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BUDGET ITEM JUSTIFICATION SHEET P-40										DATE: FEBRUARY 2004			
APPROPRIATION/BUDGET ACTIVITY OTHER PROCUREMENT, NAVY BA-7 PERSONNEL & COMMAND SUPPORT EQUIPMENT							P-1 ITEM NOMENCLATURE/LINE ITEM # ENVIRONMENTAL SUPPORT EQUIPMENT LI:8126						
Program Element for Code B Items:							OTHER RELATED PROGRAM ELEMENTS						
	Prior Years	ID Code	FY2003	FY2004	FY2005	FY2006	FY2007	FY2008	FY2009	FY2010	To Complete	Total	
QUANTITY													
EQUIPMENT COST (In Millions)			19,559	10,959	13,155	13,608	12,473	16,522	13,644			CONT.	
SPARES COST (In Millions)													
PROGRAM DESCRIPTION/JUSTIFICATION: <div style="text-align: center; margin: 10px 0;">NAVAL OCEANOGRAPHIC OFFICE</div> <p>The Naval Oceanographic Office, Stennis Space Center, MS collects, processes, analyzes and provides oceanographic, hydrographic and geophysical data worldwide to meet requirements for precise bathymetric, gravity, magnetic and environmental measurements. This data is critical for navigation, positioning and alignment, and targeting of both tactical and strategic subsurface, surface, air and space vehicles, and weapons systems. The office is supported by eight ocean survey ships and one dedicated project aircraft.</p> <p><u>AUV LITHIUM BATTERIES</u></p> <p>At present, SEAHORSE class Autonomous Underwater Vehicles (AUV) operate from 9000+ Alkaline D-Cell batteries. They were selected for their low cost and high energy density. Now, however, rechargeable lithium ion batteries are available with sufficient energy density to meet SEAHORSE performance specifications. Their cost is about the same as D-Cells for 100 days of operation, but they will provide over 2000 days of operation. Shipping for the large numbers of D-Cells required for a full survey will be eliminated. The survey time lost removing and replacing spent D-Cells will be saved.</p> <p><u>ALH HYPERSPECTRAL REPLACEMENT</u></p> <p>The fusion of a hyperspectral sensor to the Compact Hydrographic Airborne Rapid Total Survey (CHARTS) System will provide the Navy an enhanced hydrographic capability by providing detailed benthic mapping and small target detection capability. This sensor, integrated with the CHARTS system, will provide fused lidar and spectral data. The sensor replacement investment will provide a higher resolution replacement imager and faster image processing suite to allow more detailed products at a reduced processing ratio.</p>													

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<p><u>BMG-7 GRAVITY METERS</u></p> <p>These roll on/roll off gravity meters will replace aging gravity data collection systems. The new system will incorporate new technology and techniques. Some of the new technological advances will address deficiencies in leveling the sensor (stabilization subsystem), increasing data rate (sensor subsystem) and real-time data analysis (data handling subsystem). NAVOCEANO's current inventory of gravity meters are 10 to 20 years old with many parts now obsolete. Recent DoD developments have resulted in STRATCOM issuing new requirements for gravity data and associated products. In order to meet future requirements, new systems must be procured.</p> <p><u>BIOLUMINESCENCE PHOTOMETER OVER THE SIDE (OTS)</u></p> <p>NAVOCEANO supports numerous validated CINC requirements to provide bioluminescence data to determine non-acoustic detection of naval assets. These data are vital to the Navy's ability to operate undetected. The over-the-side (OTS) photometer system measures bioluminescence and pertinent ancillary environmental parameters required for warfighter products that include Environmental Guides, Submarine Tactical Oceanographic Reference Manuals (STORM), STOIC, digital products and special requests. In addition, data are used to populate the bioluminescence data base and are core data for the Data Warehouse. OTS provides a less sophisticated and easier to operate photometer system that compliments NAVOCEANO's multifunction platforms and ocean surveyor strategies. OTS units on all ships will provide expanded coverage of the basic parameters required to meet validated bioluminescence product requirements of the warfighter.</p>		

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<p><u>OCEANOGRAPHIC CENTRAL SUITE SURVEY WORKSTATIONS/MASS STORAGE UG</u></p> <p>Shipboard central suite data acquisition and processing systems including UNIX workstations, PCs, network components & mass storage are reaching the end of their supportable life cycle. Many major hardware items are already out of production but are supportable at present. Rather than piece-meal system support as individual components and equipment on individual ships fail, a complete central suite life cycle upgrade is required across all platforms to maintain survey capability and configuration control and to provide adequate data storage capacity for acquisition and post-processing. NAVOCEANO survey platforms must be able to collect data, perform quality control of the collected data, and process the data at or near the time of collection. Supplying common systems and equipment across all survey platforms is necessary to control life cycle, training, and personnel costs. While all NAVOCEANO platforms perform different survey functions using the same operating software (ISS-60), all of the system components and equipment are not exactly the same across all platforms due to the times the ships came into service. Although there has been an ongoing effort to maintain the common functionality, rapid and continual changes in vendor product lines over the past few years have caused the hardware configurations to vary across the platforms, especially if original components failed and were replaced. Failure to provide planned life cycle equipment replacements will result in system failures that could jeopardize data collection, storage, and processing resulting in lost data and/or survey time; loss of configuration; increased maintenance time and cost; and increased training cost due to platform variability.</p> <p><u>CHARTS LASER REPLACEMENT</u></p> <p>The Compact Hydrographic Airborne Rapid Total Survey (CHARTS) system will require a replacement laser unit in FY09. This replacement will result in an increased pulse repetition rate (PRR) from approximately 1,000 Hz to approximately 3,000-4,000 Hz, much faster data collection, denser laser spot spacing, and more efficient survey operations.</p>		

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<p><u>OCEANOGRAPHIC DATA WAREHOUSE MASS STORAGE</u></p> <p>NAVOCEANO's scientific data are stored within the Data Warehouse (DW) in standardized formats. The DW, using a distributed client-server architecture, is used to manage the 600 plus gigabytes of on-line storage needed to provide responsive data access to internal users and external customers that include Department of Defense (DoD) and non-DoD agencies. The existing DW servers and mass storage are at the end of their life cycle and are constrained in the number of data request transactions that may be simultaneously processed, as well as the quantity of data that may be stored and managed. NAVOCEANO is now collecting in excess of 400 gigabytes (GB) of scientific data per survey that must be ingested and processed in-house. Data collected by NAVOCEANO survey ships and new deployments of Fleet sensors and environmental satellites are estimated to increase data holdings to up to 200 terabytes (TB) per year, which significantly exceeds current Data Warehouse (DWH) mass storage capacity. Projects such as Storage Area Network (SAN), the implementation of GigE capability and upgrade of the NAVOCEANO network core fabric to OC12 (622 mbps) are under way to expedite production and delivery of near real-time collected data. These projects will significantly impact associated storage needs. To accommodate increased storage requirements, additional on-line and near-line mass storage is required. If not funded, increased production times and slower response to Fleet requests for products will occur.</p> <p><u>DIGITAL SIDE SCAN SONAR NEXGEN</u></p> <p>New, next generation side scan sonar systems are required to replace aged existing side scan systems aboard Hydrographic Survey Launches (HSL) and ships. Existing systems will not be supported by vendors due to product life expiration and difficulty finding components to continue fielding systems. Entire deck unit will be outdated and non-compatible with new existing network/data acquisition systems. Next generation systems will provide higher resolution and speed capability at lower cost and combine new processing capabilities including synthetic aperture sonar to greatly enhance imaging capability.</p>		

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<p><u>DEEP MULTIBEAM REPLACEMENT</u></p> <p>The Deep Multibeam Replacement is a life cycle replacement for the Simrad EM121A that is installed on all T-AGS-60 class ships. The EM121A is no longer manufactured and spare components are difficult to purchase. The replacement sonar will be a commercial 1 degree by 1 degree swath sonar having a minimum of 191 beams. The nominal sonar frequency is 12 khz with an angular coverage sector of up to 150 degrees or 7 times the water depth. The multibeam system will provide roll, pitch, heave, and yaw correction. The nominal depth range will be 20 to 11000 meters. The addition of this sonar will greatly improve survey efficiency due to the increased swath width and at the same time increase the number of data points per unit area. This sonar combined with the existing EM1002 shallow water multibeams will make the T-AGS-60 ships capable of producing data that exceed International Hydrographic Organization (IHO) requirements for water depths. The other cost benefits are reduction of underhull maintenance and life cycle maintenance. Funding for two systems in FY04 and installation in FY05 will free up EM121A spares to support the other ships until all systems can be replaced.</p> <p><u>HIDEX BIOLUMINESCENCE PHOTOMETER</u></p> <p>NAVOCEANO supports numerous validated requirements to provide bioluminescence data to determine non-acoustic detection of naval assets. These data are vital to the Navy's ability to operate undetected. The High Index Defined Excitation (HIDEX) photometer system measures bioluminescence and pertinent ancillary environmental parameters required for warfighter products that include: Environmental Guides, Submarine Tactical Oceanographic Reference Manuals (STORMS), STOIC, digital products and special requests. In addition, data are used to populate the bioluminescence database and are core data for the Data Warehouse. HIDEX provides a detailed and complete measurement system to characterize the water column for parameters necessary to hypothesis test models of bioluminescence distribution and light propagation. Data are required for refinement of existing models and development of new sampling strategies.</p>		

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<p><u>OCEANOGRAPHIC CENTRAL DATA BASE SERVER</u></p> <p>NAVOCEANO's scientific data are stored within the Data Warehouse (DW) in standardized formats. The DW, using a distributed client-server architecture, is used to manage the 600 plus gigabytes of on-line storage needed to provide responsive access to users that include Department of Defense (DoD) and non-DoD agencies. The existing DW servers and mass storage are at the end of their life cycle and are constrained in the number of data request transactions that may be simultaneously processed, as well as the quantity of data that may be stored and managed.</p> <p><u>HYDROPHONE COLLECTION SYSTEM</u></p> <p>The Hydrophone Collection System (HCS) is a recoverable acoustic buoy used in support of (1) Transmission Loss measurements and (2) Fleet exercises such as ship ASW Readiness Effectiveness Measuring (SHAREM) Program and Rapid Response. The HCS records acoustic signals from sound sources such as Signals Underwater Sound (SUS) and transmits acoustic data back to a surface ship. Data is also internally recorded for later retrieval. The HCS is essential for the collection of Transmission Loss data on acoustic surveys. These data are required both to produce Acoustic and Geophysical databases and to provide direct support during Fleet exercises in evaluating sonar system performance.</p> <p><u>HYOPS REPLACEMENT</u></p> <p>The Hydrographic and Oceanographic Portable Survey System (HYOPS) will integrate and standardize hydrographic and oceanographic digital data collection and processing techniques and procedures, and collect a wider variety of data for input into NAVOCEANO data bases. The Hydrographic Cooperative (HYCOOP) Surveys Program will acquire HYOPS to support joint surveys in the territorial waters of 23 foreign nations. Multidisciplinary hydrographic/oceanographic surveys support safety of navigation and littoral warfare in ports/harbors, approaches, and coastal areas. HYOPS are required to collect, process, produce, and integrate data from hydrographic and oceanographic surveys. It will interface with a variety of sensors and produce edited data in a digital format.</p>		

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<p><u>INTEGRATED DRIFTING BUOYS</u></p> <p>The Integrated Drifting Buoy Program supports Fleet activities ashore and afloat with near real-time environmental data. The buoys are deployed in Navy operational areas and disseminate oceanographic, acoustic, and meteorological data to operational commands in the area through various real-time means. These near real-time data are used for severe weather forecasting, typhoon warning, and ground truthing satellite-derived multi-channel sea surface temperature extraction, refining the fronts and eddies bogus, and initializing the Modular Ocean Data Assimilation System. Procurement has been centrally managed through the Naval Air Warfare Center, Crane, Indiana. This will ensure a smooth transition of the WSQ (XAN-1 through 6) series drifting buoy into the Fleet supply system.</p> <p><u>LASER AIRBORNE BATHYMETRIC SURVEY SYSTEM</u></p> <p>The objective of the Laser Airborne Bathymetric Survey System (LABS) program is to obtain very high speed bathymetric data collection capability in very shallow water (0-50m) in non-hostile environments that support Navy Mapping, Charting & Geodesy (MC&G) requirements. Data would support Navy and conventional nautical charting efforts in both routine operation and rapid response capability. The LABS system can acquire data at a rate of about 130 sqnm/24 vs 20 sqnm/24 for a survey ship.</p> <p><u>OCEANOGRAPHIC WINCH</u></p> <p>The Oceanographic Winch is required for deployment and retrieval of current measurement packages. This special purpose, roll on/roll off winch allows reels to be changed during deployment and recovery operations. Data obtained from current measurement systems are used to populate the Oceanographic and Atmospheric Master Library (OAML) database. These data are use to develop ocean current models in littoral regions.</p>		

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<p><u>OIS ARCHITECTURE</u></p> <p>The Naval Oceanographic Office (NAVOCEANO) Oceanographic Information System (OIS) is responsible for the collection, processing, storage and archival, and dissemination of oceanographic and other scientific information in support of Fleet METOC requirements such as safety of navigation and weapons systems performance. NAVOCEANO employs a fleet of eight T-AGS 60 class oceanographic survey ships, with each ship having an accompaniment of up to two Hydrographic Survey Launches, each having a similar data collection capability to the T-AGS 60s. NAVOCEANO also provides real-time METOC support to the Fleet Warfighter for high-temp and contingency operations as well as exercise support. State-of-the-art oceanographic sensors, such as a high-speed, high-resolution digital side scan sonar systems, are collecting data volumes far in excess of the current OIS capability to receive, process, store, and archive. This situation is exacerbated by the collection of remotely sensed data and by deployment of new Fleet sensor systems. This funding is required to acquire and maintain the minimum necessary information technology (IT) infrastructure to upgrade the end-to-end OIS processing and production systems to required levels of performance and establish an enterprise-wide systems level architecture required for the derivation of useful METOC oceanographic parameters for DoD and other customers. If not funded, the minimum necessary scientific IT resources will not be available to accommodate increased data volumes and process, produce and disseminate relevant METOC products to the Fleet.</p> <p><u>AUTONOMOUS UNDERWATER VEHICLE(AUV) TERRAIN OBSTACLE AVOIDANCE</u></p> <p>Where the terrain and ocean conditions are well known the SEAHORSE class Autonomous Underwater Vehicles (AUVs) can operate on preprogrammed instructions. To survey in coastal areas that have not previously been surveyed, organic obstacle avoidance systems are required.</p>		

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<u>SATELLITE PROCESSING SYSTEM REPLACEMENT</u>		
<p>NAVOCEANO is the National Core Processing Center for the production of multi-channel sea surface temperatures (MCSST) and altimetry products. The Satellite Processing System presently producing MCSSTs was procured in 1998 and will be ready for Life Cycle Replacement in FY03 (six year old hardware). Under the Oceanographic Analysis 2000 program, MCSST, ADCF, front & eddy, ocean model, and STOIC/SAIL production processes continue to be integrated into common hardware and software architectures. This funding will replace the Satellite Processing System and ADCF hardware and communications infrastructure, and include ocean optical processing into one integrated processing system. The ADCF hardware consists of workstations that will be 5-10 years old in FY03. Ocean optical processing is still under development on individual workstation environments. This funding will also replace the Tactical Oceanographic Processing System (TOPS) hardware and software capabilities for hyperspectral optical applications expected from Warfighter 1 and NEMO hyperspectral sensors. In addition, this funding will also provide for the replacement of the Developmental Web Server hardware that is used for application development for operational NAVOCEANO web server products.</p>		
<u>INERTIAL NAVIGATION SYSTEM</u>		
<p>This equipment will replace the POS/MV and the MK39 gyrocompass. Benefits realized by the new equipment include higher accuracy for ship's position, velocity, attitude heading and vertical motion. This will be a life cycle replacement for equipment that is 10 years old.</p>		
<u>FLEET SURVEY TEAM UUV</u>		
<p>Man-portable Unmanned Underwater Vehicle(s) to support Fleet Survey Team operations. Vehicle(s) will provide capability to deploy from Rigid Hull Inflatable Boat (RHIB), Boat of Opportunity, or from shore. UUVs provide the FST a greater ability to effectively operate in high threat areas or in contested areas. UUVs also provide the FST with self contained, low impact, low profile, and discrete surveying capability, thus increasing its employability in the tactical situation. UUVs will also reduce or eliminate the risk to FST personnel operating in difficult environments and weather conditions. The vehicle(s) provide FST with a tactical data collection tool for providing rapid data collection in the littoral that supports multiple warfare areas. Operational use of this vehicle will provide FST the ability to directly support littoral warfare (NSF. MIW. Amphibious Warfare).</p>		

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<p><u>ISS-60 SYSTEMS INTEGRATION LABORATORY</u></p> <p>The ISS-60 System Integration Laboratory (SIL) mission is to provide shipboard for system testing and troubleshooting. Integrating new systems and components, and training operators, system administrators, and field maintenance personnel. Funding will provide SIL replacement to meet future needs more effectively. Older and obsolete equipment and subsystems will be removed and replaced with survey systems then in use.</p> <p><u>SHALLOW WATER MULTIBEAM</u></p> <p>The multibeam sensor is a life cycle replacement for the Simrad EM 1002 that is installed on all T-AGS 60 class ships. The EM 1002 system will become obsolete and will no longer be supported by the manufacturer. The replacement sonar will be a commercial high resolution that will meet hydrographic requirements for swath width, accuracy, and imagery. The nominal sonar frequency is 95 khz with an angular coverage sector of up to 150 degrees or 7 times the water depth. The multibeam system will provide roll, pitch, heave, and yaw correction. The nominal depth range will be 1 meter below the keel to 1000 meters. The addition of this sonar will greatly improve survey efficiency due the increased swath width and at the same time increase the number of data points per unit area. The other cost benefits are reduction of underhull maintenance and life cycle maintenance.</p> <p><u>OCEANOGRAPHIC WEB SERVERS</u></p> <p>The Data Processing Dissemination (DPD) Board purchases of life-cycle replacement operational web servers and developmental platforms will ensure seamless access to NAVOCEANO operational products including databases, imagery, model output, near-real time geospatial data, and publications. This investment directly supports the Vice-Chief of Naval Operations Web-Enabled Navy Initiative. Type and location of assets have been determined by requirements analysis completed in November 1999. If not funded, the efficiency of data exchange between NAVOCEANO and Fleet customers will deteriorate. Hardware upgrade enhancements to support new web-enabled product generation and dissemination tools will not be realized.</p>		

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<p><u>SHALLOW WATER SEISMIC SYSTEM</u></p> <p>The Shallow Water Seismic System is a portable roll on/roll off system for use on T-AGS 60 ships in water depths to approximately 800 meters. The system includes a Chirp Subbottom Profiler, a Wide Angle Bottom Reflector (WABR), a seismic sound source, and a seismic data acquisition system. This system is required to support high priority acoustic and geophysical survey operations. Data collected from this system is use to produce acoustic and geophysical databases. These data provide support for Fleet sonar system performance and weapons system predictions.</p> <p><u>SHIP TO SHORE DATA COMMUNICATIONS</u></p> <p>The NAVOCEANO Survey Operations Center (SOC) consists of an integrated shipboard satellite communications suite and a land-based data management system capable of transferring, monitoring, managing, and validating high volume survey data to Stennis Space Center from remote survey platforms in the field. The asymmetric satellite data link consists of 2048 kb/s from the ship and 384 kb/s back to the ship. The communications system consists of a 2.7 meter C/Ku-Band satellite antenna, servers, routers, encryptors, commercial off-the-shelf (COTS) content delivery system, internet access, video teleconferencing, and voice over internet protocol (VOIP) telephone service. The SOC data management at NAVOCEANO integrates several COTS technologies into a unified, event-based system allowing data transfer and validation along with geographic displays to track the progress of the survey assets in real-time. A successful prototype demonstration of concept was conducted in June 2001. This net-centric connectivity with the remote survey assets is viewed as the optimum approach to ensuring quality data collection, increasing efficiency and reducing time from data collection to customer product generation. A negative funding decision would result in the continuation of a 30 year old CONOP in an environment where the volume of data is increasing exponentially with the fielding of new sensor systems aboard the survey platforms.</p>		

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<p><u>SURVEY OPERATIONS CENTER (SOC) DATA MANAGEMENT SYSTEM</u></p> <p>The NAVOCEANO Survey Operations Center (SOC) consists of an integrated shipboard satellite communications suite and a land-based data management system capable of transferring, monitoring, managing, and validating high volume survey data to Stennis Space Center from remote survey platforms in the field. The asymmetric satellite data link consists of 2048 kb/s from the ship and 384 kb/s back to the ship. The communications system consists of a 2.7 meter C/Ku-Band satellite antenna, servers, routers, encryptors, commercial off-the-shelf (COTS) content delivery system, internet access, video teleconferencing, and voice over internet protocol (VOIP) telephone service. The SOC data management at NAVOCEANO integrates several COTS technologies into a unified, event-based system allowing data transfer and validation along with geographic displays to track the progress of the survey assets in real-time. A successful prototype demonstration of concept was conducted in June 2001. This net-centric connectivity with the remote survey assets is viewed as the optimum approach to ensuring quality data collection, increasing efficiency and reducing time from data collection to customer product generation. A negative funding decision would result in the continuation of a 30 year old CONOP in an environment where the volume of data is increasing exponentially with the fielding of new sensor systems aboard the survey platforms.</p> <p><u>MULTIPURPOSE LAUNCH & RECOVERY</u></p> <p>The multiplatform multipurpose launch and recovery system will be constructed to replace the existing SEAMAP launcher. The launcher will be designed with the capability of launching and recovering multiple large and medium size vehicles. The vehicles the launcher will be able to handle are, but not limited to, SEAMAP, Seahorse Autonomous Underwater Vehicle (AUV), and Semi-Autonomous Mapping System (SAMS). The launcher will be self-contained roll on/roll off system with a footprint of a 20-foot conex box. The only requirement of the platform is sufficient load capacity and deck space for the launcher and support equipment.</p>		

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<p><u>WARFIGHTING SUPPORT CENTER</u></p> <p>Funding requested will provide a Shallow Water Bathymetry Exploitation System and an upgrade to hardware and software supporting ocean features and geospatial information analysis. One of NAVOCEANO's core missions is the collection and processing of bathymetric and hydrographic information to characterize the seafloor. Our ability to gather this data in some areas, especially the littoral, is limited. With advances in satellite technology we have the opportunity to gather information in shallow water leading to a core capability of providing depths, bottom characteristics and currents in the nearshore environment. This information is critical to expeditionary warfare and it provides the added capability of providing data in denied areas for use in oceanographic models and hydrographic littoral data sets. The establishment of the Shallow Water Bathymetry Exploitation System (SWBES) is critical to this effort and could potentially position NAVOCEANO and the Warfighting Support Center as the center of expertise for the exploitation of shallow water bathymetry.</p> <p><u>UNMANNED AIRBORNE VEHICLE (UAV)</u></p> <p>NAVOCEANO supports numerous validated requirements to provide bioluminescence data to determine non-acoustic detection of naval assets. These data are vital to the Navy's ability to operate undetected. Photometer systems measure bioluminescence and ancillary environmental parameters required for warfighter products that include: Environmental Guides, STORMS, STOIC, digital products and special requests. Remote observation of naval targets completes the picture to allow model validation. The technical feasibility of Unmanned Airborne Vehicles (AUV) as platforms for a variety of sensing devices is a proven fact as a result of the Gulf War. Low light camera technologies will provide NAVOCEANO and the Navy with valuable information at a significantly lower cost. Data collected with this system will refine existing detection models and expand our support to the warfighter. UAVs will also expand our product support to the warfighter by allowing near real time product generation in an area just prior to deployment.</p> <p><u>AUTONOMOUS UNDERWATER VEHICLE</u></p> <p>The SEAHORSE-class Autonomous Underwater Vehicle (AUV) is a fully autonomous survey platform designed for at-sea maintainability and ready integration of COTS oceanographic sensors. It can be deployed from T-AGS 60 ships and from ships of opportunity. With it's fully-autonomous, extended-range capability, it serves as a force multiplier to NAVOCEANO survey ships to meet validated COCOM requirements. AUVs are a subset of Unmanned Underwater Vehicles (UUVs).</p>		

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 U. S. NAVAL OBSERVATORY <p>The Naval Observatory, Washington, DC, provides the astronomical and timing data required by the Navy, the Department of Defense, other government agencies and the general public. Precise time and astronomical data are essential for command, control and communications, navigation and precise positioning, and targeting of tactical and strategic weapons systems.</p> <p><u>INSB ARRAY DETECTORS</u></p> <p>These array detectors with sensitivities between 1 and 5 micron wavelengths are needed to astronomically map the celestial background emission. The precise positions of objects at these wavelengths for infrared seekers.</p> <p><u>CESIUM SYSTEM 5071</u></p> <p>The Master Clock consists of over 10 hydrogen masers, 45 cesium standards and associated electronics, computer and communications system to establish the time scales. Additional maser and cesium atomic clock standards must be procured to replace those that have reached the end of their useable ten-year lifetime. The hydrogen maser atomic clocks are very precise in short-term stability and are utilized in conjunction with cesium beam atomic clocks that provide long-term stability to ensure the accuracy of the Navy/DOD/National Master Clock System. The components of the clock must be replaced as they age to maintain the accuracy of the timescale. This system must continue to provide a timescale stable to 12 billionths of a second for GPS operations. Smart weapons, long-range cruise missiles and weapons delivery platforms need near-perfect positioning and precise time (nanoseconds) information. Lack of replacement of the hydrogen maser and cesium standards will degrade the security for secure communication systems. The Observatory will not be able to meet its mission of providing time to GPS and other DOD users who need accurate time without the Master Clock Replacement.</p>		

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APPROPRIATION/BUDGET ACTIVITY OTHER PROCUREMENT, NAVY BA-7 PERSONNEL AND COMMAND SUPPORT EQUIPMENT	P-1 ITEM NOMENCLATURE/LINE ITEM # ENVIRONMENTAL SUPPORT EQUIPMENT LI:8126	
<p><u>TIME TRANSFER RECEIVER</u></p> <p>These receivers are needed to monitor the time on the GPS code signal. They are to be multi-channel in order to monitor all satellites above the horizon at Washington, DC and Falcon AFB. This information is needed to maintain time on the GPS satellites in accordance with an Interface Control Document between the Observatory and the Air Force.</p> <p><u>H MASER SYSTEM</u></p> <p>Hydrogen Masers are an integral part of the Master Clock system at the Naval Observatory. These clocks are very precise in the short term and are utilized in conjunction with cesium beam clocks to ensure accuracy of the Navy/DoD/National Master Clock System.</p> <p><u>NEW TECHNOLOGY CLOCK</u></p> <p>New atomic clocks are being developed that will exceed the accuracy of the present atomic clocks making up the Master Clock. This improvement in accuracy will make it possible to have knowledge of time at the 0.1 billionth of a second level. This accuracy is needed for improvement in the accuracy of the GPS system necessary for precisely guided munitions such as Cruise missiles</p> <p><u>VLBI SUBSYSTEM</u></p> <p>Very Long Baseline Interferometry (VLBI) provides the most accurate means of determining astronomical time and the celestial reference frame. Subsystems are needed to keep the VLBI program in Earth orientation in operation. These are data acquisition systems (receivers, digitizing and recording systems) and hydrogen maser clocks needed at the three observation sites in Kokee Park, Hawaii; Fairbanks, Alaska; and Green Bank, West Virginia.</p>		

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<p><u>VLBI MARK V SYSTEM</u></p> <p>The VLBI Mark V system will improve the current VLBI operational system by replacing the system that transports massive amounts of data by magnetic tape with a system built around the use of portable disk drives. This system will result in savings by eliminating the high cost of maintenance of the current VLBI tape drives. Additional improvements in data handling will also be incorporated in the Mark V system.</p> <p><u>GPS SIMULATOR</u></p> <p>The GPS Simulator will be used for the routine calibration of the Naval Observatory GPS Time Monitoring Receivers. It will also be used to evaluate the performance of the new GPS receivers which are under development.</p> <p><u>FOCAL PLANE ARRAY</u></p> <p>The Focal Plane Array has the capability to carry out astrometric observations at near-infrared wavelengths. It will provide a single measurement for well-exposed stars between 1.2-2.2 microns and offer smaller atmospheric refractive distortions and measurement of objects which are not easily detectable at optical wavelengths. This array accuracy will allow distance determinations to 2% or better.</p>		

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FLEET NUMERICAL METEOROLOGY AND OCEANOGRAPHY CENTER		
<p>Fleet Numerical Meteorology and Oceanography Center (FNMOC), Monterey, CA provides responsive quality meteorological and oceanographic (METOC) guidance and information to Navy and other Department of Defense activities worldwide to increase safety of forces and to optimize the use of platforms, weapons, sensors and facilities. METOC support to the operating forces is provided principally through seven geographically dispersed commands (six USN sites located in Fleet concentration areas, and Air Force Weather Agency which supports USAF and USA) via direct connectivity and through DoD circuits. Additionally, thousands of DoD PC users receive their product support directly from FNMOC using advanced mathematical techniques on high-performance computers. The creation and use of web enabled tactical applications is a rapidly emerging method of direct support to the Fleet. Analyses are used to predict the state of atmosphere and oceans for periods ranging from a few hours to a week. These analyses and predictions are used as the basis of specific, fleet-related products for platforms, weapon systems and sensors.</p>		
<p><u>PRIMARY OCEAN PREDICTION SYSTEM (POPS) ENHANCEMENTS</u></p>		
<p>DoD's role of "global presence" has stressed the current super computer architecture beyond its capacity to provide adequate support. Mission critical functions will be addressed through technology refreshment and enhancement. Customer service will be improved via web-services and web-enabled applications. Greater emphasis on preparation for and reaction to regional conflicts and the littoral threat has resulted in a greatly increased demand for high resolution, coupled model meteorological guidance and forecasts, as well as oceanographic support to tactical coastal operations. The capability to produce and distribute products to users will be significantly improved as well. Improved atmospheric model output will be available for regional centers to initialize locally-run mesoscale models. Higher resolution nests will be available to ships to run local area analysis and short duration forecasts. This upgrade will provide FNMOC customers with better atmospheric and oceanographic forecasts at longer ranges as a result of sharper data focus, improvements in physics and increase in the resolution of the models, including a coupled atmosphere/wave model. It will also provide improved operational data management and implementation of 3-dimensional variational data assimilation.</p>		

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 CNMOC HEADQUARTERS <p>The Commander, Naval Meteorology and Oceanography Command (CNMOC) is responsible for the command and management of assigned Meteorology and Oceanography, and Geospatial Information and Services activities and efforts under the Operational Naval Oceanography Program, providing support and technical guidance throughout the Department of the Navy and the Department of Defense. The Commander directs an organization providing METOC and GI&S products and services to optimize warfighting resources, support safe operations and enhance dominance of the battlespace through superior understanding and exploitation of the natural environment.</p> <u>SHALLOW WATER SYSTEM</u> <p>A new Fleet requirement for a worldwide Shallow Water digital navigation database for the littoral regions has resulted in a need for a greater resolution, more stringent bathymetric database than already exists. Consequently, new multibeam swath sonar systems, digital side scan sonars systems, and additional shallow water survey platforms (Hydrographic Survey Launches (HSL) must be procured to meet this critical navigation to support safe, secure SSN operations. Additionally, recent changes in hydrographic data collection techniques by the International Hydrographic Organization (IHO) have necessitated newer, more precise, shallow water survey systems be procured or upgraded to support the National Imagery and Mapping Agency's chart production in order to meet these new IHO standards.</p>		

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WEAPONS SYSTEMS COST ANALYSIS P-5						WEAPONS SYSTEMS			DATE: FEBRUARY 2004									
APPROPRIATION/BUDGET ACTIVITY Other Procurement, Navy BA-7 PERSONNEL AND COMMAND SUPPORT EQUIPMENT					ID Code	P-1 ITEM NOMENCLATURE/SUBHEAD ENVIRONMENTAL SUPPORT EQUIPMENT V7Z7												
COST CODE	ELEMENT OF COST	ID Code	TOTAL COST IN THOUSANDS OF DOLLARS															
			FY 2003			FY 2004			FY 2005									
			QTY	UNIT COST	TOTAL COST	QTY	UNIT COST	TOTAL COST	QTY	UNIT COST	TOTAL COST							
	NAVAL OCEANOGRAPHIC OFFICE																	
	AUV Lithium Batteries	8126				2	250	500										
	Autonomous Underwater Vehicle	8126	1	852	852													
	Bioluminescence Photom OTS	8126	2	105	210													
	Oceanographic Central Data Base Server	8126	1	450	450													
	Oceanographic Central Suite Svy Wkst/Stor Replacement	8126	5	230	1148	5	264	1322	3	333	1000							
	Oceanographic Data Warehouse Mass Storage	8126	1	370	370	1	255	255										
	Deep Multibeam Replacement	8126				1	2500	2500	1	3000	3000							
	FST UUV	8126	2	250	500													
	HYOPS Replacement	8126	1	425	425													
	Hydrophone Collection System	8126																
	Integrated Drifting Buoys	8126	170	5	850													
	Laser Airborne Bathy Svy System	8126	1	750	750													
	Multi-purpose Launch & Recovery	8126																
	Oceanographic Winch	8126	1	200	200													
	OIS Architecture	8126	1	200	200	1	1434	1434	4	442	1768							
	Satellite Processing System Replacement	8126	1	1225	1225													
	PAGE TOTAL		187		7180	10		6011	8		5768							

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WEAPONS SYSTEMS COST ANALYSIS P-5					WEAPONS SYSTEMS			DATE: FEBRUARY 2004									
APPROPRIATION/BUDGET ACTIVITY Other Procurement, Navy BA-7 PERSONNEL AND COMMAND SUPPORT EQUIPMENT					ID Code	P-1 ITEM NOMENCLATURE/SUBHEAD ENVIRONMENTAL SUPPORT EQUIPMENT V7Z7											
COST CODE	ELEMENT OF COST	ID Code	TOTAL COST IN THOUSANDS OF DOLLARS														
			FY 2003			FY 2004			FY 2005								
			QTY	UNIT COST	TOTAL COST	QTY	UNIT COST	TOTAL COST	QTY	UNIT COST	TOTAL COST						
	NAVAL OCEANOGRAPHIC OFFICE																
	Shallow Water Seismic System	8126										2	425	850			
	Ship to Shore Data Comm	8126	2	975	1950							3	1139	3385			
	Svy Operations Ctr Data Mgmt Sys	8126	1	100	100	1	659	659				1	330	330			
	Warfighting Support Center	8126	1	350	350												
	Oceanographic Web Servers LCR	8126										1	400	400			
	FLEET NUMERICAL METEOROLOGY AND OCEANOGRAPHY CENTER																
	POPS Enhancements	8126	1	7382	7382	1	3795	3795				1	1722	1722			
	CNMOC HEADQUARTERS																
	Shallow Water System	8126	0	0	0	0	0	0				0	0	0			
	PAGE TOTAL		5		9,782	2		4,454	8				6,687				
	Subtotal		192		16,962	12		10,465	16				12,455				

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WEAPONS SYSTEMS COST ANALYSIS P-5					WEAPONS SYSTEMS			DATE: FEBRUARY 2004						
APPROPRIATION/BUDGET ACTIVITY Other Procurement, Navy BA-7 PERSONNEL AND COMMAND SUPPORT EQUIPMENT					ID Code	P-1 ITEM NOMENCLATURE/SUBHEAD ENVIRONMENTAL SUPPORT EQUIPMENT V7Z7								
COST CODE	ELEMENT OF COST	ID Code	TOTAL COST IN THOUSANDS OF DOLLARS											
			FY 2003			FY 2004			FY 2005					
			QTY	UNIT COST	TOTAL COST	QTY	UNIT COST	TOTAL COST	QTY	UNIT COST	TOTAL COST			
	U.S. Naval Observatory													
	InSB Array Detectors		1	300	300									
	Focal Plane Array		1	127	127				1	700	700			
	Cesium System 5071		1	420	420									
	Time Transfer Receiver		2	200	400									
	H Maser System		2	250	500	2	247	494						
	New Technology Clock		1	200	200									
	VLBI Subsystem		1	150	150									
	VLBI Mark V System		1	200	200									
	GPS Simulator		1	300	300									
	PAGE TOTAL		10		2597	2		494	1		700			
	TOTAL		202		19559	14		10959	17		13155			

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BUDGET PROCUREMENT HISTORY AND PLANNING EXHIBIT (P-5A)					Weapon System		A. DATE			
B. APPROPRIATION/BUDGET ACTIVITY					C. P-1 ITEM NOMENCLATURE				SUBHEAD	
Other Procurement, Navy					ENVIRONMENTAL SUPPORT EQUIPMENT				V7Z7	
BA-7 PERSONNEL AND COMMAND SUPPORT EQUIPMENT										
Cost Element/ FISCAL YEAR	QTY	UNIT COST (000)	LOCATION OF PCO	RFP ISSUE DATE	CONTRACT METHOD & TYPE	CONTRACTOR AND LOCATION	AWARD DATE	DATE OF FIRST DELIVERY	SPECS AVAILABLE NOW	IF NO WHEN AVAILABLE
FY 2003 NAVOCEANO										
Autonomous Underwater Vehicle	1	852	NAVSEA	01/03	RCP	Penn State State College, PA	02/03	05/03	YES	
Bioluminescence Photom OTS	2	105	NASA Stennis Space Center, MS	12/02	MIPR	NASA Stennis Space Center, MS	12/02	03/03	YES	
Oceanographic Central Data Base Server	1	450	GSA Huntsville, AL	12/02	MIPR	GSA Huntsville, AL	12/02	03/03	YES	
Oceanographic Central Suite Svy Wkst/Stor Repl	5	230	SPAWAR, N Charleson SC	12/02	RCP	Consensys Corp Universal City, TX	01/03	04/03	YES	
HYOPS Replacement	1	425	NAVOCEANO	12/02	C/FP	Acoustics Transducers DBA Reson, Goleta, CA	12/02	03/03	YES	
Integrated Drifting Buoys	170	5	NSWC, Crane, IN	12/02	RCP	METOCEAN Halifax, Nova Scotia	01/03	03/03	YES	
Laser Airborne Bathy Svy Sys	1	750	USACE Waterways Stn Vicksburg, MS	12/02	MIPR	USACE Waterways Stn Vicksburg, MS	03/03	05/03	YES	
Oceanographic Winch	1	200	NAVOCEANO	10/03	C/FP	VARIOUS	12/03	02/04	YES	
OIS Architecture	1	200	GSA Huntsville, AL	12/02	MIPR	GSA Huntsville, AL	02/03	05/03	YES	
D. REMARKS	P-1 SHOPPING LIST				CLASSIFICATION:					
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	EXHIBIT P-5A									

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BUDGET PROCUREMENT HISTORY AND PLANNING EXHIBIT (P-5A)					Weapon System		A. DATE			
B. APPROPRIATION/BUDGET ACTIVITY Other Procurement, Navy BA-7 PERSONNEL AND COMMAND SUPPORT EQUIPMENT					C. P-1 ITEM NOMENCLATURE ENVIRONMENTAL SUPPORT EQUIPMENT				FEBRUARY 2004	
									SUBHEAD	
Cost Element/ FISCAL YEAR	QTY	UNIT COST (000)	LOCATION OF PCO	RFP ISSUE DATE	CONTRACT METHOD & TYPE	CONTRACTOR AND LOCATION	AWARD DATE	DATE OF FIRST DELIVERY	SPECS AVAILABLE NOW	IF NO WHEN AVAILABLE
FY 2003 NAVOCEANO										
Satellite Processing Sys Repl	1	1225	GSA Huntsville, AL	04/03	MIPR	GSA Huntsville, AL	05/03	07/03	YES	
Ship to Shore Data Comm	2	975	Chicken Little Program Ofc Eglin AFB, FL	01/03	MIPR	VARIOUS	05/03	07/03	YES	
Svy Operations Center Data Mgmt Sys	1	100	Chicken Little Program Ofc Eglin AFB, FL	01/03	MIPR	Chicken Little Pgm Ofc Eglin AFB, FL	03/03	07/04	YES	
Warfighting Support Center	1	350	GSA Huntsville, AL	02/03	MIPR	GSA Huntsville, AL	02/03	05/03	YES	
<u>FY2003</u>										
U.S. NAVAL OBSERVATORY										
InSB Array Detectors	1	300	NSF	12/02	C/FP	NSF	3/03	7/03	YES	
Cesium 5071 System	1	420	FISC WASH	12/02	C/FP	DATUM, INC MA or AGILENT TECH	2/03	6/03	YES	
H Maser System	2	250	FISC WASH	12/02	C/FP	DATUM, INC MA	03/03	07/03	YES	
Time Transfer Receiver	2	200	FISC WASH	12/02	C/FP	TIME TECH	01/03	03/03	YES	
Focal Plane Array	1	127	NSF	12/03	C/FP	NSF	01/04	04/04	YES	
GPS Simulator	1	300	NSF	4/03	C/FP	SPAWAR	06/03	12/03	YES	
New Technology Clock	1	200	FISC WASH	12/02	C/FP	DATUM INC, MA	01/03	05/03	YES	
VLBI Subsystem	1	150	NASA	12/02	C/FP	NASA	02/03	06/03	YES	
VLBI Mark V System	1	200	NSF	12/02	C/FP	NSF	03/03	07/03	YES	
FY 2003										
FLEET NUMERICAL METEOROLOGY & OCEANOGRAPHY CTR										
POPS Enhancements	1	7382	GSA	10/02	BPA	IBM Bethesda, MD	002/03	03/03	YES	
D. REMARKS	P-1 SHOPPING LIST				CLASSIFICATION:		UNCLASSIFIED			
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BUDGET PROCUREMENT HISTORY AND PLANNING EXHIBIT (P-5A)					Weapon System		A. DATE			
B. APPROPRIATION/BUDGET ACTIVITY Other Procurement, Navy BA-7 PERSONNEL AND COMMAND SUPPORT EQUIPMENT					C. P-1 ITEM NOMENCLATURE ENVIRONMENTAL SUPPORT EQUIPMENT				FEBRUARY 2004	
									SUBHEAD	
Cost Element/ FISCAL YEAR	QTY	UNIT COST (000)	LOCATION OF PCO	RFP ISSUE DATE	CONTRACT METHOD & TYPE	CONTRACTOR AND LOCATION	AWARD DATE	DATE OF FIRST DELIVERY	SPECS AVAILABLE NOW	IF NO WHEN AVAILABLE
FY 2004 NAVOCEANO										
AUV Lithium Batteries	2	250	NAVOCEANO	01/04	C/FP	UNKNOWN	04/04	05/04	YES	
Oceanographic Central Suite Svy Wkst/Stor Repl	5	264	SPAWAR	12/03	C/FP	Consensys Corp Universal City, TX	01/04	04/04	YES	
Oceanographic Data Warehouse Mass Storage	1	255	GSA	02/04	C/FP	UNKNOWN	04/04	05/04	YES	
Deep Multibeam Repl	1	2500	SPAWAR	01/04	C/FP	UNKNOWN	04/04	06/04	YES	
OIS Architecture	1	1434	GSA Huntsville, AL	10/03	C/FP	VARIOUS	05/04	07/04	YES	
Svy Operations Center Data Mgmt Sys	1	659	Chicken Little Prog Ofc Eglin AFB, FL	12/03	C/FP	AVERY ISLAND TECH New Iberia, LA	02/04	06/04	YES	
<u>FY2004</u>										
U.S. NAVAL OBSERVATORY										
H MASER SYSTEM	2	247	FISC WASH	12/03	C/FP	DATUM, INC MA	03/04	7/04	YES	
<u>FY2004</u>										
FLEET NUMERICAL METEOROLOGY & OCEANOGRAPHY CTR										
POPS Enhancements	1	3795	GSA	10/03	C/FP	IBM Bethesda, MD	02/04	05/04	YES	
D. REMARKS	P-1 SHOPPING LIST				CLASSIFICATION:			UNCLASSIFIED		
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BUDGET PROCUREMENT HISTORY AND PLANNING EXHIBIT (P-5A)					Weapon System		A. DATE				
							FEBRUARY 2004				
B. APPROPRIATION/BUDGET ACTIVITY					C. P-1 ITEM NOMENCLATURE				SUBHEAD		
Other Procurement, Navy					ENVIRONMENTAL SUPPORT EQUIPMENT				V7Z7		
BA-7 PERSONNEL AND COMMAND SUPPORT EQUIPMENT											
Cost Element/ FISCAL YEAR	QTY	UNIT COST (000)	LOCATION OF PCO	RFP ISSUE DATE	CONTRACT METHOD & TYPE	CONTRACTOR AND LOCATION	AWARD DATE	DATE OF FIRST DELIVERY	SPECS AVAILABLE NOW	IF NO WHEN AVAILABLE	
FY 2005 NAVOCEANO											
Oceanographic Central Suite Svy Wkst/Stor Repl	3	333	UNKNOWN	12/04	C/FP	UNKNOWN	01/05	04/05	YES		
Deep Multibeam Repl	1	3000	UNKNOWN	01/05	C/FP	UNKNOWN	04/05	06/05	YES		
OIS Architecture	4	442	UNKNOWN	10/04	C/FP	UNKNOWN	05/05	07/05	YES		
Shallow Water Seismic System	2	425	UNKNOWN	10/04	C/FP	UNKNOWN	02/05	06/05	YES		
Ship to Shore Data Comm	3	1139	UNKNOWN	12/04	C/FP	UNKNOWN	03/05	07/05	YES		
Svy Operations Ctr Data Mgmt Sys	1	330	UNKNOWN	11/04	C/FP	UNKNOWN	01/05	03/05	YES		
Oceanographic Web Servers LCR	1	400	UNKNOWN	10/04	C/FP	UNKNOWN	03/05	05/05	YES		
<u>FY2005</u>											
U.S. NAVAL OBSERVATORY											
FOCAL PLANE ARAY	1	700	FISC WASH	12/04	C/FP	STA	04/05	09/06	YES		
FY 2005 FLEET NUMERICAL METEOROLOGY & OCEANOGRAPHY CTR											
POPS Enhancements	1	1722	GSA	10/04	C/FP	UNKNOWN	02/05	05/05	YES		
D. REMARKS					P-1 SHOPPING LIST Item No. 142 PAGE NO 25			CLASSIFICATION: UNCLASSIFIED			
EXHIBIT P-5A											