Exhibit R-2, RDT&E Budget Item Justification: PB 2013 Navy										DATE: February 2012	
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 7: *Operational Systems Development*				R-1 ITEM NOMENCLATURE PE 0305160N: *Navy Meteorological and Ocean Sensors-Space(METOC)*							
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	38.795	0.904	0.810	-	0.810	3.408	5.419	28.945	68.568	Continuing	Continuing
0524: *Navy METOC Support (SPACE)*	0.851	0.904	0.810	-	0.810	0.829	0.876	0.887	0.902	Continuing	Continuing
1452: *GEO SAT*	37.944	-	-	-	-	2.579	4.543	28.058	67.666	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program element supports the Navy's requirements in meteorological and oceanographic (METOC) space-based remote sensors. These requirements include commitments to satellite, sensor, and operational demonstration/development activities as well as the transition to fleet applications associated with three satellite programs: 1) the joint Defense Meteorological Satellite Program (DMSP), 2) the jointly funded Coriolis satellite which includes Navy Satellite Based Wind Speed (WindSat) and Air Force Solar Mass Ejection Imager instruments, 3) the Geodetic/geophysical Satellite (GEOSAT) Follow-On 2 (GFO-2) altimetry satellite funded entirely by Navy.

The Navy METOC Space-Based Sensing Capabilities project provides for Navy participation in Navy/Air Force cooperative efforts leading to DMSP sensor development, and specifically participation in the calibration and validation of instruments and delivery of satellite products to the fleet. The passive microwave instruments carried on the DMSP satellites provide global and atmospheric data of direct operational relevance, including sea surface wind, sea ice, and precipitation. WindSat is a partnered program that meets multiple naval remote sensing requirements and provides a significant risk reduction for the Joint Polar Orbiting Satellite System (JPSS) satellites' Microwave Imaging Sensor instrument.

The GEOSAT Follow-On project, and GFO-2 program, will provide a polar-orbiting satellite that measures sea surface topography using a precise altimeter. Both the GEOSAT Follow-On and Navy METOC Support (Space) projects fulfill Navy's obligation to develop naval service-unique, mission critical space-based METOC technology.

Starting in FY12 the Navy has delayed all Geodetic/geophysical Satellite (GEOSAT) Follow-On 2 (GFO-2) altimetry satellite development efforts until FY 2014.

JUSTIFICATION FOR BUDGET ACTIVITY: BA-7: This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it encompasses engineering and manufacturing development for upgrade of existing, operational systems.

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B. Program Change Summary ($ in Millions)	**FY 2011**	**FY 2012**	**FY 2013 Base**	**FY 2013 OCO**	**FY 2013 Total**
Previous President's Budget	63.878	0.904	0.822	-	0.822
Current President's Budget	38.795	0.904	0.810	-	0.810
Total Adjustments	-25.083	-	-0.012	-	-0.012
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-9.690	-			
• SBIR/STTR Transfer	-0.030	-			
• Program Adjustments	-	-	-0.001	-	-0.001
• Rate/Misc Adjustments	-	-	-0.011	-	-0.011
• Congressional Recision Adjustments	-15.038	-	-	-	-
• Congressional General Reductions Adjustments	-0.325	-	-	-	-

Change Summary Explanation

Schedule: The Navy has delayed all Geodetic/geophysical Satellite (GEOSAT) Follow-On 2 (GFO-2) altimetry satellite development efforts until FY 2014.

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 7: *Operational Systems Development*	R-1 ITEM NOMENCLATURE PE 0305160N: *Navy Meteorological and Ocean Sensors-Space(METOC)*	PROJECT 0524: *Navy METOC Support (SPACE)*	

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
0524: *Navy METOC Support (SPACE)*	0.851	0.904	0.810	-	0.810	0.829	0.876	0.887	0.902	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

The Meteorology and Oceanography (METOC) Space-Based Sensing Capabilities project provides for the naval service's unique sensor development efforts Navy Satellite Based Wind Speed (WindSat) and Navy participation in the Defense Meteorological Satellite Program (DMSP) Special Sensor Microwave/Imager and Special Sensor Microwave Imager Sounder calibration/validation efforts in support of the fleet operational requirements. WindSat, an initiative begun in 1997, is a partnered program that meets multiple naval remote sensing requirements and provides a significant risk reduction for the Joint Polar Satellite System (JPSS) satellites' Conical Microwave Imaging Sensor instrument. The passive microwave instruments carried on DMSP and future JPSS satellites provide global oceanic and atmospheric data of direct operational relevance, including sea surface wind speed, sea ice, and precipitation.

The METOC Space-Based Sensing Capabilities project ensures the naval service's operational requirements are satisfied primarily through demonstration of technologies for inclusion on operational constellations such as DMSP, the JPSS and the National Oceanic and Atmospheric Administration's Geostationary Operational Environmental Satellites (GOES). These efforts fulfill naval service unique requirements that are not funded within the DMSP, JPSS or GOES programs, and are in accordance with current inter-agency agreements.

The primary focus of the FY 2013 request is begin assessment of other national, commercial, and foreign earth observing satellite system's sensor data for use in Navy Atmospheric and Oceanographic Prediction Models.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: METOC Space-Based Sensing Capabilities	0.851	0.904	0.810
Articles:	0	0	0
FY 2011 Accomplishments: Continued performance assessments of microwave imagers (e.g.: Special Sensor Microwave Imager Sounder (SSMIS) / Special Sensor Microwave Imager (SSMI) / Microwave Imager Sounder (MIS)) and continued to calibrate sensors and validate data and resolve anomalies. Continued limited ground control and operations of the Coriolis spacecraft and monitored the WindSat on-orbit payload.			
FY 2012 Plans: Conduct performance assessments, sensor calibrations and perform quality control on National Polar-orbiting Operational Environmental Satellite System Preparatory Project (NPP) and Defense Meteorological Satellite Program (DMSP) satellite sensor			

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
suits. Continue limited ground control and operations of the Coriolis spacecraft and monitor the Navy Satellite Based Wind Speed (WindSat) on-orbit payload. ***FY 2013 Plans:*** Continue performance assessment on NPP and DMSP satellite sensor suits. Conduct assessment of planned Joint Polar Satellite System (JPSS) sensors for use in Navy Operational Environmental predictive models. Begin assessment of planned Defense Weather Satellite System (DWSS) program environmental satellite sensor capabilities. Begin assessment of other national, commercial, and foreign earth observing satellite system's sensor data for use in Navy Atmospheric and Oceanographic Prediction Models.			
Accomplishments/Planned Programs Subtotals	0.851	0.904	0.810

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
• 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

D. Acquisition Strategy

Naval service unique, space based METOC requirements. Particular sensors or data sources with unique naval service mission needs are targeted to accelerate acquisition or ensure threshold accomplishment of Joint or converged national program plans. Navy Satellite Based Wind Speed provides risk reduction data and developmental technology that the Joint Polar Satellite System (JPSS) program will use in the development of the Conical Microwave Imager Sounder (CMIS). CMIS will collect global microwave radiometry and sounding data to produce microwave imagery and other meteorological and oceanographic data. CMIS can be viewed as the follow-on instrument to the Special Sensor Microwave (SSM) instruments Navy developed for the Defense Meteorological Satellite Program. These CMIS sensors will be acquired as part of the JPSS architecture which supports these Navy requirements in the future. Maintenance of rigorous sensor calibration and data validation for operational SSM instruments continues along with algorithm development in support of fleet applications. The Advanced Altimeter technologies will improve radar altimeter resolution and aerial coverage to support Navy requirements for sea surface topography measurement in the littorals.

E. Performance Metrics

Goal: Provide precise and near real-time METOC forecasting to the warfighter using existing and future space-based satellite derived data, including ocean surface wind speed, rain rate, ice concentration, and soil moisture measurements.

Metric: Provide precise ocean surface wind speed within plus or minus 2.0 meters per second, the rain over land and ocean rate within plus or minus 5.0 millimeters per hour, soil moisture measurements within plus or minus 10%; and sea ice concentrations within plus or minus 10%.

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy			DATE: February 2012
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 7: *Operational Systems Development*	R-1 ITEM NOMENCLATURE PE 0305160N: *Navy Meteorological and Ocean Sensors-Space(METOC)*	PROJECT 1452: *GEO SAT*	

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
1452: *GEO SAT*	37.944	-	-	-	-	2.579	4.543	28.058	67.666	Continuing	Continuing
Quantity of RDT&E Articles	0	0	0	0	0	0	0	0	0		

A. Mission Description and Budget Item Justification

This project provides a Polar-orbiting satellite (the Geodetic/geophysical Satellite (GEOSAT) Follow-On 2 (GFO-2)) that measures sea surface topography using a precise altimeter. Mission data will be collected by the Spacecraft Operations Center and passed to the Payload Operations Center, and Altimetry Data Fusion Center, which are co-located at the Naval Oceanographic Office, Stennis Space Center, MS. Mission data is used in global and regional scale ocean forecast models. GFO-2 will provide a capability for precise mesoscale (e.g., fronts and eddies) and basin-scale oceanography. This capability will support tactical anti-submarine warfare, mine warfare, naval special warfare mission planning, tactical decision aids, and sensor/weapon performance prediction. GFO-2 will also provide an undersea warfare battlespace characterization capability that supports submarine detectability, weapon settings, sound velocity profiles, tropical cyclone intensity, and track forecasts.

GFO-2 data will be made freely available to other agencies, such as the National Oceanic and Atmospheric Administration and the National Aeronautics and Space Administration, who value its input to studies involving global warming and climate change, including El Nino Southern Oscillation effects.
Ocean topography data was previously provided by GEOSAT from 1985 until the satellite failed in January 1990. The Geodetic/geophysical Satellite Follow-On satellite was launched in February 1998 and deorbited in November 2008. The GEOSAT GFO-2 will provide for the continuation of this capability.

The Navy has delayed all Geodetic/geophysical Satellite (GEOSAT) Follow-On 2 (GFO-2) altimetry satellite development efforts until FY 2014.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2011	FY 2012	FY 2013
Title: GEO SAT	37.944	-	-
Articles:	0		
FY 2011 Accomplishments: Navy is assessing current program and mitigation strategies.			
Accomplishments/Planned Programs Subtotals	37.944	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

Navy will revise Acquisition Strategy to support restart in FY14.

Exhibit R-2A, RDT&E Project Justification: PB 2013 Navy		DATE: February 2012
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E. Performance Metrics

Goal: Provide METOC GEOSAT derived mission data to improve the accuracy of global and regional scale oceanographic forecast models.

Metric: Anti-Submarine Warfare capability is highly dependent on the operational environment. GEOSAT Follow-On 1 demonstrated that a space based altimeter provided the equivalent of approximately a 500-fold increase in available subsurface observations and a 10-fold increase in available surface observations, critical to characterization of the ocean environment and oceanographic modeling. War-gaming models show that this increased knowledge of the subsurface acoustic propagation resulting from one altimeter reduced the probability of losing a ship to subsurface attack from 80% to 20% for various scenarios.