

UNCLASSIFIED

FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 2000

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 1999 ACTUAL | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | FY 2004 ESTIMATE | FY 2005 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|----------------------------------|-------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------|------------------|
| R0524 Navy METOC Support (Space) | 10,329 | 12,770 | 17,896 | 19,783 | 14,115 | 18,090 | 19,507 | CONT. | CONT. |
| X1452 GEOSAT | 1,426 | 1,727 | 1,834 | 1,835 | 1,841 | 1,081 | 1,112 | CONT. | CONT. |
| TOTAL | 11,755 | 14,497 | 19,730 | 21,618 | 15,956 | 19,171 | 20,619 | CONT. | CONT. |

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program element supports Navy interests in meteorological and oceanographic (METOC) remote sensors. These interests include commitments to satellite, sensor, and operational development activities associated with three satellite programs: 1) the Joint Service Defense Meteorological Satellite Program (DMSP), 2) The National Polar-orbiting Operational Environmental Satellite System (NPOESS) and 3) the Navy Geodetic/geophysical Satellite (GEOSAT) program, funded entirely by Navy. 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, including 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 is providing a portion of the funds for the WindSat sensor and the DOD Space Test Program (STP) will fund the satellite bus and provide 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. Both the GEOSAT and Navy METOC (Space) projects fulfill Navy's obligation to develop Navy-unique, mission critical Space-based METOC technology.

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Budget Item Justification
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DATE: February 2000

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

(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:

| | <u>FY 1999</u> | <u>FY 2000</u> | <u>FY 2001</u> |
|------------------------------------|----------------|----------------|----------------|
| (U) FY 2000 President's Budget: | 11,614 | 14,507 | 19,127 |
| (U) Appropriated Value | - | 14,507 | - |
| (U) Adjustment from PRESBUDG: | - | - | - |
| (U) SBIR/STTR: | -47 | - | - |
| (U) Inflation Adjustment | -53 | - | - |
| (U) Congressional Recissions | - | -10 | - |
| (U) Execution Adjustment: | +241 | - | - |
| (U) Various Rate Adjustments | - | - | -715 |
| (U) SSP Adjustment | - | - | -2 |
| (U) Program Adjustments: | - | - | +1,320 |
| (U) FY 2001 President's Submission | 11,755 | 14,497 | 19,730 |

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Budget Item Justification
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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 1999 ACTUAL | FY 2000 ESTIMATE | FY 2001 ESTIMATE | FY 2002 ESTIMATE | FY 2003 ESTIMATE | FY 2004 ESTIMATE | FY 2005 ESTIMATE | TO COMPLETE | TOTAL PROGRAM |
|------------------------------------|-------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------|------------------|
| R0524 Navy (METOC) Support (Space) | 10,329 | 12,770 | 17,896 | 19,783 | 14,115 | 18,090 | 19,507 | 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) 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 DMSP and the National Polar-orbiting Operational Environmental Satellite System (NPOESS). 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 acquires information necessary to keep Navy ground receiving equipment compatible with future satellite data formats and data transfer rates. The project also provides for studies 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 2002 and beyond address the requirement for high-resolution METOC imagery to ships, in particular the Indian Ocean and Arabian Gulf region.

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FY 2001 RDT&E,N PE/PROJECT COST BREAKDOWN

DATE: February 2000

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

B. (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1999 ACCOMPLISHMENTS:

- (U) (495k) Participated in DMSP Special Sensor Microwave/Imager (SSM/I) calibration and validation. Continued data quality assurance activities in support of operational products.
- (U) (1,143k) Completed the design and began fabrications of Airborne Polarimetric Microwave Imaging Radiometer (APMIR) to use for calibration/validation of DMSP SSM/I, and SSM/IS, and WindSat development, calibration, and validation.
- (U) (8,691k) Completed critical design and analysis for WindSat and breadboard component and subsystem testing leading to prototype instrument validation and a manufacturing readiness review. Initiated development of algorithms and ground software for the delivery of environmental data records for use with WindSat Data.

2. (U) FY 2000 PLAN:

- (U) (765k) Conduct SSM/I calibration and validation. Prepare for validation effort associated with the expected launch of the first DMSP SSM/IS.
- (U) (425k) Complete the fabrication, integration, and flight testing of Airborne Polarimetric Microwave Imaging Radiometer (APMIR) to use for calibration/validation of DMSP SSM/I and SSM/IS sensors, and WindSat development, calibration, and validation.
- (U) (11,580k) Continue WindSat sensor development and initiate fabrication of flight hardware components and subsystems. Continue support of spacecraft development effort. Continue development of algorithms and ground software for WindSat environmental data records.

3. (U) FY 2001 PLAN:

- (U) (900k) Continue to monitor SSM/I performance and continue validation effort associated with the DMSP SSM/IS.
- (U) (16,708k) Complete final WindSat sensor integration and flight hardware testing. Integrate WindSat flight sensor with Coriolis spacecraft. Conduct full space system testing including environmental testing. Complete development and testing of algorithms and ground software for WindSat environmental data records. Prepare for WindSat launch processing, launch operations, flight operations, calibration and validation.

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FY 2001 RDT&E,N PE/PROJECT COST BREAKDOWN

DATE: February 2000

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

(U) (288k) Conduct field experiments with APMIR to use for calibration/validation of DMSP SSM/I and SSM/IS sensors, and prepare for calibration/validation of the WindSat sensor.

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

C. (U) OTHER PROGRAM FUNDING SUMMARY: DOC/NOAA Appropriation Procurement, Acquisition, and Construction, Polar Convergence.

(U)RELATED RDT&E:

(U) PE 0603434F Air Force, NPOESS

(U) PE 0605864F, Air Force, DOD STP

(U) PE 0305160F, Air Force DMSP

(U) PE 0604218N, Air/Ocean Equipment Engineering

D. (U) SCHEDULE PROFILE: Not applicable.

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FY 2001 RDT&E,N PE/PROJECT COST BREAKDOWN

DATE: February 2000

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

PROJECT NUMBER: R0524
PROJECT TITLE: Navy METOC
Support (Space)

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

| Project Cost Categories | FY 1999 | FY 2000 | FY 2001 |
|---------------------------------------|---------|---------|---------|
| a. Satellite Development | 0 | 2,300 | 7,740 |
| b. Payload Development | 8,691 | 9,280 | 8,968 |
| c. Science and Calibration/Validation | 495 | 765 | 900 |
| d. Airborne Testbed | 1,143 | 425 | 288 |
| e. Support GFO | 0 | 0 | 0 |
| Total | 10,329 | 12,770 | 17,896 |

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

PERFORMING ORGANIZATIONS

Contractor/ Contract

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PE/Project Cost Breakdown
(Exhibit R-3, page 6 of 13)

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FY 2001 RDT&E,N PE/PROJECT COST BREAKDOWN

DATE: February 2000

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

PROJECT NUMBER: R0524
 PROJECT TITLE: Navy METOC
 Support (Space)

| <u>Government Performing Activity</u> | <u>Method Fund Vehicle</u> | <u>Award/ Oblig Date</u> | <u>Perform Activity EAC</u> | <u>Project Office EAC</u> | <u>Total FY 1999 Budget</u> | <u>FY 2000 Budget</u> | <u>FY 2001 Budget</u> | <u>To Complete</u> | <u>Total Program</u> |
|---|------------------------------------|----------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|---------------------------|---------------------------|------------------------|--------------------------|
| Product Development Misc. | Misc. | N/A | CONT. | CONT. | 8,691 | 11,580 | 16,708 | CONT. | CONT. |
| Support and Management: Misc. | Misc. | N/A | CONT. | CONT. | 0 | 0 | 0 | 924 | 924 |
| Test and Evaluation: Misc. | Misc. | N/A | CONT. | CONT. | 1,638 | 1,190 | 1,188 | CONT. | CONT. |
| TOTAL: | | | | | 10,329 | 12,770 | 17,896 | CONT. | CONT. |

GOVERNMENT FURNISHED PROPERTY: Not Applicable

| | <u>FY 1999 Budget</u> | <u>FY 2000 Budget</u> | <u>FY 2001 Budget</u> | <u>To Complete</u> | <u>Total Program</u> |
|----------------------------------|---------------------------|---------------------------|---------------------------|------------------------|--------------------------|
| Subtotal Product Development | 10,329 | 12,770 | 17,896 | CONT. | CONT. |
| Subtotal Support and Management: | 0 | 0 | 0 | 0 | 0 |
| Subtotal Test and Evaluation: | 0 | 0 | 0 | 0 | 0 |
| Total Project | 10,329 | 12,770 | 17,896 | CONT. | CONT. |

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PE/Project Cost Breakdown
 (Exhibit R-3, page 7 of 13)

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FY 2001 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

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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 1999 Actual | FY 2000 Estimate | FY 2001 Estimate | FY 2002 Estimate | FY 2003 Estimate | FY 2004 Estimate | FY 2005 Estimate | To Complete | Total Program |
|------------------------------|-------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|----------------|------------------|
| X1452 GEOSAT | 1,426 | 1,727 | 1,834 | 1,835 | 1,841 | 1,081 | 1,112 | CONT. | CONT. |

- A. (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. 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.

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DATE: February 2000

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

PROJECT NUMBER: X1452
PROJECT TITLE: GEOSAT

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1999 ACCOMPLISHMENTS:

- (U) (1,076k) Conducted pre-acceptance operations and satellite anomaly resolution.
- (U) (350k) Conducted altimeter calibration/validation activities.

2. (U) FY 2000 PLAN:

- (U) (800k) Fund on-orbit performance incentive.
- (U) (360k) Develop improved ground station satellite data processing techniques.
- (U) (567k) Continue to assess on-orbit system performance, conduct payload calibration/validation and resolve performance anomalies.

3. (U) FY 2001 PLAN:

- (U) (800k) Fund on-orbit performance incentive.
- (U) (365k) Develop improved ground station satellite data processing techniques.
- (U) (669k) Continue to assess on-orbit system performance, conduct payload calibration/validation and resolve performance anomalies.

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DATE: February 2000

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

PROJECT NUMBER: X1452
PROJECT TITLE: GEOSAT

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

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

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

D. (U) SCHEDULE PROFILE:

FY 1999 FY 2000 FY 2001

Program
Milestones

Engineering
Milestones

T&E
Milestones

On orbit tests On orbit tests On orbit tests

Contract
Milestones Not Applicable

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

PROJECT NUMBER: X1452
 PROJECT TITLE: GEOSAT

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

| Project Cost Categories | <u>FY 1999</u> | <u>FY 2000</u> | <u>FY 2001</u> |
|-----------------------------------|----------------|----------------|----------------|
| a. Satellite Development | 1,426 | 1,727 | 1,834 |
| b. Sensor Development | 0 | 0 | 0 |
| c. Contractor Engineering Support | 0 | 0 | 0 |
| Total | 1,426 | 1,727 | 1,834 |

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

PERFORMING ORGANIZATIONS

| <u>Contractor/ Government Performing Activity</u> | <u>Contract Method Fund Vehicle</u> | <u>Award/ Oblig Date</u> | <u>Perform Activity EAC</u> | <u>Project Office EAC</u> | <u>Total FY 1999 Actual</u> | <u>FY 2000 Budget</u> | <u>FY 2001 Budget</u> | <u>To Complete</u> | <u>Total Program</u> |
|---|---|----------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|---------------------------|---------------------------|------------------------|--------------------------|
|---|---|----------------------------------|-------------------------------------|-----------------------------------|-------------------------------------|---------------------------|---------------------------|------------------------|--------------------------|

Product Development

| | | | | | | | | | |
|-----------------------------|---------|------|--------|--------|-----|-----|-----|-------|-------|
| Ball Aerospace w/Options | CPIF | 8/92 | 85,213 | 85,213 | 519 | 950 | 965 | CONT. | CONT. |
| Various | Various | N/A | CONT. | CONT. | 907 | 777 | 869 | CONT. | CONT. |

Support and Management: Not Applicable

Contractor/ Contract

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PE/Project Cost Breakdown
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BUDGET ACTIVITY: 7 PROGRAM ELEMENT: 0305160N
 PROGRAM ELEMENT TITLE: Navy Meteorological and Oceanographic
 Sensors-Space (METOC)

PROJECT NUMBER: X1452
 PROJECT TITLE: GEOSAT

| Government Performing Activity | Method Fund Vehicle | Award/ Oblig Date | Perform Activity EAC | Project Office EAC | Total FY 1999 Actual | FY 2000 Budget | FY 2001 Budget | To Complete | Total Program |
|--------------------------------------|---------------------------|-------------------------|----------------------------|--------------------------|----------------------------|-------------------|-------------------|----------------|------------------|
| Various | | | | | 0 | 0 | 0 | CONT. | CONT. |

Test and Evaluation: Not Applicable

GOVERNMENT FURNISHED PROPERTY Not Applicable

| | FY 1999 Actual | FY 2000 Budget | FY 2001 Budget | To Complete | Total Program |
|---|-------------------|-------------------|-------------------|----------------|------------------|
| Subtotal Product Development | 1,426 | 1,727 | 1,834 | CONT. | CONT. |
| Subtotal Support and Management | 0 | 0 | 0 | CONT. | CONT. |
| Subtotal Test and Evaluation Not Applicable | | | | | |
| Total Project | 1,426 | 1,727 | 1,834 | CONT. | CONT. |

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PE/Project Cost Breakdown
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DATE: February 2000

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

PROJECT NUMBER: X1452
PROJECT TITLE: GEOSAT

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