FY 2003 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 2002

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N
PROGRAM ELEMENT TITLE: Navy Meteorological and Oceanographic Sensors-Space (METOC)

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 2001 ACTUAL	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	FY 2006 ESTIMATE	FY 2007 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0524 Navy METOC Support (Space)	20,385	20,445	17,974	19,993	9,135	29,009	22,029	CONT.	CONT.
X1452 GEOSAT	1,694	1,849	1,827	1,065	1,096	1,121	1,146	CONT.	CONT.
TOTAL	22,079	22,294	19,801	21,058	10,231	30,130	23,175	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program element supports Navy requirements in meteorological and oceanographic (METOC) remote sensors. These interests include commitments to satellite, sensor, and operational demonstration/development activities associated with four satellite programs: 1) the Joint Service Defense Meteorological Satellite Program (DMSP), 2) The National Polar-orbiting Operational Environmental Satellite System (NPOESS), 3) the Navy Geodetic/geophysical Satellite (GEOSAT) program, funded entirely by Navy and 4) the joint NASA/Navy/NOAA Geostationary Imaging Fourier Transform Spectrometer (GIFTS) sensor program. The passive microwave instruments carried on DMSP and future NPOESS provide global oceanic and atmospheric data of direct operational relevance, including sea surface wind, sea ice, and precipitation; GEOSAT altimeter data are used to observe significant wave height, ocean fronts and eddies, and internal acoustic structure. The Navy (METOC) Support (Space) project provides for Navy participation in Navy/Air Force cooperative efforts leading to DMSP sensor development, specifically participation in the calibration and validation of instruments and delivery of satellite products to the Fleet. WindSat, an initiative begun in 1997, is a partnered program that meets multiple Naval remote sensing requirements and provides a significant risk reduction for NPOESS, the converged Department of Commerce/National Oceanic and Atmospheric Administration/Department of Defense environmental satellite program. The Navy METOC Support (Space) project supports the Navy contribution to WindSat, which is fully funded via a formalized inter-agency agreement. The NPOESS Integrated Program Office has provided a portion of the funds for the WindSat sensor and the DOD Space Test Program (STP) is funding a portion of the satellite bus and providing the launch vehicle. The GEOSAT provided ocean topography information from 1985-1990. In 1991, the Navy began the development of a follow-on capability to continue providing this required ocean topography information via the GEOSAT Follow-On satellite, launched on 10 February 1998. The Navy

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Indian Ocean METOC Imager (IOMI) partnership on the NASA GIFTS sensor development, extends the lifetime of the GIFTS sensor to support the Navy Indian Ocean requirement for imagery direct to the Fleet. The joint Navy, NASA and NOAA sponsored IOMI-GIFTS program will provide the required temporal resolution with real-time high resolution environmental data to the fleet with technology transition to future GOES operational capabilities. Both the GEOSAT and Navy METOC (Space) projects fulfill Navy's obligation to develop Navy-unique, mission critical Space-based METOC technology.

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

B. (U) PROGRAM CHANGE SUMMARY FOR TOTAL PE:

	FY 2001	FY 2002	FY 2003
(U) FY 2002 PRESIDENT'S Submission	19,549	23,492	
(U) FY01 SBIR Apr-27-01	-174		
(U) Execution Adjustment	2,704		
(U) Section 8123: Management Reform/ Initiative Reduction		-198	
(U) Congressional Decrease (Navy Transformation Priorities)		-1,000	
(U) FY 2003 PRESIDENT'S Submission	22,079	22,294	19,801

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PROGRAM ELEMENT TITLE: Navy Meteorological and Oceanographic Sensors-Space (METOC)

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 2001 ACTUAL	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	FY 2006 ESTIMATE	FY 2007 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0524 Navy (METOC) Support (Space)	20,385	20,445	17,974	19,993	9,135	29,009	22,029	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Navy Meteorological and Oceanographic Sensor-Space (METOC)-Navy (METOC) Support (Space) project provides for Navy participation in Defense Meteorological Satellite (DMSP) Special Sensor Microwave/Imager (SSM/I) and Special Sensor Microwave Imager/Sounder (SSM/IS) calibration efforts, and future Navy-unique sensor development efforts (WindSat and the Indian Ocean METOC Imager (IOMI)) in support of the Fleet operational requirements. The project ensures Navy operational requirements are satisfied primarily through demonstration of technologies for inclusion on operational constellations such as Defense Meteorological Satellite Program (DMSP), the National Polar-orbiting Operational Environmental Satellite System (NPOESS) and the National Oceanic and Atmospheric Administration (NOAA) Geostationary Operational Environmental Satellites (GOES). These efforts fulfill Navy unique requirements that are not funded within the DMSP and NPOESS programs, and are in accordance with current inter-agency agreements. The project also provides for participation in efforts leading to operational improvements of satellite derived products and Navy participation as a voting member of the DMSP Configuration Control Board (CCB). Future funding plans respond to emerging Chief of Naval Operations requirements for Navy METOC data. Plans for FY 2001 and beyond address the requirement for high-resolution METOC imagery to ships, in particular the Indian Ocean and Arabian Gulf region. The Indian Ocean METOC Imager (IOMI) mission will be executed cooperatively with the development of the NASA EO-3 New Millennium Program Geostationary Imaging Fourier Transform Spectrometer (GIFTS) with NOAA providing calibration and validation of the data products. The NASA GIFTS instrument, enhanced for extended demonstration of Navy operational utility, will meet Navy imaging requirements while satisfying NASA's technology demonstration objectives. This enhanced demonstration of an operational utility will promote a rapid technology infusion into next generation NOAA Geostationary Operational Environmental Satellites (GOES) and allows Navy to have data sets in place to utilize the future NOAA capability. An inter-agency partnership has been formed with NASA for the development of GIFTS and with NASA and NOAA for data calibration and validation. The DoD Space Test Program will provide the access to space of the IOMI-GIFTS satellite. The IOMI-GIFTS program directly responds to the #1 priority, and 2 additional concerns, of the CINC's

FY 2003 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 2002

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N PROJECT NUMBER: R0524
PROGRAM ELEMENT TITLE: Navy Meteorological and Oceanographic Sensors-Space (METOC) PROJECT TITLE: Navy METOC Support (Space)

(2001 June) Top Five Maritime Concerns From Space and the Joint Typhoon Warning Center Mission Need Statement.

. (U) PROGRAM ACCOMPLISMENTS AND PLANS:

1. (U) FY 2001 ACCOMPLISHMENTS:
   - (U) (1,128k) Conducted SSM/I calibration and validation and began the calibration and validation effort associated with the launch of DMSP SSM/IS. Completed the integration, and flight testing of the Airborne Polarimetric Microwave Imaging Radiometer (APMIR) to use for calibration/validation of DMSP SSM/I and SSM/IS sensors and WindSat sensor. Prepared for WindSat calibration and validation.
   - (U) (19,067k) Completed WindSat sensor developmental testing and begin final integration and environmental test of flight payload. Continued development of algorithms and ground software for WindSat environmental data records.
   - (U) (190k) Supported the IOMI-GIFTS sensor development and spacecraft development trade studies. Successfully competed to obtain launch services for the IOMI-GIFTS payload from the DoD Space Test Program. Successfully completed sensor Preliminary Design Review.

2. (U) FY 2002 PLAN:
   - (U) (1,120k) Continue to monitor SSM/I performance and continue validation effort associated with the DMSP SSM/IS. Conduct field experiments with APMIR to use for calibration/validation of DMSP SSM/I, SSM/IS sensors, and the WindSat sensor.
   - (U) (9,772k) Complete flight payload development and delivery for spacecraft integration testing and conduct full space vehicle system testing including environmental testing. Complete development and testing of algorithms and ground software for WindSat environmental data records. Support WindSat launch processing, launch operations, early orbit checkout and begin on-orbit calibration and validation.
   - (U) (9,553k) Begin spacecraft and sensor development with long lead hardware in support of IOMI-GIFTS mission. Continue support of GIFTS sensor lifetime enhancements, data product development and mission operations and ground segment development.

3. (U) FY 2003 PLAN:

- (U) (688k) Continue to monitor SSM/I performance and continue validation effort associated with the DMSP SSM/IS and WindSat sensor. Conduct field experiments with APMIR to use for calibration/validation of DMSP SSM/I, SSM/IS sensors, and the WindSat sensor.
- (U) (2,000k) Provide engineering support for the evaluation of the Coriolis spacecraft and WindSat payload on-orbit performance and complete on-orbit calibration/validation of WindSat data.
- (U) (15,286k) Begin integration of IOMI spacecraft components. Continue engineering participation of the GIFTS sensor and data product development. Initiate mission operations and ground segment implementation.

B. (U) PROGRAM CHANGE SUMMARY: See total program change summary for P. E.

C. (U) OTHER PROGRAM FUNDING SUMMARY: DoD Space Test Program (STP) and NASA.

(U) RELATED RDT&E:
(U) PE 0605864F, DOD STP
(U) PE 0305160F, Air Force DMSP
(U) SAT 809/00110 NASA 258-30, Science, Aeronautics, & Technology; Office of Earth Science Research and Technology

D. (U) SCHEDULE PROFILE: Not applicable.

FY 2003 RDT&E,N PE/PROJECT COST BREAKDOWN DATE: February 2002

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N PROJECT NUMBER: R0524
PROGRAM ELEMENT TITLE: Navy Meteorological and Oceanographic Sensors-Space (METOC) PROJECT TITLE: Navy METOC Support (Space)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 2001	FY 2002	FY 2003
a. Satellite Development	7,370	11,725	15,286
b. Payload Development	11,887	7,600	2,000
c. Science and Calibration/Validation	854	770	438
d. Airborne Testbed	274	350	250
e. Support GFO	0	0	0
Total	20,385	20,445	17,974

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method Fund Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 2001 Budget	FY 2002 Budget	FY 2003 Budget	To Complete	Total Program
Product Development									
Misc.	Misc.	N/A	CONT.	CONT.	19,257	19,325	17,286	CONT.	CONT.
Support and Management:									
Misc.	Misc.	N/A	CONT.	CONT.	0	0	0	CONT.	CONT.
Test and Evaluation:									
Misc.	Misc.	N/A	CONT.	CONT.	1,128	1,120	688	CONT.	CONT.
TOTAL:					20,385	20,445	17,974	CONT.	CONT.

FY 2003 RDT&E,N PE/PROJECT COST BREAKDOWN DATE: February 2002

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N PROJECT NUMBER: R0524
PROGRAM ELEMENT TITLE: Navy Meteorological and Oceanographic Sensors-Space (METOC) PROJECT TITLE: Navy METOC Support (Space)

GOVERNMENT FURNISHED PROPERTY: Not Applicable

	FY 2001 Budget	FY 2002 Budget	FY 2003 Budget	To Complete	Total Program
Subtotal Product Development	19,257	19,325	17,286	CONT.	CONT.
Subtotal Support and Management:	0	0	0	0	0
Subtotal Test and Evaluation:	1,128	1,120	688	CONT.	CONT.
Total Project	20,385	20,445	17,974	CONT.	CONT.

FY 2003 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 2002

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N
PROGRAM ELEMENT TITLE: Navy Meteorological and Oceanographic Sensors-Space (METOC)

(U) COST (Dollars in thousands)

PROJECT NUMBER & Title	FY 2001 Actual	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	To Complete	Total Program
X1452 GEOSAT	1,694	1,849	1,827	1,065	1,096	1,121	1,146	CONT.	CONT.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides a satellite-borne radar altimeter sensor to obtain ocean topography measurements from which tactically significant features such as ocean fronts, and eddies, wave heights, internal acoustic structure, and sea-ice edges are derived. Topography provides a unique and important data source in support of a number of Naval warfare areas such as anti-submarine and undersea warfare. It also provides other agencies, such as National Oceanic and Atmospheric Administration and National Aeronautics and Space Administration with valuable inputs to studies involving Pacific Ocean temperature oscillations, global warming and climate change (El Nino, La Nina effects). Ocean topography data was previously provided by GEOSAT from 1985 until the satellite failed in January 1990. The GEOSAT Follow-On (GFO) satellite provides altimetry data until altimetry data becomes available from a future national environmental satellite system.

FY 2003 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: February 2002

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N PROJECT NUMBER: X1452
PROGRAM ELEMENT TITLE: Navy Meteorological and Oceanographic Sensors-Space (METOC) PROJECT TITLE: GEOSAT

- (U) PROGRAM ACCOMPLISMENTS AND PLANS:

1. (U) FY 2001 Accomplishments:

- (U) (800k) Funded on-orbit performance incentive.
- (U) (325k) Developed improved ground station satellite data processing techniques.
- (U) (569k) Continued to assess on-orbit system performance, conducted payload calibration/validation, refined orbits and resolved performance anomalies.

2. (U) FY 2002 Plan:

- (U) (800k) Fund on-orbit performance incentive.
- (U) (373k) Develop improved ground station satellite data processing techniques.
- (U) (676k) Continue to assess on-orbit system performance, conduct payload calibration/validation, refine orbits and resolve performance anomalies.

3. U) FY 2003 Plan:

- (U) (800k) Fund on-orbit performance incentive.
- (U) (375k) Develop improved ground station satellite data processing techniques.
- (U) (652k) Continue to assess on-orbit system performance, conduct payload calibration/validation, refine orbits and resolve performance anomalies.

FY 2003 RDT&E,N PE/PROJECT COST BREAKDOWN DATE: February 2002

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N PROJECT NUMBER: X1452
PROGRAM ELEMENT TITLE: Navy Meteorological and Oceanographic Sensors-Space (METOC) PROJECT TITLE: GEOSAT

B (U) PROGRAM CHANGE SUMMARY:

(U) SEE PROGRAM CHANGE SUMMARY FOR PE.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:
(U) PE 0604218N (Air/Ocean Equipment Engineering)

D. (U) SCHEDULE PROFILE:

	FY 2001	FY 2002	FY 2003
Program Milestones			
Engineering Milestones			
T&E Milestones	Oper Supt	Oper Supt	Oper Supt
Contract Milestones	Not Applicable		

FY 2003 RDT&E,N PE/PROJECT COST BREAKDOWN DATE: February 2002

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N PROJECT NUMBER: X1452
PROGRAM ELEMENT TITLE: Navy Meteorological and Oceanographic Sensors-Space (METOC) PROJECT TITLE: GEOSAT

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 2001	FY 2002	FY 2003
a. Satellite Development	1,694	1,849	1,827
b. Sensor Development	0	0	0
c. Contractor Engineering Support	0	0	0
Total	1,694	1,849	1,827

B. (U) BUDGET ACQUISITION HISTORY AND PLANNING INFORMATION ($ in thousands)

PERFORMING ORGANIZATIONS

Contractor/ Government Performing Activity	Contract Method Fund Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 2000 &Prior	FY 2001 Budget	FY 2002 Budget	FY 2003 Budget	To Complete	Total Program
Product Development										
Ball Aerospace w/Options	CPIF	8/92	85,213	85,213	84,271	0	0	0	CONT.	CONT.
Various	Various	N/A	CONT.	CONT.	8,045	0	0	0	CONT.	CONT.
Support and Management:										
Ball Aerospace w/Options	CPIF	8/92	0	0	0	1,125	1,173	1,175	CONT.	CONT.
Various	Various	N/A	CONT.	CONT.	0	569	676	652	CONT.	CONT.

FY 2003 RDT&E,N PE/PROJECT COST BREAKDOWN DATE: February 2002

BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N PROJECT NUMBER: X1452
PROGRAM ELEMENT TITLE: Navy Meteorological and Oceanographic Sensors-Space (METOC) PROJECT TITLE: GEOSAT

Contractor/ Government Performing Activity	Contract Method Fund Vehicle	Award/ Oblig Date	Perform Activity EAC	Project Office EAC	Total FY 2000 &Prior	FY 2001 Actual	FY 2002 Budget	FY 2003 Budget	To Complete	Total Program
Various					0	0	0	0	CONT.	CONT.

Test and Evaluation: Not Applicable

GOVERNMENT FURNISHED PROPERTY Not Applicable

	FY 2000 & Prior Actual	FY 2001 Budget	FY 2002 Budget	FY 2003 Budget	To Complete	Total Program
Subtotal Product Development	92,316	0	0	0	CONT.	CONT.
Subtotal Support and Management	0	1,694	1,849	1,827	CONT.	CONT.
Subtotal Test and Evaluation Not Applicable						
Total Project	92,316	1,694	1,849	1,827	CONT.	CONT.