advanced data collection systems to generate products and populate databases that characterize the acoustic environment in support of Undersea Warfare (USW) missions. Developed autonomous underwater vehicle/system (AUV) technology demonstrations to measure in-situ oceanographic, acoustic and geoacoustic parameters remotely from Fleet survey vessels. Continued to develop capabilities to calculate acoustic transmission loss (TL) values in tactical timeframes to include uncertainty quantification of those values. Continued to develop next generation acoustic bottom loss and backscatter databases and database structures for transition into U.S. Navy USW Tactical Decision Aids (TDAs). Conducted Validation and Verification (V&V) of next generation acoustic models, databases and algorithms. Continued to develop improved techniques to support geoacoustic and oceanographic survey operations. Continued to develop algorithms for inclusion of bioacoustic effects in acoustic surveys and Navy USW operations. Developed active acoustic sources to aid geoacoustic survey operations. Provided project technical and program management oversight.			
FY 2012 Plans: Continue to transition models, algorithms and databases that either calculate accurate acoustic TL or characterize environmental parameters that affect TL and develop TL calculation implementations. Continue to develop capabilities to calculate acoustic TL values in tactical timeframes to include uncertainty quantification of those values. The Navy has canceled all previously funded Ocean Bottom Characterization Initiative (OBCI) activities.			
FY 2013 Plans: Continue to transition models, algorithms and databases that either calculate accurate acoustic TL or characterize environmental parameters that affect TL and develop TL calculation implementations. Continue to develop capabilities to calculate acoustic TL values in tactical timeframes to include uncertainty quantification of those values.			
Accomplishments/Planned Programs Subtotals	14.719	6.073	6.702

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2341: *METOC Data Acquisition*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
• OPN/4226: *METEOROLOGICAL EQUIPMENT*	25.442	30.278	18.339	0.000	18.339	20.154	20.831	20.528	20.926	Continuing	Continuing
• RDTEN/0604218N/2345: *FLEET METOC EQUIPMENT*	3.987	4.436	2.615	0.000	2.615	2.751	2.865	2.821	2.872	Continuing	Continuing
• RDTEN/0603207N/2342: *METOC DATA ASSIMILATION AND MOD*	14.750	10.636	11.127	0.000	11.127	9.875	9.854	9.827	9.986	Continuing	Continuing
• RDTEN/0604218N/2346: *METOC SENSOR ENGINEERING*	1.509	1.486	1.445	0.000	1.445	1.490	1.506	1.517	1.543	Continuing	Continuing

D. Acquisition Strategy

Acquisition, management and contracting strategies are to support the meteorological and oceanographic (METOC) Data Acquisition Project to develop, demonstrate, and validate METOC data collection methods and sensors, and to evolve the ability to provide timely and accurate METOC data and products to the Tactical Commander, all with management oversight by the Navy.

E. Performance Metrics

Goal: Develop techniques and tools to acquire METOC data in order to improve the accuracy of global and regional scale meteorological and oceanographic forecast models. Advanced sensor component, data collection, and meteorological, oceanographic and hydrographic survey technique development tasks are directed by Resource Sponsor, with input from external Systems Commands and/or Type Commanders, in response to validated capability gaps or operational fleet requirements. Wherever applicable, and based on favorable Science & Technology (S&T) assessments, tasks shall leverage or transition existing Small Business Innovative Research and/or RDT&E Budget Activity 6.2 - 6.3 S&T work.

Metric -- Tasks will address no less than 75% of applicable capability gaps and requirements.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2341: *METOC Data Acquisition*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
METOC Future Mission Capabilities	WR	Naval Research Laboartory:Washington, DC	60.501	4.949	Oct 2011	5.554	Oct 2012	-		5.554	Continuing	Continuing	Continuing
METOC Future Mission Capabilities	WR	SSC PAC:California	22.033	0.150	Oct 2011	0.108	Oct 2012	-		0.108	Continuing	Continuing	Continuing
METOC Future Mission Capabilities	Various	Various:Various	43.021	-		-		-		-	0.000	43.021	
LBS-G	C/CPIF	Teledyne Brown Eng:Alabama	6.557	-		-		-		-	0.000	6.557	
METOC Future Mission Capabilities	WR	NPGS:Monterey, CA	0.200	0.200	Oct 2011	0.195	Oct 2012	-		0.195	Continuing	Continuing	Continuing
METOC Future Mission Capabilities	C/FP	Penn State University:PA	0.300	0.290	Dec 2011	0.271	Dec 2012	-		0.271	Continuing	Continuing	Continuing
Tactical Oceanography Capabilities / Undersea Warfare (TOC USW)	WR	NRL:Washington, DC	1.400	0.284	Oct 2011	0.312	Oct 2012	-		0.312	Continuing	Continuing	Continuing
Littoral Battlespace Sensing - Autonomous Undersea Vehicle	C/FP	Hydroid INC:Pocasset, MA	1.865	-		-		-		-	0.000	1.865	
Tactical Oceanography Capabilities / Undersea Warfare (TOC USW)	C/FP	Univ. of Texas:Texas	1.300	-		-		-		-	0.000	1.300	
Tactical Oceanography Capabilities / Undersea Warfare (TOC USW)	WR	SSC PAC:California	2.754	-		-		-		-	0.000	2.754	
		Subtotal	139.931	5.873		6.440		-		6.440			

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2341: *METOC Data Acquisition*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
METOC Future Mission Capabilities	C/CPIF	Various:Various	2.672	-		-		-		-	Continuing	Continuing	Continuing
Littoral Battlespace Sensing - Autonomous Undersea Vehicle	C/FP	SAIC:Virgina	0.600	-		-		-		-	0.000	0.600	
		Subtotal	3.272	-		-		-		-			

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
METOC Future Mission Capabilities	WR	OPTEVFOR:Virginia	0.160	-		-		-		-	0.000	0.160	
METOC Future Mission Capabilities	MIPR	JITC:Arizona	0.040	-		-		-		-	0.000	0.040	
		Subtotal	0.200	-		-		-		-	0.000	0.200	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Acquisition Workforce	Various	Not Specified:Not Specified	0.096	-		-		-		-	0.000	0.096	
METOC Future Mission Capabilities Management Support	C/FP	BAH:Virgina	0.200	0.200	Nov 2011	0.262	Nov 2012	-		0.262	Continuing	Continuing	Continuing
		Subtotal	0.296	0.200		0.262		-		0.262			

	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	143.699	6.073		6.702		-		6.702			

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2341: *METOC Data Acquisition*	

	Total Prior Years Cost	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2341: *METOC Data Acquisition*

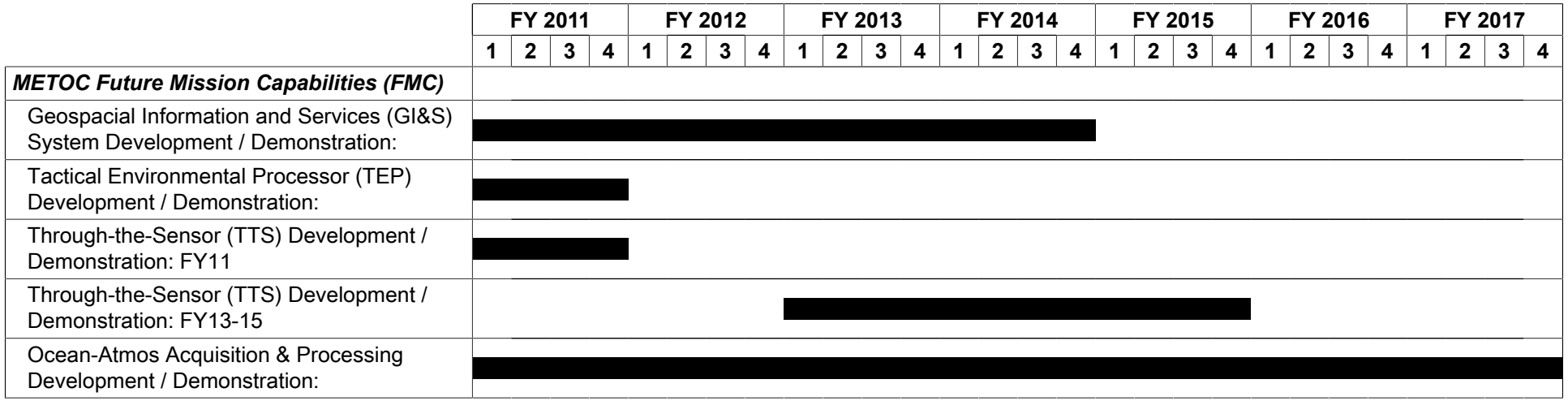

Exhibit R-4A, RDT&E Schedule Details: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603207N: *Air/Ocean Tactical Applications*	**PROJECT** 2341: *METOC Data Acquisition*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
METOC Future Mission Capabilities (FMC)				
Geospacial Information and Services (GI&S) System Development / Demonstration:	1	2011	4	2014
Tactical Environmental Processor (TEP) Development / Demonstration:	1	2011	4	2011
Through-the-Sensor (TTS) Development / Demonstration: FY11	1	2011	4	2011
Through-the-Sensor (TTS) Development / Demonstration: FY13-15	1	2013	4	2015
Ocean-Atmos Acquisition & Processing Development / Demonstration:	1	2011	4	2017

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2342.: *METOC Data Assimilation and Mod*	

COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
2342.: *METOC Data Assimilation and Mod*	14.750	10.636	14.127	-	14.127	14.875	17.654	18.127	20.586	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

The meteorological and oceanographic (METOC) Data Assimilation Project is a multi-faceted project that provides future mission capabilities for warfighters to characterize the physical environment within their battlespace. This project includes: 1) development, demonstration and validation of atmospheric and oceanographic data assimilation techniques, forecast models, database management systems, and associated software for use in both mainframe and tactical scale computers. Included are numerical oceanographic and atmospheric models for the Large Scale Computers at the Navy Fleet Numerical Meteorology and Oceanography Center (FNMOC), Monterey, CA and the Naval Oceanographic Office (NAVO), Stennis Space Center, MS. These models, combined with a global communications network for data acquisition and distribution, form a prediction system which provides METOC data and products necessary to support naval operations worldwide in virtually every mission area; 2) other models, which focus on ocean thermal structure and circulation, and surf and tide prediction; 3) techniques to process and manage satellite remotely-sensed environmental data at Oceanography Centers ashore and on ships equipped with the AN/SMQ-11 satellite receiver/recorder; 4) future METOC and environmental satellite data readiness and risk reduction preparations to develop hardware and software that will allow ground stations to receive, ingest and exploit satellite data including the National Polar Orbiting Operational Environmental Satellite System (NPOESS) Preparatory Project (NPP), the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) Polar Systems' Meteorological Operational satellites A & B (METOP-A & B), Joint Polar Satellite System (JPSS), and Defense Meteorological Satellite Program (DMSP). These techniques allow for the integration and tactical application of significant oceanographic and atmospheric data derived from satellite-borne sensors. Satellite and unmanned sensor data, combined with manned platform data are foundational to a robust numerical weather and oceanographic modeling capability that predicts battlespace conditions impacting fleet and adversary weapon and sensor performance. Included are techniques and algorithms for the processing of sensor measurements, conversion of raw signal data to geophysical information, analysis schemes encompassing Artificial Intelligence and Expert Systems, and other satellite data applications and field validation of end products; and, 5) a family of acoustic system performance models beginning with active system models and databases in the low-, mid-, and high-frequency regimes and culminating with high fidelity simulation products. As weapons and sensors become more sophisticated and complex, the marine environment has an increasingly significant impact on system performance. Operational limitations induced by the ocean and atmosphere must be understood, and the resulting constraints on mission effectiveness and system employment minimized. Hence, the operating forces require more accurate worldwide forecasts of METOC conditions with increased temporal and spatial resolution. An additional challenge is posed by the emergence of new satellite sensor data. In order to fully exploit this dynamic and massive volume of data, modern Data Base Management Systems are required, and must be tailored for individual computer configurations at both FNMOC and NAVO. Improved representation of smaller-scale phenomena, particularly in the littoral, is also an important consideration. Intelligence Preparation of the Environment Sensor R&D to meet Chief of Naval Operations and Commander, Fleet Forces Command requirements for remote autonomous, clandestine, littoral battlespace sensing in near shore areas in support of Sea Shield & Sea Basing.

Major emphasis areas include the Meteorological and Oceanographic Future Mission Capabilities (METOC) the Meteorological and Oceanographic (METOC) Space-Based Sensing Capabilities, and the Tactical Oceanographic Capabilities / Under Sea Warfare projects.

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2342.: *METOC Data Assimilation and Mod*

FY 2013 request provides for continued advanced component development and prototype efforts associated with advanced data assimilation into environmental prediction systems (to include development of tactical decision aids and asset allocation tools), the continued development of advanced oceanographic and atmospheric prediction systems and architectures to provide improved forecasts and estimates of product accuracies, continued development of improved data fusion techniques, data quality control technologies and accelerate the automation prediction processes, and the development of data assimilation and fusion techniques and technologies for tactical radars, remote sensing and undersea sensor systems.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: Littoral Battlespace Sensing, Unmanned Undersea Vehicle (LBS-UUV)	0.473	-	-
Articles:	0		
FY 2011 Accomplishments: Developed advanced Littoral Battlespace Sensing, Glider (LBS-G) and Littoral Battlespace Sensing, Autonomous Undersea Vehicle (LBS-AUV) data fusion efforts. Demonstrated prototype mission planning and adaptive sampling capability at the Naval Oceanographic Office (NAVOCEANO). Began integration of advanced quality control algorithms as required into the LBS-AUV program as part of its Engineering and Manufacturing Development (EMD) phase. Continued the LBS-AUV EMD Phase.			
Title: Meteorological and Oceanographic (METOC) Future Mission Capabilities (FMC)	5.907	4.758	4.746
Articles:	0	0	0
FY 2011 Accomplishments: Continued advanced component development and prototype efforts associated with advanced data assimilation into environmental prediction systems, to include development of tactical decision aids and asset allocation tools. Continued development of advanced oceanographic and atmospheric prediction systems and architectures to provide improved forecasts and estimates of product accuracies. Continued development of improved data fusion techniques, data quality control technologies and accelerate the automation of and visualization of prediction processes leading to improved weapon and sensor allocation decisions. Continued to develop data assimilation and fusion techniques and technologies for tactical radars, remote sensing and undersea sensor systems. Continued development of network integration capability and continue to develop systems engineering plans, requirements, standards, studies, and other documentation supporting integration of these products. Continued development of advanced data assimilation and data quality control algorithms for glider and Autonomous Undersea Vehicles (AUVs) data including, temperature, depth, salinity, optics, hydrographic, bathymetric and other water column and ocean bottom properties.			
FY 2012 Plans: Continue advanced component development and prototype efforts associated with advanced data assimilation into environmental prediction systems, to include development of tactical decision aids and asset allocation tools. Continue development of advanced oceanographic and atmospheric prediction systems and architectures to provide improved forecasts and estimates of product accuracies. Continue development of improved data fusion techniques, data quality control technologies and accelerate the			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2342.: *METOC Data Assimilation and Mod*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
automation of prediction processes. Continue to develop data assimilation and fusion techniques and technologies for tactical sensors, remote sensing and undersea sensor systems. Continue to develop Meteorological & Oceanographic (METOC) and Geospatial Information & Services (GI&S) fusion algorithms and demonstrate reach-back fusion capability. ***FY 2013 Plans:*** Continue development of advanced oceanographic and atmospheric prediction systems and architectures to provide improved forecasts and estimates of product accuracies. Continue development of improved data fusion techniques, data quality control technologies and accelerate the automation of prediction processes using data from tactical sensors, remote sensing and undersea sensor systems. Continue to develop METOC and GI&S fusion algorithms and demonstrate reach-back capability.			
Title: Meteorological and Oceanographic (METOC) Space-Based Sensing Capabilities	4.790	2.787	3.264
Articles:	0	0	0
FY 2011 Accomplishments: Began development of the satellite data assimilation algorithms using National Polar Orbiting Operational Environmental Satellite System Preparatory Project (NPP) data. Continued development of techniques for the assimilation of data from current and future civil, military and international earth observing systems. Continued research and development of data assimilation processes and advanced modeling techniques for ingesting satellite sensor data. ***FY 2012 Plans:*** Continue development of the data processing and data assimilation algorithms using NPP, Meteorological Operational satellite program (MetOp), and Defense Meteorological Satellite Program (DMSP) satellite data. Continue development of techniques for the assimilation of data from current and future civil, military and international earth observing systems. Conduct research and development of data processing techniques, data assimilation processes and advanced modeling methodologies utilizing satellite sensor data to generate METOC products. Prepare to utilize data from follow-on DoD Satellites to develop METOC products. ***FY 2013 Plans:*** Continue research and development of data processing and data assimilation algorithms utilizing NPP, MetOp, and DMSP satellite data. Begin assimilation of Meteorological satellite data from other Federal non-DOD, commercial, and foreign earth observing satellite systems. Prepare to ingest data from Joint Polar Satellite System (JPSS) and Defense Weather Satellite System (DWSS) program satellites.			
Title: Tactical Oceanographic Capabilities (TOC) / Undersea Warfare (USW)	3.580	3.091	3.117
Articles:	0	0	0
FY 2011 Accomplishments: Continued to develop decision tool mission planning modules to optimize deployment of both environmental data collection assets and tactical Undersea Warfare (USW) acoustic and non-acoustic sensors. Continued to refine and validate USW-			

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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013

related performance assessment and decision products for use at the Naval Oceanographic Office's (NAVOCEANO's) Anti-Submarine Warfare Reachback Cell (ASW RBC) and in USW decision tools. Continued spiral development of active and passive acoustic propagation loss models for use in fleet mission planning systems supporting mono- and multistatic USW operations. Continued technology upgrades to transmission loss acceleration algorithms. Continued to develop algorithms that characterize acoustic loss/scatter functions as observed by active tactical sonar systems. Developed sea surface and seabed boundary interaction characterizations to support sensor performance predictions. Expanded capabilities and increased access speed of acoustic surface scattering and loss modules. Continued to develop directional and omnidirectional regional ambient noise characterization and forecasting tools. Continued to populate/upgrade oceanographic and acoustic databases in Combatant Commanders' (COCOM) areas of interest. Continued to transition algorithms that capture and communicate variability and uncertainty, robustness and sensitivity as input to Fleet ASW decision tools and underlying models and data bases. Developed an ASW RBC ocean model assessment toolkit. Developed post-USW event Reconstruction and Analysis (R&A) validation tools and capabilities. Began capability upgrades and validation of electro-optic performance prediction systems.

FY 2012 Plans:

Continue visualization and decision tool development that assist USW warfighters to optimally deploy assets equipped with both acoustic and non-acoustic sensors and to take advantage of prevailing environmental conditions. Continue to refine and validate USW-related performance surface and decision products for use afloat and at reachback cells to determine appropriate tactical Courses of Action (COAs) in ASW. Continue population/upgrade of oceanographic, acoustic and geoacoustic databases in COCOM areas of interest. Transition algorithms that capture and communicate variability and uncertainty contained in the output of underlying model and data base components of ASW Tactical Decision Aids (TDAs.) Expand capabilities and increase access speed of acoustic surface scattering and loss modules. Populate/upgrade oceanographic and acoustic databases in COCOM areas of interest. Continue development of an ASW RBC ocean model assessment toolkit. Develop methodologies that characterize and forecast bioacoustic volume attenuation and scatter functions as observed by the Navy's active hull-mounted sonar systems. Develop and transition the environmental components of Mine Warfare (MIW) TDAs in use by the U.S. Navy's MIW Forces and Naval Oceanography enterprise (NOe) personnel supporting them. Document autonomous underwater vehicle (AUV) technology demonstrations that measure in-situ geoacoustic data. Deliver a prototype bottom backscatter database to NAVOCEANO. Provide technical support to NAVOCEANO in updating bottom loss data bases for sonar performance predictions.

FY 2013 Plans:

Continue decision tool development that assist USW warfighters to optimally deploy assets equipped with acoustic sensors and to take advantage of prevailing environmental conditions. Continue to refine and validate USW-related performance surface and decision products for use afloat and at reachback cells to determine appropriate tactical Courses of Action (COAs) in ASW. Continue population/upgrade of oceanographic, acoustic and geoacoustic databases in COCOM areas of interest. Transition algorithms that capture and communicate variability and uncertainty contained in the output of underlying model and data base components of ASW TDAs. Expand capabilities and increase access speed of acoustic surface scattering and loss

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
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B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
modules. Continue development of an ASW RBC ocean model assessment toolkit. Continue development of methodologies that characterize and forecast bioacoustic volume attenuation and scatter functions as observed by the Navy's active hull-mounted sonar systems. Continue to develop and transition the environmental components of MIW TDAs in use by the U.S. Navy's MIW Forces and NOe personnel supporting them.			
Title: Earth System Prediction Capability (ESPC) ***Articles:*** ***FY 2013 Plans:*** The Earth System Prediction Capability (ESPC) program provides a more accurate global ocean and atmospheric forecast system with longer skillful forecast times through integrating and coupling atmosphere, ocean, ice, land and near-space forecast models into a seamless prediction system that reduces errors in the current modeling suite. Additionally it will develop a National common modeling architecture to improve cross-Agency collaboration, and a greatly more efficient computational architecture to allow for real-time operational prediction. In 2013, a common model architecture and standards will be initiated, demonstration plans will be developed, and science workshops and early benchmark testing will be conducted. Long range program goal is advanced skillful forecast (relative to averaged climatology) from the operational capability, currently 7-10 days, to 30 days and longer. Provides the Navy component to match a National R&D initiative across the major U.S. National Operational Prediction Centers at Navy, NOAA, and DOE	-	-	3.000 0
Accomplishments/Planned Programs Subtotals	14.750	10.636	14.127

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
• OPN/4226: *METEOROLOGICAL EQUIPMENT*	25.442	30.278	18.339	0.000	18.339	20.154	20.831	20.528	20.926	Continuing	Continuing
• RDTEN/0604218N/2345: *FLEET METOC EQUIPMENT*	3.987	4.436	2.615	0.000	2.615	2.751	2.865	2.821	2.872	Continuing	Continuing
• RDTEN/0603207N/2341: *METOC DATA ACQUISITION*	14.719	6.073	6.702	0.000	6.702	6.724	6.886	6.845	6.958	Continuing	Continuing
• RDTEN/0604218N/2346: *METOC SENSOR ENGINEERING*	1.509	1.486	1.445	0.000	1.445	1.490	1.506	1.517	1.543	Continuing	Continuing
• RDTEN/0305160N/0524: *NAVY METOC SUPPORT (SPACE)*	0.851	0.904	0.810	0.000	0.810	0.829	0.876	0.887	0.902	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
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D. Acquisition Strategy

Acquisition, management and contracting strategies to support the METOC Data Assimilation Project which is a multi-faceted program which includes: 1) development, demonstration and validation of atmospheric and oceanographic data assimilation techniques, forecast models, database management systems, and associated software for use in both mainframe and tactical scale computers; 2) other models, which focus on ocean thermal structure and circulation, and surf and tide prediction; 3) techniques to process and manage satellite remotely-sensed environmental data at Oceanography Centers ashore and on ships equipped with the AN/SMQ-11 satellite receiver/recorder; and, 4) a family of acoustic system performance models beginning with active system models and databases in the low-, mid-, and high-frequency regimes and culminating with high fidelity simulation products.

E. Performance Metrics

Goal: Develop techniques and tools to assimilate meteorological and oceanographic (METOC) data in order to improve the accuracy of global and regional scale meteorological and oceanographic forecast models. Data assimilation is expanded to include new in-situ and remotely-sensed data types, based on operational need. Tasks are directed toward advanced techniques enabling assimilation of disparate sources on non-synoptic time scales. Acoustic, atmospheric, and oceanographic model development, prototyping and transition is focused on improved model physics, increased resolution, and computational efficiency.

Metric: Tasks will address no less than 75% of applicable capability gaps and requirements.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy			DATE: February 2012
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
METOC Future Mission Capabilities	WR	NRL:Washington DC	108.619	4.644	Oct 2011	4.646	Oct 2012	-		4.646	Continuing	Continuing	Continuing
METOC Future Mission Capabilities	WR	SSCs:California, South Carolina	2.272	-		-		-		-	Continuing	Continuing	Continuing
METOC Future Mission Capabilities	Various	Various:Various	41.183	-		-		-		-	0.000	41.183	
METOC Future Mission Capabilities	C/FP	Univ. S. Miss.:Mississippi	2.413	-		-		-		-	0.000	2.413	
METOC Space-Based Sensing Capabilities	WR	NRL:Washington, DC	4.608	2.445	Oct 2011	2.939	Oct 2012	-		2.939	Continuing	Continuing	Continuing
Tactical Oceanography Capabilities / Undersea Warfare	WR	NRL:Washington, DC	2.130	1.851	Oct 2011	1.786	Oct 2012	-		1.786	Continuing	Continuing	Continuing
Tactical Oceanography Capabilities / Undersea Warfare	C/FP	University of Texas:TX	0.700	0.598	Dec 2011	0.693	Dec 2012	-		0.693	Continuing	Continuing	Continuing
Tactical Oceanography Capabilities / Undersea Warfare	WR	NSWC Carderock:West Bethesda, MD	0.450	0.399	Oct 2011	0.383	Oct 2012	-		0.383	Continuing	Continuing	Continuing
Tactical Oceanography Capabilities / Undersea Warfare	WR	NAVOCEANO:Mississippi	0.300	0.249	Oct 2011	0.255	Oct 2012	-		0.255	Continuing	Continuing	Continuing
Earth Systems Prediction Capability (SPAWAR)	WR	NRL:Washington DC	-	-		-		-		-	Continuing	Continuing	Continuing
Earth Systems Prediction Capability (ONR)	WR	NRL:Washington DC	-	-		2.100	Oct 2012	-		2.100	Continuing	Continuing	Continuing
ESPC	Various	Various:Various	-	-		0.900	Oct 2012	-		0.900	Continuing	Continuing	Continuing
		Subtotal	162.675	10.186		13.702		-		13.702			

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy		DATE: February 2012
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Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
METOC Future Mission Capabilities	C/CPIF	SSA/CSC:MISC	0.295	-		-		-		-	0.000	0.295	
Littoral Battlespace Sensing - Autonomous Undersea Vehicle	C/FP	SAIC:Virgina	0.473	-		-		-		-	0.000	0.473	
METOC Future Mission Capabilities	C/FP	SAIC:Virgina	0.200	0.150	Nov 2011	0.100	Nov 2012	-		0.100	Continuing	Continuing	Continuing
		Subtotal	0.968	0.150		0.100		-		0.100			

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Acquisition Workforce	Various	Not Specified:Not Specified	0.090	-		-		-		-	0.000	0.090	
METOC Space-Based Sensing Capabilities	C/FP	BAH:Virgina	0.400	0.300	Nov 2011	0.325	Nov 2012	-		0.325	Continuing	Continuing	Continuing
		Subtotal	0.490	0.300		0.325		-		0.325			

	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	164.133	10.636		14.127		-		14.127			

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603207N: *Air/Ocean Tactical Applications*	**PROJECT** 2342.: *METOC Data Assimilation and Mod*

Exhibit R-4, RDT&E Schedule Profile: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2342.: *METOC Data Assimilation and Mod*

Exhibit R-4, RDT&E Schedule Profile: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2342.: *METOC Data Assimilation and Mod*

Exhibit R-4, RDT&E Schedule Profile: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603207N: *Air/Ocean Tactical Applications*	**PROJECT** 2342.: *METOC Data Assimilation and Mod*

Exhibit R-4A, RDT&E Schedule Details: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603207N: *Air/Ocean Tactical Applications*	**PROJECT** 2342.: *METOC Data Assimilation and Mod*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
METOC Future Mission Capabilities (FMC)				
ESPC Coupled Data Assimilation into Environmental Prediction:	1	2013	4	2017
METOC FMC: Data Assimilation Into Environmental Prediction Systems:	1	2011	4	2017
ESPC Development Global Coupled Environmental Models:	1	2013	4	2017
METOC FMC: Develop Oceanographic and Atmospheric Forecast Models:	1	2011	4	2017
ESPC Advanced Computational Architectures:	1	2014	4	2017
METOC FMC: Oceanographic and Atmospheric Forecast Model Data Assimilation:	1	2011	4	2014
ESPC Demonstrate Extended Range Prediction:	1	2014	4	2017
METOC FMC: Demonstrate TEP Reachback Fusion Capability:	1	2014	4	2016
METOC FMC: Oceanographic and Atmospheric Forecast Model Network Integration:	1	2011	4	2011
METOC Space-Based Sensing Capabilities				
NPP: Dev. NPP Data Algorithims:	1	2011	4	2015
NPP: NPP Launch:	4	2011	4	2011
METOP: Dev. METOP Data Algorithims:	1	2011	4	2017
METOP: METOP-A Launch:	2	2011	2	2011
METOP: METOP-B Launch:	2	2012	2	2012
METOP: METOP-C Launch:	1	2016	1	2016
EUMETSAT: Dev. EUMETSAT Data Algorithims:	1	2013	4	2017
EUMETSAT: EUMETSAT Launch:	3	2015	3	2015
GOES-R: Dev. GOES-R Algorithims:	1	2014	4	2017
GOES-R: GOES-R Launch:	2	2016	2	2016
GCOM-W2: Dev. GCOM-W2 Algorithims:	1	2014	3	2017

Exhibit R-4A, RDT&E Schedule Details: PB 2013 Navy		DATE: February 2012
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	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
GCOM-W2: GCOM-W2 Launch:	1	2016	1	2016
Sentinel: Dev. Sentinel 3B Algorithims:	1	2015	4	2017
Sentinel: Sentinal 3B Launch:	2	2017	2	2017
DWSS: Dev. DWSS Algorithims:	1	2015	4	2017
Tactical Oceanographic Capabilities (TOC) / Undersea Warfare (USW)				
Asset Allocation & Mission Planning: ASW TDA deliveries:	1	2011	4	2016
Asset Allocation & Mission Planning: TDA deliveries: ASW TDA Delivery 1	1	2012	1	2012
Asset Allocation & Mission Planning: TDA deliveries: ASW TDA Delivery 2	4	2014	4	2014
Asset Allocation & Mission Planning: TDA deliveries: ASW TDA Delivery 3	2	2016	2	2016
Asset Allocation & Mission Planning: RBC deliveries: ASW RBC Delivery 1	3	2013	3	2013
Asset Allocation & Mission Planning: RBC deliveries: ASW RBC Delivery 2	2	2015	2	2015
Acoustic Performance Surface Toolset: Page/Group/Row:	1	2011	4	2017
Acoustic Performance Surface Toolset: Acoustic Performance Surface Toolset v2:	4	2011	4	2011
Acoustic Performance Surface Toolset: NEXGEN Stochastic Bond Tier II/III Acoustic Toolsets: NEXGEN Stochastic Bond Tier II/III Acoustic Toolset 1	3	2013	3	2013
Acoustic Performance Surface Toolset: NEXGEN Stochastic Bond Tier II/III Acoustic Toolsets: NEXGEN Stochastic Bond Tier II/III Acoustic Toolset 2	3	2015	3	2015
Acoustic Performance Surface Toolset: NEXGEN Stochastic Bond Tier II/III Acoustic Toolsets: NEXGEN Stochastic Bond Tier II/III Acoustic Toolset 3	3	2017	3	2017
Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades:	1	2011	4	2017
Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades: CASS/ASPM/NSPE Upgrade 1	1	2011	1	2011
Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades: CASS/ASPM/NSPE Upgrade 2	2	2012	2	2012
Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades: CASS/ASPM/NSPE Upgrade 3	4	2013	4	2013

Exhibit R-4A, RDT&E Schedule Details: PB 2013 Navy		DATE: February 2012
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	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades: CASS/ASPM/NSPE Upgrade 4	3	2014	3	2014
Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades: CASS/ASPM/NSPE Upgrade 5	2	2015	2	2015
Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades: CASS/ASPM/NSPE Upgrade 6	1	2016	1	2016
Acoustic Model Upgrades: CASS/ASPM/NSPE Upgrades: CASS/ASPM/NSPE Upgrade 7	4	2017	4	2017
Descriptive Dynamic Oceanography Assessment Tool: ARCOAS Deliveries:	1	2011	4	2013
Descriptive Dynamic Oceanography Assessment Tool: ARCOAS Deliveries: ARCOAS Delivery 3	4	2011	4	2011
Descriptive Dynamic Oceanography Assessment Tool: ARCOAS Deliveries: ARCOAS Delivery 4	4	2012	4	2012
Descriptive Dynamic Oceanography Assessment Tool: ARCOAS Deliveries: ARCOAS Delivery 5	4	2013	4	2013
STAPLE Upgrades:	1	2011	4	2017
STAPLE Upgrades: STAPLE Delivery 5	4	2011	4	2011
STAPLE Upgrades: STAPLE Delivery 6	4	2012	4	2012
STAPLE Upgrades: STAPLE Delivery 7	4	2013	4	2013
STAPLE Upgrades: STAPLE Delivery 8	4	2014	4	2014
STAPLE Upgrades: STAPLE Delivery 9	4	2015	4	2015
STAPLE Upgrades: STAPLE Delivery 10	4	2016	4	2016
STAPLE Upgrades: STAPLE Delivery 11	4	2017	4	2017
Boundary Interaction Algorithims:	1	2011	4	2014
Boundary Interaction Algorithims: SESSS Algorithm Upgrade	2	2011	2	2011
Boundary Interaction Algorithims: TOTLOSS Algorithm	4	2012	4	2012
Boundary Interaction Algorithims: TOTLOSS/SCATTER Algorithm Delivery	4	2014	4	2014

Exhibit R-4A, RDT&E Schedule Details: PB 2013 Navy		DATE: February 2012
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	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
TOC/USW (Cont.)				
ASW R&A: NOe ASW Product V&V:	1	2011	4	2011
ASW R&A: NOe ASW Product V&V: NOe ASW Product V&V	4	2011	4	2011
ASW R&A: Ambient Noise Characterization:	1	2011	4	2011
ASW R&A: AN Archive:	4	2011	4	2011
ASW R&A: AN GIS Forecast Tool:	3	2011	3	2011
ASW R&A: Bottom Backscatter Database:	1	2011	4	2011
ASW R&A: Bottom Backscatter Database: NAVOCEANO Delivery	3	2011	3	2011
ASW R&A: Bioacoustic Volume Attenuation and Scatter Effors:	1	2011	4	2017
ASW R&A: Bioacoustic Volume Attenuation and Scatter Effors: Documentation Delivery	3	2012	3	2012
ASW R&A: Bioacoustic Volume Attenuation and Scatter Effors: VSS Database Upgrade 1	4	2014	4	2014
ASW R&A: Bioacoustic Volume Attenuation and Scatter Effors: VSS Database Upgrade 2	4	2016	4	2016
ASW R&A: Bioacoustic Volume Attenuation and Scatter Effors: Bioacoustic Forecast Capability 1	4	2015	4	2015
ASW R&A: Bioacoustic Volume Attenuation and Scatter Effors: Bioacoustic Forecast Capability 2	4	2017	4	2017
SME Support to NAVOCEANO Bottom Loss Database Upgrades:	1	2011	4	2012
SME Support to NAVOCEANO Bottom Loss Database Upgrades: HFBL Low Grazing Angle	4	2011	4	2011
SME Support to NAVOCEANO Bottom Loss Database Upgrades: HFBL Horizontal Variability	4	2012	4	2012
MIW TDA Support: Medal METOC Capability:	1	2011	4	2016
MIW TDA Support: Medal METOC Capability: MEDAL METOC Capability 1	3	2011	3	2011
MIW TDA Support: Medal METOC Capability: MEDAL METOC Capability 2	4	2012	4	2012

Exhibit R-4A, RDT&E Schedule Details: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603207N: *Air/Ocean Tactical Applications*	**PROJECT** 2342.: *METOC Data Assimilation and Mod*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MIW TDA Support: Medal METOC Capability: MEDAL METOC Capability 3	3	2013	3	2013
MIW TDA Support: Medal METOC Capability: MEDAL METOC Capability 4	4	2014	4	2014
MIW TDA Support: Medal METOC Capability: MEDAL METOC Capability 5	3	2015	3	2015
MIW TDA Support: Medal METOC Capability: MEDAL METOC Capability 6	4	2016	4	2016
MIW TDA Support: DPMA builds: DPMA Build 3	2	2011	2	2011
MIW TDA Support: DPMA builds: DPMA Build 4	3	2012	3	2012
MIW TDA Support: DPMA builds: DPMA Build 5	4	2013	4	2016

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2343: *Tactical METOC Applications*	

COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
2343: *Tactical METOC Applications*	12.226	9.562	9.172	-	9.172	5.453	13.960	19.509	16.231	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

The Tactical Meteorological and oceanographic (METOC) Applications Project provides future operational effects decision aid capabilities for Navy and Marine Corps warfighters in the context of Joint Operations in a net-centric environment. This project identifies and transitions state-of-the-art decision support software technologies from the government's and commercial Industry's technology base and then demonstrates and validates these capabilities before fielding. These software decision support tools provide platform, sensor, communications, and weapon systems performance assessments for warfighters in terms of their littoral and deep-strike battlespace environments. These assessments allow mission planners and warfighters, from the unit to theater level, to optimize their sensor employment on airborne, surface, and subsurface platforms in support of all Naval Composite Warfare mission areas including Undersea Warfare (USW), Anti-Submarine Warfare (ASW), Mine Warfare, Amphibious Warfare (AMW), Anti-Surface Warfare (ASUW), Anti-Air Warfare (AAW), Strike Warfare (STW), and Naval Special Warfare (NSW). Performance assessments leading to improvements in operational and tactical control are conducted through a two-tiered approach: 1) METOC Decision Aids (MDAs) and, 2) Operational Effects Decision Aids (OEDAs). MDAs consist of a series of analysis tools which characterize the physical environment conditions of the battlespace based on the best set of physical environment data available at the time (i.e., some combination of historical and/or real-time (or near real-time) in-situ, and numerically modeled forecast data). OEDAs then use the MDA information by fusing it with relevant, often-classified sensor and target data to predict how own-force weapons and sensor systems will perform against hostile targets. Performance results are displayed in tabular and graphic formats integrated into net-centric visualization tools for use by mission planners and combat/weapon system operators to develop localization plans, USW/AAW/ASUW screens, STW profiles, AMW ingress and egress points, and for other warfare considerations. MDAs and OEDAs typically use data derived from sensors developed in Project 2341 (METOC Data Acquisition) and assimilated by software produced by Project 2342 (METOC Data Assimilation and Modeling). MDAs and OEDAs also use data obtained through direct interfaces to Navy combat systems. A current emphasis area of the project is capabilities required to characterize and/or predict sensor and weapons system performance in the highly complex littoral environments in support of regional conflict scenarios. It addresses multi-warfare areas, particularly shallow water ASW, NSW, and missile and air defense/strike capabilities.

The major emphasis of this project is the software only Naval Integrated Tactical Environmental System Next Generation (NITES-Next) program of record.

FY 2013 request provides for the continuation of NITES-Next Release 1 software development efforts including extensive system architecture, and testing efforts.

Beginning in FY14 the Navy has resumed all Naval Integrated Tactical Environmental System Next Generation (NITES-Next) program development efforts.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: Naval Integrated Tactical Environmental System Next Generation (NITES-Next)	12.226	9.562	9.172
Articles:	0	0	0

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2343: *Tactical METOC Applications*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
FY 2011 Accomplishments: Continued the development of NITES-Next Release 1 (R1) system architecture, system engineering, and software, including integration with next generation Electromagnetic and Electro-optical (EM/EO) and performance prediction systems. Conducted NITES-Next Release 1 Preliminary Design Review (PDR) involving lab, fleet and site testing and early Commander, Operational Test & Evaluation Force (COMOPTEVFOR) involvement. ***FY 2012 Plans:*** Continue software Engineering and Manufacturing Development (EMD) efforts for NITES-Next R1. Conduct NITES-Next R1 Critical Design Review (CDR). Continue the development of NITES-Next R1 system design including the software architecture design. Begin NITES-Next R1 software development phase. Begin preparation for all Test Readiness Reviews (TRR), Developmental Test and Evaluation (DT&E), and Initial Operational Test and Evaluation (IOT&E) efforts scheduled for FY 2013. Begin preparations for the award of the NITES-Next Release 2 contract option. Begin R1 contractor developmental test and evaluation activities. ***FY 2013 Plans:*** Continue software EMD efforts for NITES-Next R1. Continue NITES-Next R1 developmental system test activities in preparation for Milestone C. Conduct R1 TRR, DT&E, IOT&E and Software Verification Review. Conduct preparations for the deployment, fielding and sustainment of R1. Conduct preparations for both the award of the NITES-Next Release 2 (R2) contract option and the R2 software requirements development phase. Conduct preparations for NITES-Next Milestone C.			
Accomplishments/Planned Programs Subtotals	12.226	9.562	9.172

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

Acquisition, management and contracting strategies are to support the Tactical METOC Applications project to continue the development of state-of-the-art software capabilities that provide sensor, communication, and weapon system performance assessments across the full spectrum of open ocean and littoral operating environments, meteorology and oceanography , all with management oversight incorporating these into the Naval Integrated Tactical Environmental System Next Generation program under Joint Capabilities Integration and Development System (JCIDS) by the Department of the Navy (DoN).

E. Performance Metrics

Goal: Develop meteorological and oceanographic (METOC) future operational effects decision aid capabilities for Navy and Marine Corps war fighters in order to facilitate the characterization and prediction of the entire battle space.

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2343: *Tactical METOC Applications*

Metric: Improve the accuracy of meteorological and oceanographic tactical decision aids and applications in order to address no less than 75% of applicable capability gaps and requirements.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2343: *Tactical METOC Applications*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	WR	NRL:Washington, DC	3.893	-		-		-		-	0.000	3.893	
NITES/NITES-Next	WR	SSCs:California, South Carolina	8.673	-		-		-		-	Continuing	Continuing	Continuing
NITES/NITES-Next	Various	Various:Various	5.775	-		-		-		-	0.000	5.775	
NITES	Various	Various:Various	61.400	-		-		-		-	0.000	61.400	
NITES-Next	C/CPIF	GD-IT:Virginia	25.551	7.387	Nov 2011	7.245	Nov 2012	-		7.245	Continuing	Continuing	Continuing
NITES-Next	WR	NAVOCEANO:Mississippi	0.125	0.125	Oct 2011	0.200	Oct 2012	-		0.200	Continuing	Continuing	Continuing
NITES-Next	WR	SSC Pacific:San Diego, CA	-	0.700	Oct 2011	0.491	Oct 2012	-		0.491	0.000	1.191	
		Subtotal	105.417	8.212		7.936		-		7.936			

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Support Cost	C/CPIF	IPD:Various	0.595	-		-		-		-	0.000	0.595	
NITES-Next	C/FP	SAIC:Virgina	1.600	0.950	Nov 2011	0.878	Nov 2012	-		0.878	Continuing	Continuing	Continuing
NITES-Next	C/FP	NAVAIR:Maryland	0.125	-		-		-		-	0.000	0.125	
		Subtotal	2.320	0.950		0.878		-		0.878			

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Acquisition Workforce	Various	Various:Various	0.031	-		-		-		-	0.000	0.031	
NITES-Next	WR	SSC Pacific:San Diego, CA	-	0.100	Oct 2011	0.100	Oct 2012	-		0.100	Continuing	Continuing	Continuing
NITES-Next	C/FP	BAH:Virgina	0.400	0.300	Nov 2011	0.258	Nov 2012	-		0.258	Continuing	Continuing	Continuing
		Subtotal	0.431	0.400		0.358		-		0.358			

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2343: *Tactical METOC Applications*	

	Total Prior Years Cost	FY 2012		FY 2013 Base		FY 2013 OCO		FY 2013 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	108.168	9.562		9.172		-		9.172			

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2343: *Tactical METOC Applications*

Exhibit R-4A, RDT&E Schedule Details: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2343: *Tactical METOC Applications*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Naval Integrated Tactical Environmental System Next Generation (NITES-Next)				
Milestones: MS C	4	2013	4	2013
Milestones: IOC	2	2014	2	2014
Contract Actions: Base Option	1	2011	4	2013
Contract Actions: Contract Option 1 Award	4	2013	4	2013
Contract Actions: Option 1	1	2014	4	2017
System Engineering Phase: SW Design 0001	1	2011	4	2011
System Engineering Phase: SW Development 0001	1	2012	4	2012
System Engineering Phase: System Test 0001	4	2012	4	2013
System Engineering Phase: SW Requirments 0101	1	2014	3	2014
System Engineering Phase: Software Design 0101	4	2014	3	2015
System Engineering Phase: SW Development 0101	4	2015	3	2016
System Engineering Phase: System Test 0101	4	2016	3	2017
System Development & Demonstration, Production & Deployment: Software Release 1:	1	2011	4	2013
System Development & Demonstration, Production & Deployment: Software Release 1: Release 1: Production Design Review (PDR)	2	2011	2	2011
System Development & Demonstration, Production & Deployment: Software Release 1: Release 1: Critical Design Review (CDR)	1	2012	1	2012
System Development & Demonstration, Production & Deployment: Software Release 1: Release 1: Technical Readiness Review (TRR)	2	2013	2	2013
System Development & Demonstration, Production & Deployment: Software Release 1: Release 1: Development, Test, & Eval (DT&E)	3	2013	3	2013

Exhibit R-4A, RDT&E Schedule Details: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2343: *Tactical METOC Applications*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
System Development & Demonstration, Production & Deployment: Software Release 1: Release 1: IOT&E	4	2013	4	2013
System Development & Demonstration, Production & Deployment: Software Release 1: Release 1: SVR	4	2013	4	2013
System Development & Demonstration, Production & Deployment: Software Release 2:	1	2014	4	2017
System Development & Demonstration, Production & Deployment: Software Release 2: Release 2: SRR	3	2014	3	2014
System Development & Demonstration, Production & Deployment: Software Release 2: Release 2: Production Design Review (PDR)	1	2015	1	2015
System Development & Demonstration, Production & Deployment: Software Release 2: Release 2: Critical Design Review (CDR)	3	2015	3	2015
System Development & Demonstration, Production & Deployment: Software Release 2: Release 2: Technical Readiness Review (TRR)	1	2017	1	2017
System Development & Demonstration, Production & Deployment: Software Release 2: Release 2: Development, Test, & Eval (DT&E)	2	2017	2	2017
System Development & Demonstration, Production & Deployment: Software Release 2: Release 2: FOT&E	3	2017	3	2017
System Development & Demonstration, Production & Deployment: Software Release 2: Release 2: SVR	4	2017	4	2017
Optional CLINs: Demostration & Software Updates Optional (R&D):	1	2012	4	2017
Optional CLINs: Deployment, Fielding & Sustainment Optional (OMN):	1	2014	4	2017
Optional CLINs: Sustainment Optional CLINs (OMN):	1	2011	4	2017

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2344.: *Precise Timing and Astronomy*	

COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
2344.: *Precise Timing and Astronomy*	1.973	1.025	3.043	-	3.043	2.814	1.923	1.382	0.999	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

The major thrust of the Precise Timing and Astrometry Project is to provide future capabilities that directly support the mission of the U.S. Naval Observatory (USNO). These future mission capabilities are intended to:

1) address DoD requirements for needed increases in positioning accuracies of modern weapons systems by the determination of star positions (including objects at other than optical wavelengths) and the stellar inertial reference system (to which all navigation, guidance, and positioning systems are ultimately referred); 2) develop techniques for the prediction of the Earth's instantaneous orientation with respect to the stellar inertial reference system; 3) oversee the determination and dissemination of precise time information using the Navy/DoD Master Clock System and precise time distribution networks; and, 4) develop advanced electronic light detectors and interferometry in the optical and infrared wavelength regions for very precise determination of the positions of both faint and bright stars, satellite tracking, and space debris studies. DoD Instruction 5000.2 assigns to the Navy the responsibility for coordinating Precise Time and Time Interval (PTTI) requirements and for maintaining a PTTI reference standard (astronomical and atomic) for use by all DoD Services, Federal agencies, and related scientific laboratories. The Navy is also responsible for providing astronomical data for navigation, positioning, and guidance, including space. Some operational and many emerging requirements surpass current support capabilities.

In response to these DoD requirements, this project transitions Research and Exploratory Development efforts, as well as developments in the civilian sector, into the operational capabilities of the USNO.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: Precise Timing and Astronomy	-	-	3.043
Articles:			0
FY 2013 Plans: Achieve Alternate Master Clock (AMC) Initial Operating Capability (IOC). Complete Full System Capability (FSC) testing and certification of the Rb Fountain MC capability. Complete IOC and Full Operation Capability (FOC) testing of the M-Code Timing receiver. Complete construction and conduct Operational Testing (OT) of the software (SW) correlator. Contract awarded for Very Long Base-Line Interferometry (VLBI) Data Acquisitions System at Kokee Park, HI. The Precise Timing and Astrometry (PTA) Program will focus on replacement and upgrade of the aging VLBI Data Acquisition System (DAS) at Kokee Park, HI. The system will be converted to the new upgraded international standard (VLBI2010). The Data Acquisition System at Kokee Park, HI is a critical US-based member of an international network of VLBI radio telescopes and			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2344.: *Precise Timing and Astronomy*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
associated electronic systems. The VLBI radio telescope data from this telescope is needed for generation of Earth Orientation Parameters and for the Celestial Reference Frame.			
Title: Precision Timing and Astronomy	1.973	1.025	-
Articles:	0	0	
FY 2011 Accomplishments: Continued installation and operational testing of the completed Master Clock (MC) systems installation at U.S. Naval Observatory (USNO), DC and achieved Initial Operating Capability (IOC) of MC installation . Continued development of and began production of the Global Positioning System (GPS)-III M-Code Timing Receiver. Continued the development, installation and testing of electronic Very Long Base-Line Interferometry (eVLBI) wide-band data connectivity capability.			
FY 2012 Plans: Transport Rb Fountain Master Clocks (MC) to the United States Naval Observatory (USNO) Alternate Master Clock (AMC) site. Complete IOC of Rb Fountain MC. Conduct Operational Testing (OT) on the first production of GPS M-Code timing receiver. Complete Critical Design Review (CDR) of software (SW) on correlator VLBI Earth Orientation Parameters and demonstrate SW correlator utilizing wide-band internet transmission of VLBI data from all VLBI sites.			
Accomplishments/Planned Programs Subtotals	1.973	1.025	3.043

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

Acquisition, management and contracting strategies are to support the Precise Timing and Astrometry Project in direct support of the U.S. Naval Observatory in: 1) addressing DoD requirements for needed increases in positioning accuracies of modern weapons systems by the determination of star positions and the stellar inertial reference system ; 2) developing techniques for the prediction of the Earth's instantaneous orientation with respect to the stellar inertial reference system; 3) overseeing the determination and dissemination of precise time information using the Navy/DoD Master Clock System and precise time distribution networks; and, 4) developing advanced electronic light detectors and interferometry in the optical and infrared wavelength regions for very precise determination of the positions of both faint and bright stars, satellite tracking, and space debris studies, all with
management oversight by Program Executive Officer for Command, Control, Communications, Computers, and Intelligence.

E. Performance Metrics

Goal: Address Navy/DoD requirements for needed increases in positioning accuracies of modern weapons systems by the determination of star positions, oversee the determination and dissemination of precise time information using the Navy/DoD Master Clock System and precise time distribution networks.

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2344.: *Precise Timing and Astronomy*

Metric: Measurable progress toward stated GPS-III requirement to meet or exceed a 2 sigma accuracy of 0.5 nanoseconds (ns) for the M Code Rx error and 0.1ns Master Clock error. Improve star position accuracy to within 10 milliarcseconds in support of National Technical Means (classified) program requirements.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2344.: *Precise Timing and Astronomy*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	WR	Naval Observatory:Washington, DC	-	-		3.043	Oct 2012	-		3.043	Continuing	Continuing	Continuing
Product Development	WR	The Naval Observatory:Washington, DC	18.672	1.025	Oct 2011	-		-		-	0.000	19.697	
Precise Timing & Astrometry	Various	Various:Various	19.144	-		-		-		-	0.000	19.144	
		Subtotal	37.816	1.025		3.043		-		3.043			

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Acquisition Workforce	Various	Various:Various	0.099	-		-		-		-	0.000	0.099	
		Subtotal	0.099	-		-		-		-	0.000	0.099	

	Total Prior Years Cost	FY 2012		FY 2013 Base		FY 2013 OCO		FY 2013 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	37.915	1.025		3.043		-		3.043			

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2344.: *Precise Timing and Astronomy*

Exhibit R-4A, RDT&E Schedule Details: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603207N: *Air/Ocean Tactical Applications*	**PROJECT** 2344.: *Precise Timing and Astronomy*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Precise Timing and Astronomy (PTA)				
Master Clock System:	1	2011	4	2017
Master Clock System: Rb Initial Operational Capability (IOC) - Milestone C (MC) Start	4	2011	4	2011
Master Clock System: Rb Initial Operational Capability (IOC) - Milestone C (MC) Finish	1	2012	1	2012
Master Clock System: IOC Rb Alternate Master Clock (AMC)	2	2013	2	2013
Master Clock System: Rb & AMC Initial Operational Capability (IOC) - MC	2	2013	2	2013
Master Clock System: Rb & AMC Full Operational Capability (FOC) - MC	4	2013	4	2013
Master Clock System: Design Optical Prototype	4	2014	4	2014
Master Clock System: Develop Laser	2	2015	2	2015
Master Clock System: Demonstrate Optical Prototype	2	2016	2	2016
GPS M-Code Receiver:	1	2011	4	2013
GPS M-Code Receiver: Preliminary Design Review (PDR)	4	2011	4	2011
GPS M-Code Receiver: Critical Design Review (CDR)	2	2012	2	2012
GPS M-Code Receiver: IOC	2	2013	2	2013
GPS M-Code Receiver: FOC	4	2013	4	2013
Electronic Very Long Base-Line (eVLBL) / Software Correlator:	1	2011	4	2013
Electronic Very Long Base-Line (eVLBL) / Software Correlator: Wide Band (WB) IOC Start	2	2011	2	2011
Electronic Very Long Base-Line (eVLBL) / Software Correlator: Wide Band (WB) IOC Finish	3	2011	3	2011
Electronic Very Long Base-Line (eVLBL) / Software Correlator: SW Correlator Preliminary Design Review (PDR)	4	2011	4	2011
Electronic Very Long Base-Line (eVLBL) / Software Correlator: SW Correlator Contract	3	2012	3	2012

Exhibit R-4A, RDT&E Schedule Details: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 2344.: *Precise Timing and Astronomy*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Electronic Very Long Base-Line (eVLBL) / Software Correlator: Software COR CDR	4	2012	4	2012
Electronic Very Long Base-Line (eVLBL) / Software Correlator: Wide Band (WB) VLBI Ops	4	2012	4	2012
Electronic Very Long Base-Line (eVLBL) / Software Correlator: SW COR FOC	1	2013	1	2013

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 3207: *Fleet Synthetic Training*	

COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
3207: *Fleet Synthetic Training*	3.311	0.968	1.041	-	1.041	1.065	1.086	1.105	1.124	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

Fleet Synthetic Training (FST) provides naval forces with an enhanced in-port training capability. Integrating embedded shipboard training devices, aircraft and submarine simulators into an interoperable network with joint, coalition and interagency partners will provide more effective training for our deploying naval forces.

A key factor in achieving this new way of training our naval forces is to ensure that the required training is based on realistic characterizations of the physical environment. This project develops and delivers software that characterizes the ocean and atmospheric environments; adjusts to meet fleet-required training scenarios; allows synthetic training to be conducted in areas of planned and contingency operations; and, provides sufficient detail to simulate the real-world conditions of the physical environment in those areas of interest.

To support Fleet readiness the Navy has established a persistent training environment. It enables the use of modeling and simulation in support of Fleet Synthetic Training (FST). Navy's Continuous Training Environment (NCTE) satisfies this requirement by providing the infrastructure and connectivity required for distributed simulation-based training, events, and exercises. The Joint Semi-Automated Forces (JSAF) simulation provides the core model for maritime constructive representation and stimulation for Navy Training and Joint Training events.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: Navy Training Baseline Fleet Required Capabilities	1.446	-	-
Articles:	0		
Description: Fleet required capabilities priorities include: 1) Information Operations (IO), 2) Integrated Air and Missile Defense (IAMD), 3) Cross-Domain Solutions (CDS), and 4) Live and Virtual Range Integration. Development efforts to meet priorities 1 through 4 include: Integration of the Navy Information Operations Database (NIODB) into Joint Semi-Automated Forces (JSAF); development of Link-16, Link-11, and Global Command and Control System OTH-GOLD coalition proxies via JBUS; integration of Missile Defense Agency (MDA) threat generation libraries into JSAF, and enhancements to the synthetic command and control capability to manage Link-16 in a tactical training environment. Accomplishments planned include the stability and robustness improvements to support Fleet Synthetic Training. Improved capability of Automated Status Boards and Link 16 Information Display for the Tactical Training Group Schoolhouses. Improved capability of Class III and V Logistics, Theater Battle Management Core Systems mission support interface, and Intel fidelity			

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 3207: *Fleet Synthetic Training*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
(Electronic Intelligent (ELINT)) in support of Navy requirements. Improved capability in support of virtual and constructive users such as: Manned Flight Systems' H-60R and H-60S trainers. ***FY 2011 Accomplishments:*** - Research feasibility of providing live data in support of synthetic training events. - Research implementation of climatology products into Fleet Synthetic Training. - Develop fleet-required capabilities and enhancements to the Navy Continuous Training Environment (NCTE) and Joint Semi-Automated Forces (JSAF) Navy software application baselines.			
Title: DISA MSPP / MPLS Architecture for Fleet Synthetic Training ***Articles:*** ***Description:*** Prototype System. Align NCTE with the new DISA MSPP/MPLS architecture and to continue to influence the build-out of that architecture for optimum support of Fleet Synthetic Training (FST). This is a fundamental imperative to providing a seamless transition from current legacy infrastructures to the improved backbone architectures, the migration to which is mandated starting in 2012 by the Assistant Secretary of Defense for C3, Space, and Spectrum. The Navy Training Baseline JSAF and other Virtual and Constructive components will be correlated with Live players, significantly upgrading common ground truth. Intensified terrain is required for every FST AOR, as the NCTE "world thin" terrain will contain areas of high definition for entities to transit through successfully, resulting in increased planning and developing of scenarios to support wargaming. Order of battle change implementation activities are enhanced reducing developer time; FST planners will be able to use the existing Link-16 model in the Navy Training Baseline JSAF and the supporting services in the NCTE to represent Link-11 platform operations; and FST events and Joint and COCOM wargames that require the use of unclass/releasable JSAF can be supported, enhancing Live, Virtual and Constructive operations. ***FY 2011 Accomplishments:*** Accomplishments include the stability and robustness improvements to support Fleet Synthetic Training. Improved capability of Automated Status Boards and Link-16 Information Display for the Tactical Training Group Schoolhouses. Improved capability of Class III and V Logistics, Theater Battle Management Core Systems mission support interface, and Intel fidelity (Electronic Intelligence (ELINT)) in support of Navy requirements. Improved capability in support of virtual and constructive users such as: Manned Flight Systems' H-60R and H-60S trainers.	0.922 0	-	-
Title: Fleet Synthetic Training ***Articles:***	0.943 0	0.968 0	1.041 0

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 3207: *Fleet Synthetic Training*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013

Description: Develop and deliver software that characterizes the ocean and atmospheric environments; adjusts to meet fleet-required training scenarios; allows synthetic training to be conducted in areas of planned and contingency operations; and, provides sufficient detail to simulate the real-world conditions of the physical environment in those areas of interest.

Accomplishments include development of meteorological and oceanographic environmental databases for total of 10 of 14 Navy Continuous Training Environment (NCTE) exercise areas. Conducted data and architecture testing between CNMOC data and the Environmental Data Cube Support system. Integrated environmental database hosting at the Naval Oceanographic Office. Developed capability to realistically simulate bathythermograph data collection based on synthetic ocean environment for total of 6 of 14 NCTE areas. Enhanced realism of training environment by providing synthetic satellite/radar imagery based on synthetic enviromental data. Made improvements in generating acoustic performance products used by Anti-Submarine Warfare (ASW) white cell and ASW commander staff. Conducted verification and validation of acoustic performance products.

FY 2011 Accomplishments:
* Completed production of environmental archive data for 4-6 NCTE exercise areas per Navy Warfare Development Command (NWDC) specifications
* Increased number of mineable NCTE area
* Refined link between claimancy data architecture and architecture for data provision in support of NCTE as required
* Continued to automate the process for producing acoustic products in support of FST events
* Developed additional synthetic point data and field imagery products (fog ht parameter, synthetic BTs)
* Developed fleet-required capabilities and enhancements to Environmental Data Cube Support System (EDCSS) to support white cell operations and METOC TDA use
* Conducted study to determine validity of adjusting environmental parameters in order to improve customized scenarios

FY 2012 Plans:
* Complete mineability of last 6 NCTE areas
* Research implementation of automated Tactical Oceanographic Forecast products
* Research implementation of additional performance surface capabilities
* Continue to improve Environmental Data Cube Support System (EDCSS) interface in support of environmental product generation
* Research "model on demand" capability
* Develop new products in response to NWDC demand signal
* Increase archives (years) as required

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 3207: *Fleet Synthetic Training*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
* Conduct studies in support of innovative decision superiority products in response to fleet demand ***FY 2013 Plans:*** * Implement automated Tactical Oceanographic Forecast products * Produce additional performance surface capabilities * Continue to improve Environmental Data Cube Support System (EDCSS) interface in support of environmental product generation * Research "model on demand" capability * Develop new products in response to NWDC demand signal * Increase archives (years) as required * Conduct studies in support of innovative decision superiority products in response to fleet demand			
Accomplishments/Planned Programs Subtotals	3.311	0.968	1.041

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

The included technology developments are primarily in-house with contractor participation through existing vehicles.

E. Performance Metrics

1) CNMOC will produce meteorological and oceanographic environmental databases for all Navy Continuous Training Environment (NCTE) exercise areas. Will implement, test, and integrate with JSAF and other federates in accordance with requirements.

2) CNMOC will complete data and architecture integration, including information assurance compliance for provision of synthetic METOC data to the NCTE. Data and products will be available via NEP-Oc, DVD and/or M2M during planning and excution of FST events.

3) CNMOC will produce Tactical Oceanographic Forecast products and bathythermographic data profiles based on synthetic ocean environment and synthetic satellite/radar imagery based on meteorological environmental data for all NCTE exercise areas. Products are utilized in planning and execution of FST events.

4) Navy Warfare Development Command (NWDC) will research and develop the software and associated efforts to include documentation; will design and implement upgrades to Joint Semi-Automated Forces (JSAF) consistent with approved requirements and Change Requests and document the effects of JSAF capabilities (robustness) and stability. Will design, implement, test, and integrate JSAF enhancements in accordance with requirements. NWDC will deliver JSAF Version 5.0 that will include this newly developed software.

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
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5) NWDC will produce a Next Generation Architecture that meets all Defense Information Security Agency (DISA) and Navy requirements. The architecture will include a Bill of Material (BOM) for the prototype equipment, and a transition plan for the 72+ nodes within the NCTE.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 3207: *Fleet Synthetic Training*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Engineering	MIPR	SNIM, DTIC:FT Belvoir, VA	2.368	-		-		-		-	0.000	2.368	
		Subtotal	2.368	-		-		-		-	0.000	2.368	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support	WR	NRL / AER:MS / CA / VA	0.471	0.561	Nov 2011	0.436	Nov 2012	-		0.436	0.000	1.468	
Software Development	WR	AER / GEOCENT:VA / MS	0.237	0.307	Nov 2011	0.305	Nov 2012	-		0.305	0.000	0.849	
Configuration Management	WR	AER / GEOCENT:VA / MS	0.135	0.100	Feb 2012	0.100	Feb 2013	-		0.100	0.000	0.335	
Studies and Analysis	Various	Various:Various	0.100	-		0.200	Jan 2013	-		0.200	0.000	0.300	
		Subtotal	0.943	0.968		1.041		-		1.041	0.000	2.952	

	Total Prior Years Cost	FY 2012		FY 2013 Base		FY 2013 OCO		FY 2013 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	3.311	0.968		1.041		-		1.041	0.000	5.320	

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 3207: *Fleet Synthetic Training*

Exhibit R-4A, RDT&E Schedule Details: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 ITEM NOMENCLATURE** PE 0603207N: *Air/Ocean Tactical Applications*	**PROJECT** 3207: *Fleet Synthetic Training*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3207				
Navy Training Baseline / DISA MSPP/MPLS Architecture: JSAF 4.5 Release:	4	2011	3	2012
Navy Training Baseline / DISA MSPP/MPLS Architecture: NCTE Interoperability Guide 5.0:	4	2011	3	2012
Navy Training Baseline / DISA MSPP/MPLS Architecture: JSAF 4.3 Release:	4	2011	2	2012
Navy Training Baseline / DISA MSPP/MPLS Architecture: NCTE NextGen Prototype:	4	2011	3	2012
Navy Training Baseline / DISA MSPP/MPLS Architecture: NCTE Integration Events: NCTE Integration Events	4	2011	4	2012
Fleet Synthetic Training: Database Developement:	1	2012	4	2017
Fleet Synthetic Training: Architecture:	2	2012	4	2017
Fleet Synthetic Training: Performance Surface Improvements:	2	2012	4	2017
Fleet Synthetic Training: Development Work:	1	2012	4	2017
Fleet Synthetic Training: Studies:	1	2012	4	2017
Fleet Synthetic Training: Configuration Management:	2	2012	4	2017

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 3229: *JMAPS*	

COST ($ in Millions)	FY 2011	FY 2012	FY 2013 Base	FY 2013 OCO	FY 2013 Total	FY 2014	FY 2015	FY 2016	FY 2017	Cost To Complete	Total Cost
3229: *JMAPS*	68.093	56.698	-	-	-	-	-	-	-	0.000	124.791
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

Joint Milli-Arcsecond Pathfinder Survey (JMAPS) program. Joint strike operations require extremely accurate Positioning, Navigation, and Timing (PNT) systems in order to locate hostile threats with space-borne Intelligence Surveillance and Reconnaissance (ISR) systems, and then to deliver ordnance on precisely selected targets. The Navy provides a key component of PNT - the Celestial Reference Frame. This reference frame is defined in star catalogs that are used in conjunction with star trackers to determine orientation of space-based sensors to minimize target location error and the resultant weapon system accuracy. The accuracy of star positions (hence ability to hit desired target) is degrading with time due to the movement of stars since the last highly accurate space-based measurements of star positions (order of 1 milli-arcsecond) were made in 1991. The JMAPS initiative will satisfy the emerging requirements for a new high accuracy star catalog through a space-based. The program was terminated by Navy in FY13 and out due to ahead of current war-fighter requirements.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: JMAPS	68.093	56.698	-
Articles:	0	0	
FY 2011 Accomplishments: Alignment of program requirements with full traceability from the Capability Description Document (CDD) to Space and Ground Segments Specification was completed. Completed activities including sub-system design reviews leading to a Program Preliminary Design Review (PDR) at the end of Sept 2011. Established program baseline in preparation for a Gate 3 review in July 2011 and IBR in early 2012. Continued risk reduction and long lead development items for the payload, spacecraft, and ground system. Performed analysis on expected system level performance to ensure current design satisfies Key Performance Parameters (KPPs) and Key System Attributes (KSAs).			
FY 2012 Plans: JMAPS will close out all PDR activities, with the exception of the ground segment, and begin advance design and engineering activities. Complete spacecraft bus component fabrication and deliver in place. Complete instrument design including detector and partial instrument electronics, finalizing the optical telescope design, and initializing telescope production. Final deliveries of the sensor chip assemblies will occur and chip integration into the Focal Plane Assembly (FPA) will begin. Delivery of the engineering model for FPA will occur. Update Mission performance analysis based on instrument and bus design and available test data. All design and development completed will capture program state at time of termination or enable transition of selected components to leverage current investment in technology development.			
Accomplishments/Planned Programs Subtotals	68.093	56.698	-

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 3229: *JMAPS*

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

The program was terminated by Navy in FY13 and out due to ahead of current war-fighter requirements.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 3229: *JMAPS*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Instrument Development & Integration	WR	Naval Research Laboratory:Washington, DC	54.110	19.043	Dec 2011	-		-		-	0.000	73.153	Continuing
Space Bus	SS/CPFF	AeroAstro, Inc.:Ashburn, VA	30.749	25.297	Dec 2011	-		-		-	0.000	56.046	Continuing
Optical Telescope	SS/CPFF	L3 Communications SSG:Tinsley, Wilmington, MA	6.799	6.160	Jan 2012	-		-		-	0.000	12.959	
Sensor Chip Assembly	SS/CPFF	Teledyne Scientific & Imaging (AKA Rockwell Intl.):Camarillo, CA	1.998	4.675	Jan 2012	-		-		-	0.000	6.673	
Mission Analysis	WR	United States Naval Observatory:Washington, DC	2.769	0.625	Jan 2012	-		-		-	0.000	3.394	Continuing
Algorithm Development	WR	United States Naval Observatory:Washington, DC	6.018	-		-		-		-	0.000	6.018	Continuing
System Requirements	Various	Various:Various	13.244	-		-		-		-	0.000	13.244	
		Subtotal	115.687	55.800		-		-		-	0.000	171.487	

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Requirements and Performance Analysis, Systems Engineering	C/CPFF	MANDEX, Inc.:Arlington, VA	0.358	0.198	Nov 2011	-		-		-	0.000	0.556	Continuing
Trade-Off Studies	C/CPFF	AEROSPACE:Albuquerque, NM	0.200	-		-		-		-	0.000	0.200	0.200
Systems and Technical Support	Various	Universities/ Colleges:Various	0.150	0.100	Feb 2012	-		-		-	0.000	0.250	Continuing
		Subtotal	0.708	0.298		-		-		-	0.000	1.006	

Exhibit R-3, RDT&E Project Cost Analysis: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 3229: *JMAPS*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PMO Support	SS/CPFF	BAH:San Diego, CA	0.365	0.600	Dec 2011	-		-		-	0.000	0.965	
PMO Support	SS/CPFF	ITS:Arlington, VA	1.125	-		-		-		-	0.000	1.125	Continuing
		Subtotal	1.490	0.600		-		-		-	0.000	2.090	

	Total Prior Years Cost	FY 2012 Cost	FY 2012 Award Date	FY 2013 Base Cost	FY 2013 Base Award Date	FY 2013 OCO Cost	FY 2013 OCO Award Date	FY 2013 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	117.885	56.698		-		-		-	0.000	174.583	

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 3229: *JMAPS*

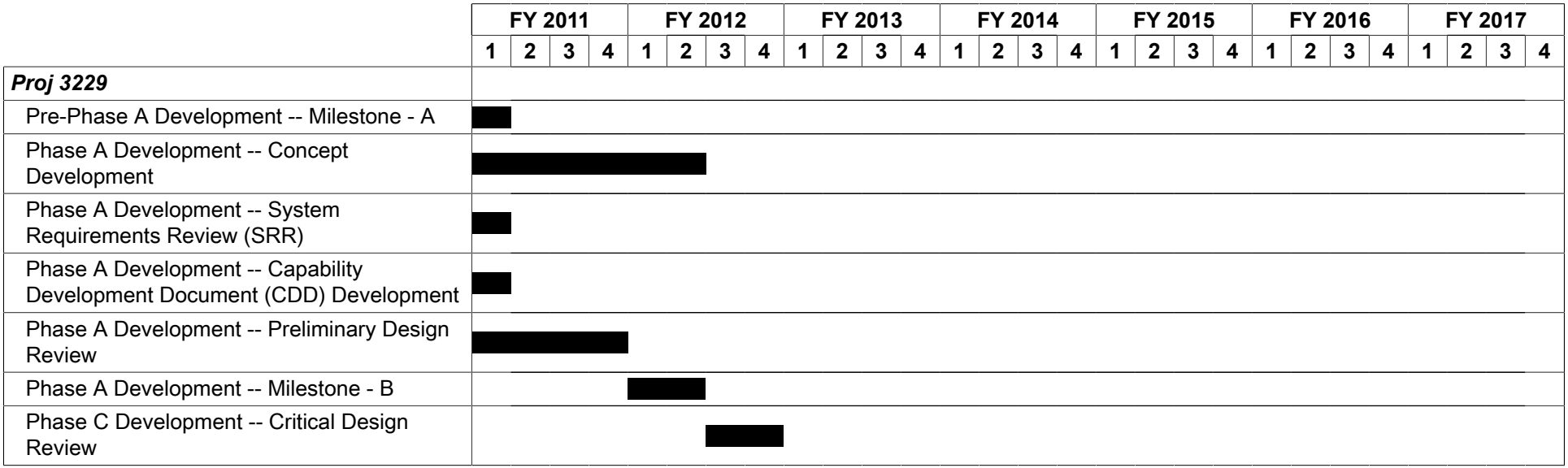

Exhibit R-4A, RDT&E Schedule Details: PB 2013 Navy		DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	R-1 ITEM NOMENCLATURE PE 0603207N: *Air/Ocean Tactical Applications*	PROJECT 3229: *JMAPS*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Proj 3229				
Pre-Phase A Development -- Milestone - A	1	2011	1	2011
Phase A Development -- Concept Development	1	2011	2	2012
Phase A Development -- System Requirements Review (SRR)	1	2011	1	2011
Phase A Development -- Capability Development Document (CDD) Development	1	2011	1	2011
Phase A Development -- Preliminary Design Review	1	2011	4	2011
Phase A Development -- Milestone - B	1	2012	2	2012
Phase C Development -- Critical Design Review	3	2012	4	2012