EXHIBIT R-2, RDT&E Budget Item Justification						DATE: February 2008	
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-4				R-1 ITEM NOMENCLATURE PE 0603207N Air/Ocean Tactical Applications			
COST ($ in Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Total PE Cost	**35.070**	**43.406**	**66.133**	**46.725**	**40.120**	**32.300**	**31.448**
2341 METOC Data Acquisition	13.750	14.056	19.831	15.979	14.214	9.032	9.253
2342 METOC Data Assimilation and Modeling	10.664	14.212	18.642	21.652	17.356	14.497	13.189
2343 Tactical METOC Applications	8.164	7.374	6.390	6.758	6.185	6.349	6.516
2344 Precise Timing and Astrometry	1.517	1.206	20.270	1.313	1.311	1.337	1.364
3207 Fleet Synthetic Training			1.000	1.023	1.054	1.085	1.126
9999 Congressional Increases	0.975	6.558					

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Air Ocean Tactical Applications (AOTA) Program Element is fully aligned with Navy's Sea Power 21 concept to enhance the future mission capabilities of the Navy-Marine Corps Team. New state-of-the art government and commercial technologies are identified, transitioned, demonstrated and then integrated into Combat Systems and FORCEnet-related programs of record and Tactical Decision Aids (TDAs) that determine in real-time and near-real-time the operational effects of the physical environment on the performance of combat forces and their new and emerging platforms, sensors, systems and munitions. The AOTA program element focuses on sensing and characterizing the littoral and deep-strike battlespace in the context of regional conflicts and crisis response scenarios. Projects in this program element transition state-of-the art sensing, assimilation, modeling and decision aid technologies from Government and commercial sources. Unique project development efforts include atmospheric and oceanographic data assimilation techniques, forecast models, data base management systems and associated software for use in mainframe, desktop and laptop computers. Global Geospatial Information and Services efforts within this program address the bathymetric and gravimetric needs of the Navy. Also developed are algorithms to process new satellite sensor data for integration into Navy and Marine Corps decision support systems and for display as part of the common operational and tactical pictures. In addition, the projects provide for demonstration and validation of specialized atmospheric and oceanographic instrumentation and measurement techniques, new sensors, communications and interfaces. Included are new capabilities to assess, predict and enhance the performance of current and emerging undersea warfare and mine warfare weapons systems. AOTA capabilities are designed to support the latest versions of the Global Command and Control System (GCCS), the new Network Enterprise Command and Control (NECC) system (formerly called Joint Command and Control (JC2)), and specific unit-level combat systems. This program also develops representations of the physical environment for incorporation into Navy and Marine Corps warfare trainers and simulations. Finally, this program develops technological upgrades for the U.S. Naval Observatory's Master Clock system to keep pace with the demands of modern military communications, cryptographic, intelligence, geolocation, and targeting systems; develops near-real-time earth orientation predictions; develops very precise determination of positions of both faint and bright stars; and supports satellite tracking and space debris studies. Funding increase in Project 2341 beginning in FY09 reflects an internal transfer of Geo-Acoustic Sensing funding for the Ocean Bottom Characterization Initiative (OBCI). Funding increase in Project 3207 beginning in FY09 reflects funding for Fleet Synthetic Training to be executed by Fleet Forces Command. Fleet Synthetic Training (FST) is a CNO initiative that is intended to provide naval forces with an enhanced in-port training capability. Integrating embedded shipboard training devices, aircraft and submarine simulators into an interoperable network with Joint, Coalition and Interagency partners is expected to provide more effective training for our deploying naval forces. FY09 funding increase in project 3207 for the Joint Milli-Arcsecond Pathfinder Survey (J-MAPS) will be used to complete Phase A (conceptual design) and Phase B (preliminary design) of the overall spacecraft and mission. In addition, long lead item developments will begin immediately after the System Requirements Review (SRR) at end of FY08. Development will include focal plane assemblies, readout and processing electronics, and optical components. By the end of FY09, as a result of this funding, a preliminary design for the spacecraft will be delivered.

FY09 funding increase in project 2344 reflects funding for the Joint Milli-Arcsecond Pathfinder Survey (J-MAPS). The accuracy of star positions is degrading with time due to the movement of stars since the last highly accurate space-based measurements of star positions were made in 1991 . The accuracy of the catalog is approaching the minimum necessary to support current requirements, and will not meet future needs for high accuracy sensors and weapon systems. Therefore, the United States Naval Observatory (USNO), in concert with other activities and agencies in the Space and Intelligence Surveillance and Reconnaissance (ISR) communities, has developed the J-MAPS initiative. J-MAPS will satisfy the emerging requirements for a new high accuracy star catalog through a space-based (satellite) astrometry mission that will also “pathfind” new star tracker technology for future ISR systems.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA 4	R-1 ITEM NOMENCLATURE PE 0603207N Air/Ocean Tactical Applications

(U) B. PROGRAM CHANGE SUMMARY:

(U) Funding:	FY 2007	FY 2008	FY 2009
FY08 President's Budget	32.654	47.914	36.215
FY09 President's Submit	35.070	43.406	66.133
Total Adjustments	2.416	(4.508)	29.918
Summary of Adjustments			
Program Adjustment		(3.543)	29.990
Miscellaneous Adjustment	2.757		
Small Business Innovative Research (SBIR) Tax	(0.341)	(0.682)	
Navy Working Capital Fund (NWCF) Rate Adjustment			(0.072)
Congressional Adjustments		(0.283)	
Subtotal	2.416	(4.508)	29.918

(U) Schedule:

This budget reflects a reorganization by program/project to better support the acquisition process. Schedules are now presented separately for each program/project.

(U) Technical:

Not applicable

EXHIBIT R-2a, RDT&E Project Justification					DATE: February 2008		
APPROPRIATION/BUDGET ACTIVITY RDT&E,N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications				PROJECT NUMBER AND NAME 2341 METOC Data Acquisition		
COST ($ in Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	**13.750**	**14.056**	**19.831**	**15.979**	**14.214**	**9.032**	**9.253**
RDT&E Articles Qty							

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The major thrust of the Meteorology and Oceanography (METOC) Data Acquisition Project is to provide future mission capabilities to warfighters that will allow them to detect and monitor the conditions of the physical environment throughout the entire battlespace. New sensor technologies (including unmanned vehicles, tactical sensor exploitation, in-situ sensors, etc.) are identified and the most promising candidates are transitioned from the government's and commercial industry's technology base to this project. These new sensor technologies are then demonstrated, validated and integrated into operational programs of record for use by warfighters. These new sensor capabilities are to provide timely and accurate METOC data and products to operational and tactical level of war commanders. As the emphasis on Naval Warfare has evolved from blue water operations to the littoral and deep strike battlespace, METOC data requirements have likewise evolved. The littoral and deep strike regions are extremely dynamic and complex, characterized by strong and highly variable oceanographic and atmospheric conditions. As a result, the need to accurately characterize these conditions is more crucial than ever in planning and executing Amphibious Warfare, Mine Warfare, Special Operations, Anti-Submarine Warfare (ASW), and Strike Warfare operations. Routinely available data sources, such as climatology, oceanographic and meteorological numerical models, and satellite remote sensing are necessary but not sufficient to support these warfare areas in the littoral and deep strike regions. Current operational sensors, such as the standard balloon-launched radiosound, are deployed from platforms that are frequently located great distances from the target area of interest. The principal challenge is to provide a means for the collection and dissemination of METOC data in highly variable and dynamic littoral environmental conditions or in denied, remote or inaccessible areas over extended periods of time. The principal goals of this project are to: 1) provide the means to rapidly and automatically acquire a broad array of METOC data using both off-board and on-board sensors; 2) provide an on-scene assessment capability for the tactical commander; 3) provide the tactical commander with real-time METOC data and products for operational use; 4) demonstrate and validate the use of tactical workstations and desktop computers for processing and display of METOC data and products using latest networking technologies; 5) demonstrate and validate techniques which employ data compression, connectivity and interface technologies to ingest, store, process, distribute and display these METOC data and products; 6) develop new charting and bathymetric survey techniques necessary to reduce the existing shortfall in coastal hydrographic survey requirements; and, 7) develop an expanded database for predictive METOC models in areas of interest. In FY07 and FY08 a portion of project funding is directed towards the development of the USMC Meteorological Mobile Facility (Replacement) Next Generation (METMF(R) NEXGEN) due to emergent critical USMC capability requirements. These efforts will enhance Intelligence Preparation of the Environment (IPE) capabilities to meet CNO and CFFC (Commander, Fleet Forces Command) requirements for remote autonomous, clandestine, Littoral Battlespace Sensing (LBS) in support of Sea Shield & Sea Basing.

Funding increases in FY08 and beyond support development of radar weather using Through-The-Sensor (TTS) techniques and development of ocean glider and Autonomous Undersea Vehicles (AUV), sensors, Tracking and Telemetry, and Mission Planning System (MPS) as part of the Littoral Battlespace Sensing, Fusion and Integration (LBSF&I) Program. Funding increases for the Ocean Bottom Characterization Initiative (OBCI) support 1) Intelligence Preparation of the Environment (IPE), providing optimal force structure and asset allocation and placement determination; 2) Phase 0 Antisubmarine Warfare (ASW) operations; and 3) sensor performance predictions for low and mid frequency active and passive Navy sonar systems.

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT NUMBER AND NAME**	**PROJECT NUMBER AND NAME**
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	2341 METOC Data Acquisition

(U) B. Accomplishments/Planned Program

Littoral Battlespace Sensing, Fusion and Integration (LBSF&I)	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost	2.379	0.980	4.841
RDT&E Articles Quantity			

FY07 - Demonstrated and validated automated data acquisition and assimilation efforts as part of the Littoral Battlespace Sensing, Fusion and Integration (LBSF&I) program. Formerly part of "Acoustic Data Inversion/Sensors and Observing Systems (Through-the-Sensor)." Delivered/tested/demonstrated prototype Sensor Pod on operational Unmanned Aerial Vehicles (UAVs) of miniaturized sensor suites for mini/micro UAV platforms. Developed and tested Network interoperability of miniaturized sensor suites for emergent UAV and Autonomous Undersea Vehicles (AUV) platforms (continued from autonomous sensors (AUV/UAV)). Ruggedized vehicles and began development of a common command and control system. Developed prototype AUV (buoyancy) and other in-situ sensors in accordance with study results. Integrated new sensing capabilities into prototypes as part of the LBSF&I program. Formerly part of "Autonomous Sensors (AUV/UAV)/Sensors and Observing Systems (Unmanned Vehicles)."

FY08 - Begin development of glider prototypes and the planned tracking and telemetry components of the unmanned systems in preparation of Milestone C (FY10). Sensor integration and validation/ verification tests will be initiated. Continue development glider prototypes, including the development and testing of integrated sensors. Complete related studies (communications, databasing, data flow, etc.) and system engineering plans. Continue development of a common Tracking and Telemetry and vehicle mission planning system. Demonstrate and test components. Develop requirements, specifications, and standards for the glider, Tracking and Telemetry, and Mission Planning systems in preparation for procurement and for use in related Joint Capabilities Integration & Development System (JCIDS) documentation. Formerly part of "Autonomous Sensors (AUV/UAV)/Sensors and Observing Systems (Unmanned Vehicles)."

FY09 - Continue development of end-to-end LBSF&I Increment 1.0 glider sensor and support systems. Begin testing and demonstration of end to end glider systems in preparation for MS C and LRIP in FY10. Define Increment 2.0 requirements and definition of Spiral 2 improved Unmanned Undersea Vehicles and associated support systems (launch and recovery, mission planning, test equipment, etc.). Conduct Spiral 2 studies (Analyses of Alternatives, Engineering Studies, etc.). Formerly part of "Autonomous Sensors (AUV/UAV)/Sensors and Observing Systems (Unmanned Vehicles)." Begin preparations for the System Development and Demonstration (SDD) phase of the Autonomous Undersea Vehicle (AUV) procurement scheduled to commence in FY10.

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT NUMBER AND NAME**	**PROJECT NUMBER AND NAME**
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	2341 METOC Data Acquisition

(U) B. Accomplishments/Planned Program

USMC Meteorological Mobile Facility (Replacement) Next Generation (METMF(R) NEXGEN)	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost	2.704	2.491	
RDT&E Articles Quantity			

FY07 - Conducted METMF(R) NEXGEN (formerly METMF(R) NG) software, hardware, radar, and communications upgrades. Delivered Variant I EDM and Variant II prototype. Formerly part of "USMC Acquisition."

FY08 - Conduct operational testing of METMF(R) NEXGEN (formerly METMF(R) NG) prototypes and prepare for delivery. Formerly part of "USMC Acquisition."

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT NUMBER AND NAME**	**PROJECT NUMBER AND NAME**
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	2341 METOC Data Acquisition

(U) B. Accomplishments/Planned Program

Meteorlogical and Oceanographic (METOC) Furture Mission Capabilities (FMC)	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost	5.243	9.687	7.537
RDT&E Articles Quantity			

FY07 - Completed integration of the AQS-20 inversion techniques into the Commander, Naval Meteorological and Oceanographic Command (CNMOC) Mine Warfare Workstation and the Mine Warfare Environmental Decision Aids Library (MEDAL). Continued development of the SPS-48E weather radar and SPY-1 Tactical Environmental Processor (TEP) work. Demonstrated and validate automated data acquisition and assimilation efforts as part of the Littoral Battlespace Sensing, Fusion and Integration (LBSF&I) program. Began integration into Fleet Combat Systems. Began development of Military Aircraft Communications Addressing and Report System (ACARS). Formerly part of "Acoustic Data Inversion/Sensors and Observing Systems (Through-the-Sensor)." Continued the development of the next generation AN database modeled after the Global Data Base Variable Resolution (GDB-V) database. Conducted annual pre-release technical analysis and research of new National Geospatial Agency (NGA) products used by the Navy for navigation systems and maritime safety for Quality Control, Suitability of Use, and Interoperability. (from Digital MC and G Analysis Program (DMAP)). Continued to develop Tactical Decision Aids (TDA) uncertainty algorithms (from Acoustic Data Acquisition). Formerly part of "Ambient Noise Data/TDA/Mission Planning."

FY08 - METOC Future Capabilities will continue development and test military ACARS and exploit Intelligence Surveillance & Reconnaissance (ISR) sensors for manned & unmanned platforms for environmental information. Continue with use of Naval Special Warfare (NSW), Mine Warfare tactical sensors for Through-the-Sensor (TTS) applications for environmental assessment and characterization. Develop, demonstrate & test TTS concept for undersea warfare systems. Continue development of the SPS-48E and SPS-48G Radar Obsolescence and Availability (ROAR) Hazardous Weather Detection and Display Capability (HWDDC). Test and demonstrate the HWDDC system. Begin work with SPS-48G developer to integrate algorithms into ROAR. Continue development of the SPY-1 TEP prototype. Complete related studies (communications, databasing, data flow, etc.) and system engineering plans. Complete development of the HWDDC requirements, specifications, and standards for the HWDDC system in preparation for procurement and for use in related JCIDS documentation. Begin development of TEP requirements, specifications, standards and system engineering plans for the TEP system. Formerly part of "Acoustic Data Inversion/Sensors and Observing Systems (Through-the-Sensor)." Mapping, Charting & Geodesy (MC&G) product analysis and development. Architecture and design of Mission Planning Systems and support elements in support of littoral combat operations. Data analysis and processing development for environmental characterization for Mission Planner & Tactical Decision Aid use. Develop quality control, fusion and product uncertainty tools and techniques to transform data into information to support product development for mission planners and TDA use. Development of techniques and tools to guide adaptive sampling to optimize use of measurement assets. Develop advanced Geospatial Information and Services (GI&S) databases and data processing tools and techniques to support boundary conditions for numerical forecast models. Develop advanced data fusion tools and interface modules to ocean and atmospheric data assimilation systems. Formerly part of "Ambient Noise Data/TDA/Mission Planning."

FY09 - Continue advanced component and prototype efforts associated with acquiring environmental data. Continue development of advanced data measurement and survey techniques to improve survey planning and execution. Continue development of improved data quality control technologies and the automation of data acquisition processes. Continue to develop advanced technologies and techniques to improve Geospatial Information and Services (GI&S) capabilities within Navy METOC production centers and throughout the fleet user base. Implement through-the-sensor (TTS) technologies to use tactical detection systems to characterize undersea and atmospheric environment in the battlespace intregate with analysis and C4I distribution systems. Development of the SPY-1 TEP prototype and integration of HWDDC into the SPS-48G ROAR. Develope TEP requirements, specifications, standards and system engineering plans for integration of the TEP algorithms into the Aegis SPY-1 Open Architecture upgrade program. Work with the SPS-48G program office and prime contractor to integrate HWDDC algorithms into the ROAR system. Formerly part of the "Acoustic Data Inversion/Sensors and Observing Systems (Through-the-Sensor)".

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	**PROGRAM ELEMENT NUMBER AND NAME** PE 0603207N Air/Ocean Tactical Applications	**PROJECT NUMBER AND NAME** 2341 METOC Data Acquisition

(U) B. Accomplishments/Planned Program

Naval Integrated Tactical Environmental System Next Generation (NITES-Next)	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost			2.289
RDT&E Articles Quantity			

FY09 - Support METOC data transport, storage, delivery, design and development efforts in a Net-centric environment for pre-Milestone C Naval Integrated Tactical Environmental Subsystem Next Generation (NITES-Next) activities. Formerly part of "Data Connectivity/METOC in the IT Enterprise."

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT NUMBER AND NAME**	**PROJECT NUMBER AND NAME**
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	2341 METOC Data Acquisition

(U) B. Accomplishments/Planned Program

Tactical Environmental Support System/Naval Integrated Tactical Environmental Subsystem (TESS/NITES)	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost		0.342	0.231
RDT&E Articles Quantity			

FY08 - Finalize Naval Integrated Tactical Environmental Subsystem (NITES) Data (formerly known as Tactical Environmental Data (TED) Services) integration efforts and prepare for COMOPTEVFOR operational evaluation (OPEVAL) with Command and Control Systems. Formerly part of "Data Connectivity/METOC in the IT Enterprise."

FY09 - Tactical Environmental Support System/Naval Integrated Tactical Environmental Subsystem (TESS/NITES) software development and testing for technology upgrades, refreshes, migrations, and system engineering efforts. Formerly part of "Data Connectivity/METOC in the IT Enterprise."

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT NUMBER AND NAME**	**PROJECT NUMBER AND NAME**
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	2341 METOC Data Acquisition

(U) B. Accomplishments/Planned Program

Tactical Oceanography Capabilities (TOC) / Undersea Warfare (USW)	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost	0.275	0.556	0.433
RDT&E Articles Quantity			

FY07- Delivered Geophysical Acoustic Inversion Toolkit (GAIT) Version 2 to Ocean Atmosphere Master Library (OAML). Began integration into Fleet Combat Systems. Matured networked data sharing capabilities (from acoustic data inversion). Continued investigation of Precise Underwater Mapping (PUMA) volumetric sound velocity and backscatter inversion techniques. Tested and validated Modular Ocean Data Assimilation System-Light (MODAS-L) string data ingest capability and volumetric sound velocity assimilation algorithms for OAML approval. Began integration of these algorithms into submarine combat systems. Began development of web-based submarine ambient noise assimilation capability (Acoustic Data Acquisition). Formerly part of "Acoustic Data Inversion/Sensors and Observing Systems (Through-the-Sensor)." Integrated the Dynamic Ambient Noise Prediction System (DAPS) Version 2 and updated historical shipping noise database into Fleet Anti-submarine Warfare (ASW) Combat Systems (specifically the Sonar Tactical Decision Aid Variants and Under Sea Warfare (USW) Decision Support System (DSS)). Developed Network based on DAPS. Added real-time ship tail Ambient Noise (AN) observations to the Shipping Nose (SN) database (from Ambient Noise Data). Continued the development of the next generation AN database modeled after the Global Data Base Variable Resolution (GDB-V database. Continued to develop Tactical Decision Aids (TDA) uncertainty algorithms (from Acoustic Data Acquisition). Formerly part of "Ambient Noise Data/TDA/Mission Planning.".

FY08 - Complete integration of GAIT Version 2 algorithms into Fleet Combat Systems, Anti-submarine Warfare (ASW) Tactical Decision Aids (TDAs) and for use aboard Naval Oceanographic Office (NAVOCEANO) assets. Commence development of the GAIT Version 3 algorithms. Engineering studies and preliminary design for a passive seabed classification system to be used aboard submarines, next-generation surface ships and aboard Maritime Patrol & Reconnaissance Aircraft (MPRA.) Continue development of ambient noise assimilation capability aboard submarines. Begin development of advanced geo-acoustic merging algorithms to support inversions. Conduct submarine fathometer (BQN-17) Automated Sediment Classification System (ASCS) validation. Develop, demonstrate & test Through-the-Sensor (TTS) concept for undersea warfare systems. Formerly part of "Acoustic Data Inversion/Sensors and Observing Systems (Through-the-Sensor)." Architecture and design of Mission Planning Systems and support elements in support of littoral combat operations. Data analysis and processing development for environmental characterization for Mission Planner & Tactical Decision Aid use. Develop quality control, fusion and product uncertainty tools and techniques to transform data into information to support product development for mission planners and TDA use. Development of techniques and tools to guide adaptive sampling to optimize use of measurement assets. Formerly part of "Ambient Noise Data/TDA/Mission Planning." Develop advanced processing tools to work with insitu data sources to populate environmental database and support forward deployed oceanographic personnel. Continue development work, test and document adaptive hydrographic and seafloor survey work for transition to the unmanned vehicles, small surface craft and T-AGS 60 class ships. Formerly part of "Littoral Battlespace Data Acquisition/Sensors and Observing Systems (In-Situ)."

FY09 - Geo-acoustic data inversion (through-the-sensor) efforts rolled into the Ocean Bottom Characterization Initiative (OBCI). Expand ambient noise through-the-sensor collection and assimilation capability to include current and future MPRA platforms like the Multi-Mission Maritime Aircraft (MMA) and future surface combatant platforms like the Littoral Combat Ship (LCS) and the Next Generation Destroyer (DD(X)). Develop techniques and algorithms to collect atmospheric refractivity data in support od Anti-Submarine Warfare (ASW) operations. Continue to develop, test and demonstrate advanced Geographic Information Systems (GIS) in support of world-wide Anti-Submarine Warfare (ASW) operations. Develop mission planning tools in support of littoral combat operations. Develop capability to quickly calculate transmission loss (TL) values in tactical timeframes. Continue data analysis and processing development for environmental characterization for mission planning & tactical decision aid use. Continue development, test/document and quality control fusion and product uncertainty tools and techniques to transform data into information to support product development for mission planners and tactical decision aid (TDA) use. Continue development, test and validation of techniques and tools to guide adaptive sampling to optimize use of measurement assets. Develop both acoustic and non-acoustic ASW reconstruction and analysis algorithms and techniques to aid in environmental analysis of Naval exercises. Develop and validate ASW product effectiveness metrics algorithms. Develop and validate methods for a theater-wide ambient noise planning tool using all available data sources. Develop next-generation shipping noise quantification, data fusion and forecast algorithms. Design the automated model metrics system. Continue to develop and demonstrate advanced processing tools to work with insitu data sources to populate environmental database and support forward deployed oceanographic personnel. Development and demonstration of advanced insitu sensor systems to support very near shore situational awareness in support of Anti-Submarine Warfare missions. Continue development, verify and validate performance and document adaptive geoacoustic survey work for transition to unmanned vehicles and T-AGS 60 class ships. Continue the development and demonstration of micro-miniature oceanographic and atmospheric in-situ sensors & systems. Utilize tactical and survey platforms for insitu measurements.

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications	PROJECT NUMBER AND NAME 2341 METOC Data Acquisition

(U) B. Accomplishments/Planned Program

Ocean Bottom Characterization Initiative (OBCI)	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost	3.149		4.500
RDT&E Articles Quantity			

FY07 - Developed improved capabilities to characterize acoustic sea bottom loss and backscatter (reverberation) properties for inclusion in Naval Oceanographic Office (NAVOCEANO) databases supporting sensor performance predictions for low and mid-frequency active and passive Navy sonar systems in the Major Combat Operation (MCO) 2 and 3 areas of interest. Designed a prototype offboard ocean bottom characterization system to augment currently existing NAVOCEANO survey techniques employed by NAVOCEANO's fleet of T-AGS class ships. Conducted a zero-based review of existing survey methods by investigating concepts such as adaptive geoacoustic sampling, including horizontal/vertical bottom loss database decimation to determine the effect of building loss databases with fewer grid points and/or fewer sub-bottom layers on acoustic transmission loss calculations by Anti Submarine Warfare (ASW) tactical decision aids (TDAs). Improve data base accuracy of Navy Standard Low & High Frequency Bottom Loss (LFBL and HFBL) databases without inclusion of newly collected data sets. Incorporate existing, on-the-shelf data sets (e.g. HEP and BTEC data) into those databases. Extend the frequency boundaries of existing data bases in order to support new acoustic sensors. d. Characterize active reverberation for use in ASW tactical decision aids (TDAs). Provide a first-order solution to the reverberation characterization problem by furthering the development of the Geophysical Acoustic Bottom Interaction Model (GABIM).

FY09 - Develop capability to rapidly map coastal and deep-water seabed geoacoustic properties through characterization of seabed variability. Design offboard geo-acoustic survey platform and sensor prototypes for deployment aboard T-AGS class ships and other Naval Oceanographic Office (NAVOCEANO) assets. Continue development, validation and verfication of the Delivered Geophysical Acoustic Inversion Toolkit (GAIT) Version 3 bottom loss algorithms for AntiSubmarine Warfare Tactical Decision Aids (ASW TDAs) and NAVOCEANO assets to include active inversion methods. Continue development of a passive seabed classification system. Verify & validate performance of Through The Sensor (TTS) applications for inclusion in Navy Standard databases. Continue development of advanced geo-acoustic merging algorithms to support inversions. Pursue adapative sampling techniques for NAVOCEANO geoacoustic survey assets. Characterize backscatter (i.e. reverberation) data for inclusion in NAVOCEANO databases. Adapt ocean glider and autonomous underwater vehicle (AUV) sensors and behavior algorithms to support NAVOCEANO survey operations. Perform gravity/seismic data set correlation to improve geoacoustic databases. Extend bandwidth of existing bottom loss databases and algorithms to include all active and passive tactical acoustic frequencies. Define frequency extrapolation limits of existing reverberation data sets. Continue to develop prototype replacement acoustic source for NAVOCEANO survey operations. Begin development of active acoustic clutter characterization algorithms into Fleet Synthetic Training (FST) systems. Adapt the Generalized Acoustic Bottom Interaction Model (GABIM) to act as the first-order solution for a comprehensive, integrated system to generate an acoustic bottom loss and backscatter database in regions of strategic Navy interest. Provide technical and program management oversight for the Ocean Bottom Characterization Initiative (OBCI). Continue investigation of Low Frequency Active (LFA) source to characterize the seabed.

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT NUMBER AND NAME**	**PROJECT NUMBER AND NAME**
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	2341 METOC Data Acquisition

(U) C. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name

Not Applicable

RELATED RDT&E: PE 0604218N, Air/Ocean Equipment Engineering - AN/SMQ-11 satellite receiver/recorder system engineering to receive data from on-orbit Defense Meteorological Satellite Program (DMSP) sensors onboard selected ships and shore sites.

(U) D. ACQUISITION STRATEGY:

Acquisition, management and contracting strategies are to support the METOC Data Acquisition Project to develop, demonstrate, and validate METOC data collection methods and sensors, and to evolve the ability to provide timely and accurate METOC data and products to the Tactical Commander, all with management oversight by the Program Executive Officer for Command, Control, Communications, Computers, and Intelligence (PEO C4I).

(U) E. MAJOR PERFORMERS:

Not applicable

(U) F. METRICS:

Earned Value Management (EVM) is used for metrics reporting and risk management.

Exhibit R-3 Cost Analysis (page 1)												DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4			PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications			PROJECT NUMBER AND NAME 2341 METOC Data Acquisition						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 07 Cost	FY 07 Award Date	FY 08 Cost	FY 08 Award Date	FY 09 Cost	FY 09 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Software/Product Development	WX	NRL	30.720	5.008	N/A	6.070	N/A	5.824	N/A	CONT	CONT	
	WX	SSCs	9.784	2.718	N/A	3.447	N/A	3.030	N/A	CONT	CONT	
	WX	MISC	5.792	0.528	N/A	1.009	N/A	0.790	N/A	CONT	CONT	
	CP	MISC	14.895	5.436	N/A	3.470	N/A	10.187	N/A	CONT	CONT	
	N/A	MISC	3.784		N/A		N/A		N/A	CONT	CONT	
Subtotal Software/Product Development			64.975	13.690	N/A	13.996	N/A	19.831	N/A	CONT	CONT	
Remarks:												
Systems Engineering	CP	MISC	2.060		N/A		N/A		N/A	CONT	CONT	
Subtotal Systems Engineering			2.060	0.000	N/A	0.000	N/A	0.000	N/A	CONT	CONT	
Remarks:												

Exhibit R-3 Cost Analysis (page 2)												DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4			PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications			PROJECT NUMBER AND NAME 2341 METOC Data Acquisition						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 07 Cost	FY 07 Award Date	FY 08 Cost	FY 08 Award Date	FY 09 Cost	FY 09 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WX	OPTEVFOR	0.140	0.020	N/A	0.020	N/A		N/A	CONT	CONT	
	MP	JITC		0.040		0.040				CONT	CONT	
Subtotal Developmental T & E			0.140	0.060	N/A	0.060	N/A	0.000	N/A	CONT	CONT	
Remarks: Testing supports delivery of the Marine Corps Meteorological Mobile Facility Replacement (METMF(R)) Next Generation (NEXGEN) prototypes.												
Management												
Subtotal Management			0.000	0.000		0.000		0.000				
Remarks:												
Total Cost			67.175	13.750	N/A	14.056	N/A	19.831	N/A	CONT	CONT	

EXHIBIT R4, Schedule Profile | **DATE:** February 2008

APPROPRIATION/BUDGET ACTIVITY
RDT&E, N / BA-4

PROGRAM ELEMENT NUMBER AND NAME
PE 0603207N Air/Ocean Tactical Applications

PROJECT NUMBER AND NAME
2341 METOC Data Acquisition - Program: Littoral Battlespace Sensing, Fusion and Integration (LBSF&I)

Fiscal Year	2007				2008				2009				2010				2011				2012				2013				2014			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
LBSF&I UUV	Studies				MS B				Glider Sys Dev & Dem								AUV Sys Dev & Dem				AUV MS C				AUV IOC		AUV FOC		Sprial 2.0 EDM			
					MS B								Glider MS C			Glider IOC				Glider FOC												

Exhibit R-4a, Schedule Detail						**DATE:** February 2008	
APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT**				**PROJECT NUMBER AND NAME**		
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications				2341 METOC Data Acquisition - Program: Littoral Battlespace Sensing, Fusion and Integration (LBSF&I)		
Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
LBSF&I UUV		2Q			4Q	4Q	1Q	

EXHIBIT R4, Schedule Profile			DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications	PROJECT NUMBER AND NAME 2341 METOC Data Acquisition - Program: USMC Meteorological Mobile Facility (Replacement) Next Generation (METMF(R) NEXGEN)	

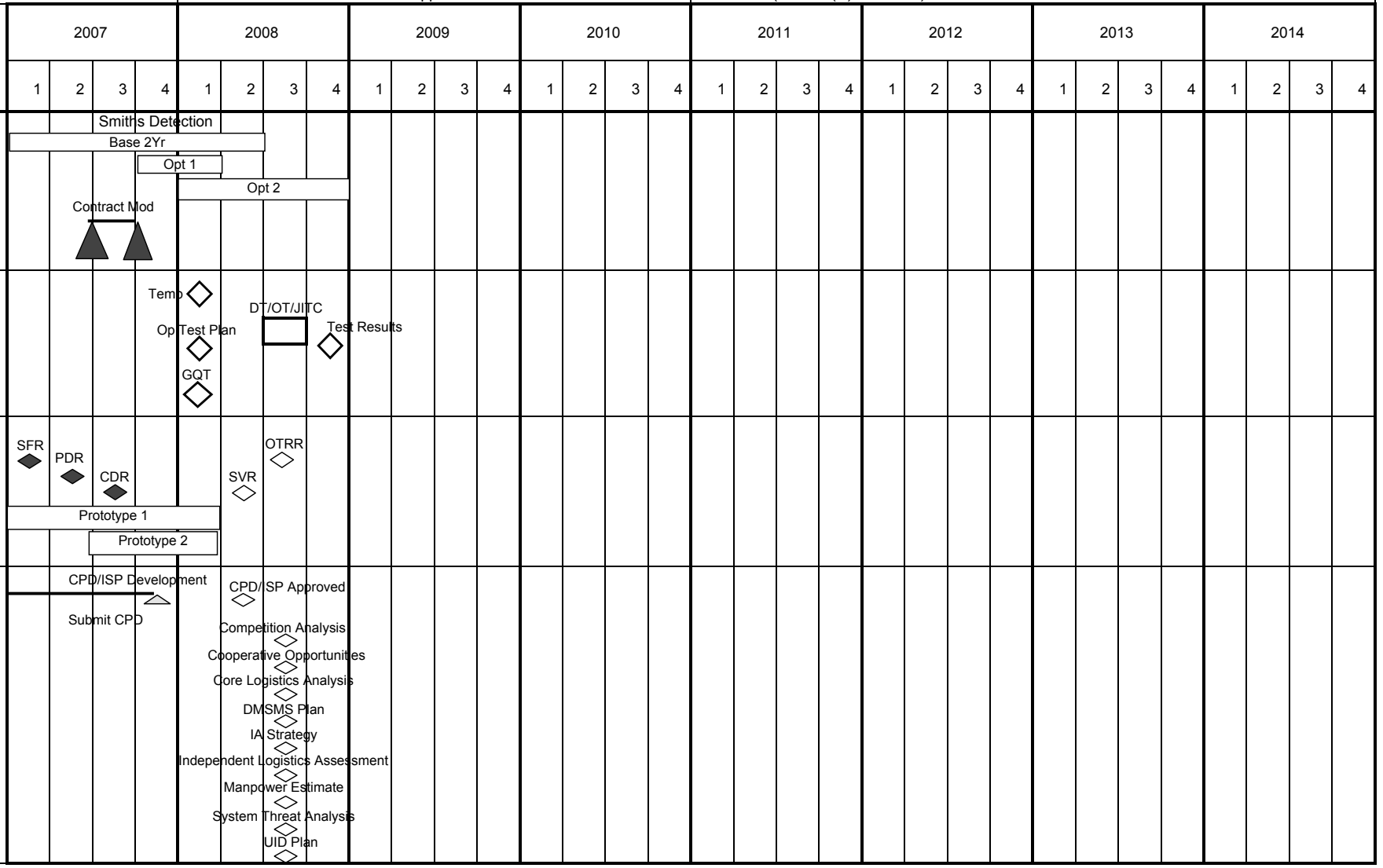


Exhibit R-4a, Schedule Detail						**DATE:** February 2008		
APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT**				**PROJECT NUMBER AND NAME**			
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications				2341 METOC Data Acquisition - Program: METMF NEXGEN			
Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
Contract Award or Events								
Base	1Q - 4Q	1Q - 2Q						
Modification	3Q							
Option 1	4Q	1Q						
Option 2		1Q - 4Q						
Testing								
Temp - Test & Evaluation Master Plan		1Q						
Op Test Plan - Oper		1Q						
GQT		1Q						
DT/OT/JITC		3Q						
Test Results		4Q						
Development								
SFR	1Q							
PDR	2Q							
CDR	3Q							
Prototype 1	1Q - 4Q	1Q						
Prototype 2	3Q - 4Q	1Q						
SVR		2Q						
OTRR		3Q						
Program Documentation								
CDP/ISP Development	1Q - 4Q							
Submit CDP	4Q							
CDP/ISP Approval		2Q						
Competition Analysis		3Q						
Cooperative Opportunities		3Q						
Core Logistics Analysis		3Q						
DMSMS Plan		3Q						
IA Strategy		3Q						
Independent Logistics Assessment		3Q						
Manpower Estimate		3Q						
System Threat Analysis		3Q						
UID Plan		3Q						

EXHIBIT R4, Schedule Profile			DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications	PROJECT NUMBER AND NAME 2341 METOC Data Acquisition - Program: Meteorlogical and Oceanographic (METOC) Future Mission Capabilities (FMC)	

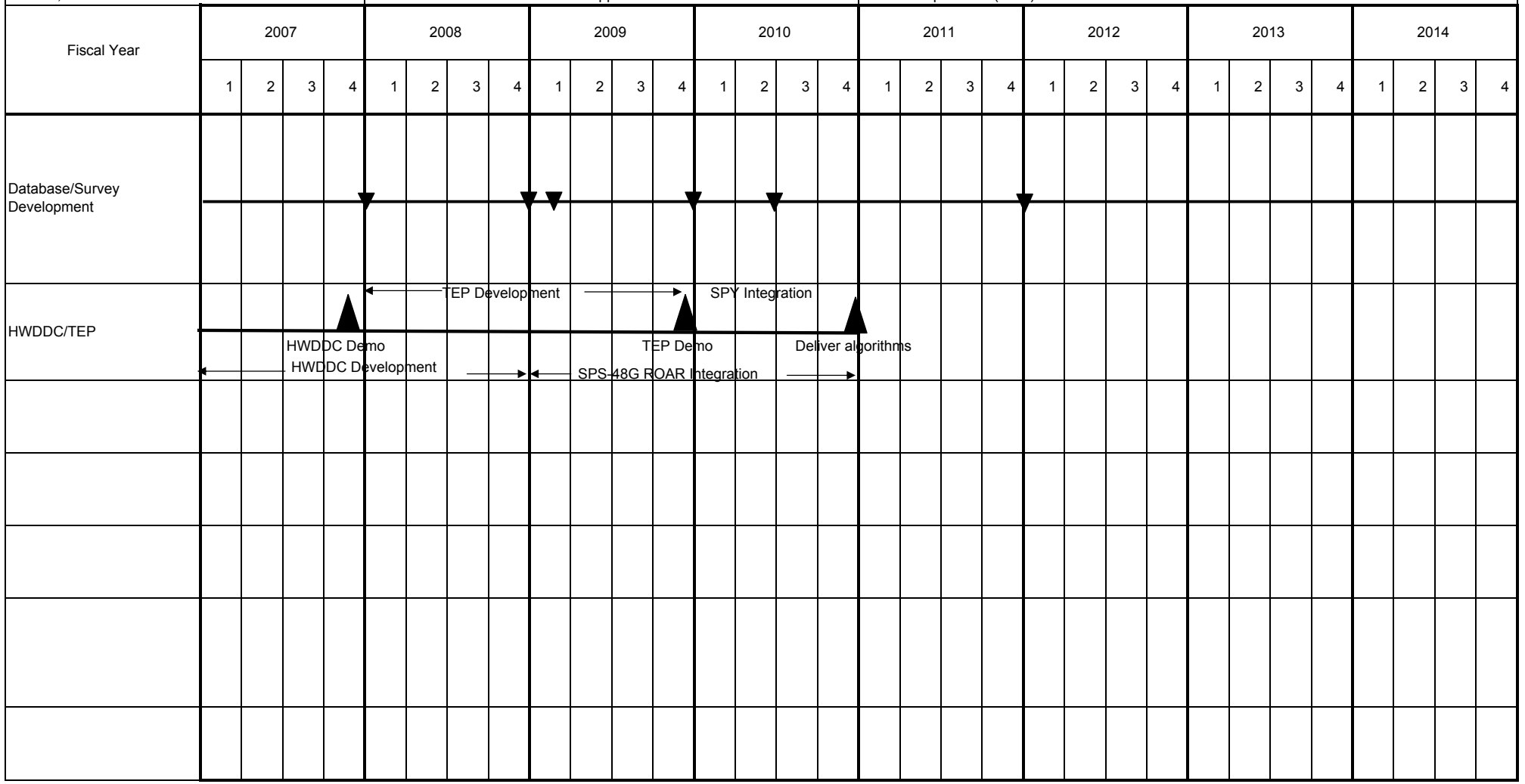


Exhibit R-4a, Schedule Detail						**DATE:** February 2008		
APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT**				**PROJECT NUMBER AND NAME**			
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications				2341 METOC Data Acquisition - Program: Meteorological and Oceanographic (METOC) Future Mission Capabilities			
Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
Database/Survey Development	4Q	4Q	1Q/4Q	2Q	4Q			
HWDDC/TEP	4Q		4Q	4Q				

CLASSIFICATION:

EXHIBIT R4, Schedule Profile			DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N /**	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications	PROJECT NUMBER AND NAME 2341 METOC Data Acquisition - Program: Tactical Environmental Support System/Naval Integrated Tactical Environmental Subsystem (TESS/NITES)	

Fiscal Year	2007				2008				2009				2010				2011				2012				2013				2014			
					1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Update Database Software for Transition to New Technology																																
Tactical Decision Aid (TDA) and Data Software Test and Integration																																
NITES TDA/Data Integration Efforts for Command and Control System Platforms																																

Exhibit R-4a, Schedule Detail						**DATE:** February 2008		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	**PROGRAM ELEMENT** PE 0603207N Air/Ocean Tactical Applications				**PROJECT NUMBER AND NAME** 2341 METOC Data Acquisition - Program: Tactical Environmental Support System/Naval Integrated Tactical			
Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
Update Database Software for Transition to New Technology	4Q	3Q						
Tactical Decision Aid (TDA) and Data Software Test and Integration		2Q	1Q					
NITES TDA/Data Integration Efforts for Command and Control System Platforms		1Q	1Q/4Q					

EXHIBIT R4, Schedule Profile			DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications	PROJECT NUMBER AND NAME 2341 METOC Data Acquisition - Program: Naval Integrated Tactical Environmental Subsystem (NITES) Next	

Fiscal Year	2007				2008				2009				2010				2011				2012				2013				2014			
					1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Engineering Studies/Prototypes of Data Transport for Engineering & Development									Arch/Design Study/Eng																							
Design Development and Test of Data Storage in Netcentric Environment with NITES-Next													Net-centric METOC data								NITES-next SOA migration for data											

Exhibit R-4a, Schedule Detail						**DATE:** February 2008		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	**PROGRAM ELEMENT** PE 0603207N Air/Ocean Tactical Applications				**PROJECT NUMBER AND NAME** 2341 METOC Data Acquisition - Program: Naval Integrated Tactical Environmental Subsystem (NITES)			
Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
Engineering Studies/Prototypes of Data Transport for Engineering & Development			1Q/3Q					
Design Development and Test of Data Storage in Netcentric Environment with NITES-Next				1Q	1Q	2Q		

EXHIBIT R4, Schedule Profile

DATE: February 2008

APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT NUMBER AND NAME**	**PROJECT NUMBER AND NAME**
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	2341 METOC Data Acquisition - Program: Tactical Oceanography Capabilities (TOC) / Undersea Warfare (USW)

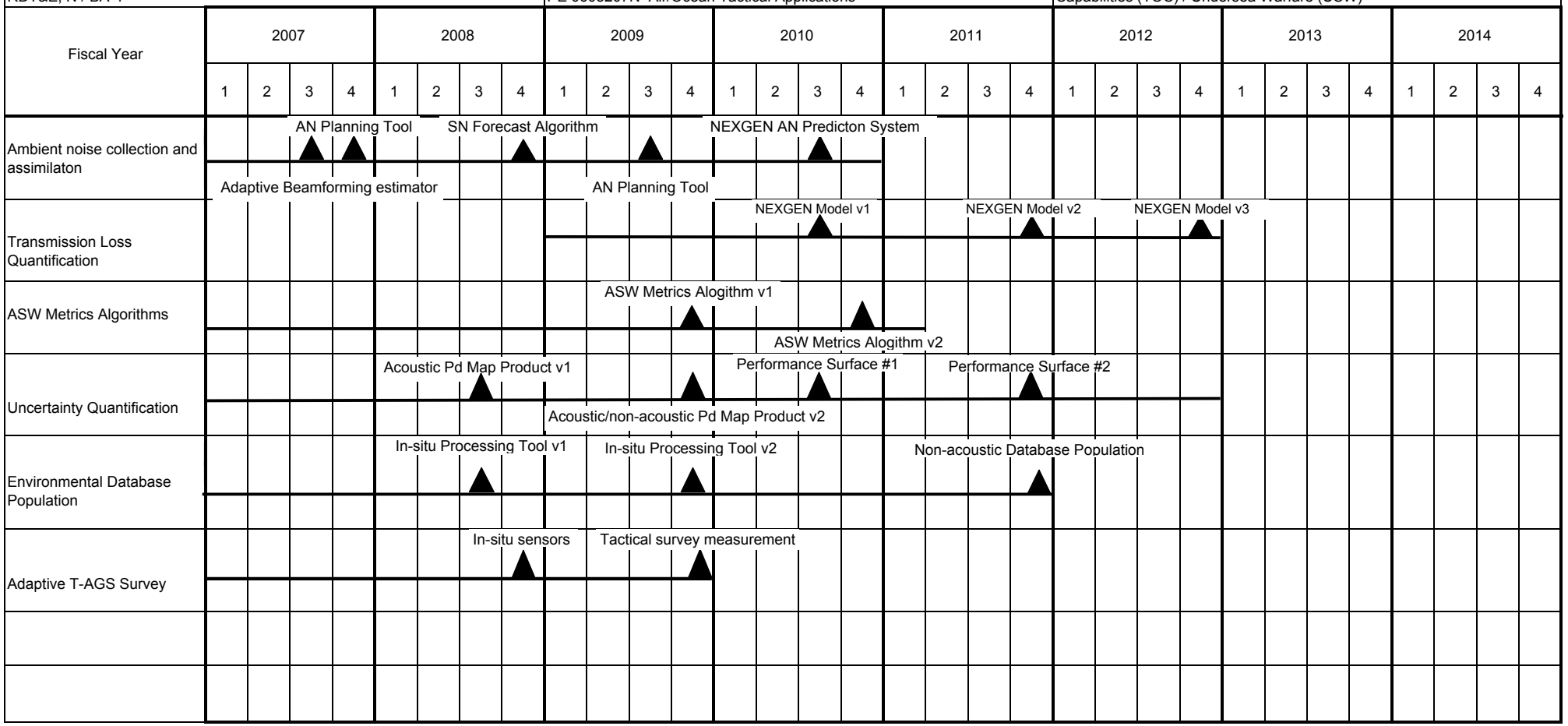


Exhibit R-4a, Schedule Detail						**DATE:** February 2008		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	**PROGRAM ELEMENT** PE 0603207N Air/Ocean Tactical Applications				**PROJECT NUMBER AND NAME** 2341 METOC Data Acquisition - Program: Tactical Oceanography Capabilities (TOC) / Undersea Warfare (USW)			
Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
Ambient noise collection and assimilaton	3Q/4Q	4Q	3Q	3Q				
Transmission Loss Quantification				3Q	4Q	4Q		
ASW Metrics Algorithms			4Q	4Q				
Uncertainty Quantification		3Q	4Q	3Q	4Q			
Environmental Database Population		3Q	4Q		4Q			
Adaptive T-AGS Survey		4Q	4Q					

EXHIBIT R4, Schedule Profile | **DATE:** February 2008

APPROPRIATION/BUDGET ACTIVITY
RDT&E, N / BA-4

PROGRAM ELEMENT NUMBER AND NAME
PE 0603207N Air/Ocean Tactical Applications

PROJECT NUMBER AND NAME
2341 METOC Data Acquisition - Program: Ocean Bottom Characterization Initiative (OBCI)

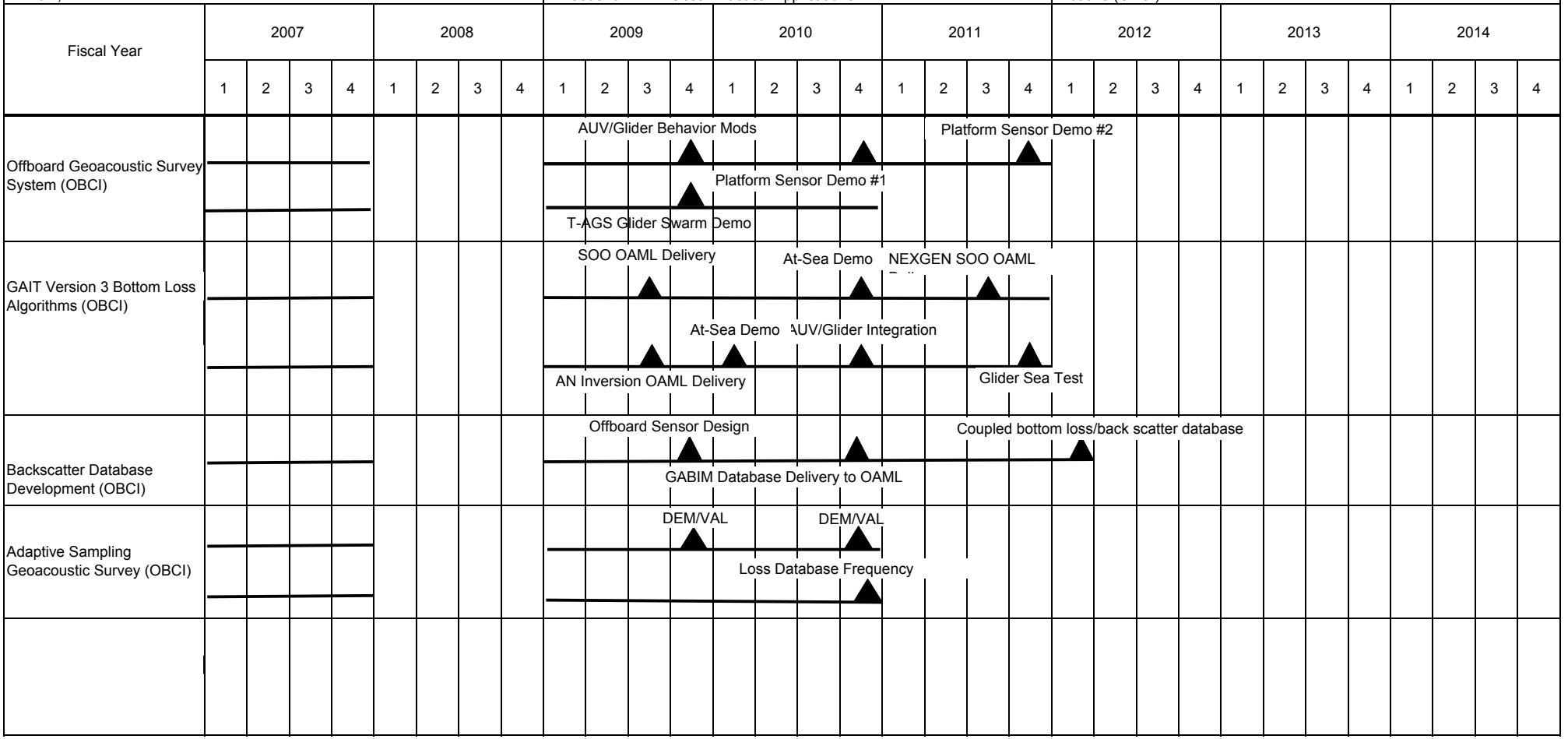


Exhibit R-4a, Schedule Detail						**DATE:** February 2008		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	**PROGRAM ELEMENT** PE 0603207N Air/Ocean Tactical Applications				**PROJECT NUMBER AND NAME** 2341 METOC Data Acquisition - Program: Ocean Bottom Characterization Initiative (OBCI)			
Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
Offboard Geoacoustic Survey System (OBCI)			4Q	4Q	4Q			
GAIT Version 3 Bottom Loss Algorithms (OBCI)			3Q	1Q/4Q	3Q/4Q			
Backscatter Database Development (OBCI)			4Q	4Q		1Q		
Adaptive Sampling Geoacoustic Survey (OBCI)			4Q	4Q				

EXHIBIT R-2a, RDT&E Project Justification						DATE: February 2008	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications				PROJECT NUMBER AND NAME 2342 METOC Data Assimilation and Modeling		
COST ($ in Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	**10.664**	**14.212**	**18.642**	**21.652**	**17.356**	**14.497**	**13.189**
RDT&E Articles Qty							

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

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

Funding increases in FY08 and beyond support the development of advanced data fusion algorithms and network integration as part of the Littoral Battlespace Sensing, Fusion and Integration (LBSF&I) Program.

This budget reflects a reorganization by program/project to better support the acquisition process.

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT NUMBER AND NAME**	**PROJECT NUMBER AND NAME**
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	2342 METOC Data Assimilation and Modeling

(U) B. Accomplishments/Planned Program

Littoral Battlespace Sensing, Fusion and Integration (LBSF&I)	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost	0.990		1.700
RDT&E Articles Quantity			

FY07- Developed advanced data fusion algorithms for weather radars in support of the LBSF&I program. Formerly part of "Coupled Data Assimilation/Assimilation and Prediction Models (Atmosphere)." Developed advanced data fusion algorithms in support of the LBSF&I program. Formerly part of "Basin Scale Ocean Models/Assimilation and Prediction Models (Oceans)."

FY09 - Continue development of advanced data assimilation and fusion algorithms for glider and Autonomous Undersea Vehicles (AUVs) data including, temperature, depth, saliningy, optics, hydrographic, bathymetric and other water column and ocean bottom properties. Demonstrate a basic capability to assimilate, database, and relay data and derived products from ocean gliders and AUVs, including optics, bathymetry, temperature, depth, salinity, and currents. Demonstrate prototype mission planning and adaptive sampling capability. Begin defining LBSF&I Unmanned Undersea Vehicle (UUV) Spiral 2.0 Fusion and Integration requirements and capabilities. Conduct Spiral 2 capability studies and analyses as required. Formerly part of the "Basin Scale Ocean Models/Assimilation and Prediction Models (Oceans)."

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications	PROJECT NUMBER AND NAME 2342 METOC Data Assimilation and Modeling

(U) B. Accomplishments/Planned Program

Meteorlogical and Oceanographic (METOC) Future Mission Capabilities (FMC)	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost	6.719	11.418	9.968
RDT&E Articles Quantity			

FY07 - Delivered Joint Modeling and Simulations (M&S) support capabilities to Naval Oceanography Command (NAVOCEANO). Continued development of Version 2.0 of the Carrier Strike Group/Expeditionary Strike Group (CSG/ESG) Environmental Simulator. Participated in selected Naval Exercises and delivered post exercise strawman and final reports (from Fleet Exercises). New applications and data are delivered from the program and require verification and validation on an annual basis. Delivered annual report (from Fleet Applications and Data Verification and Validation). Formerly part of "Modeling and Simulation (M&S)/Tactical Design Aids (TDA) and Mission Planning." Completed Variational Data Assimilation System (NAVDAS) Version 3 Operational Test (OPTEST) and deliver to FNMOC. Investigated and incorporated Automated Techniques into the next generation data assimilation system. Re-coded NAVDAS to conform to Weather Research and Forecasting (WRF) compatibility requirements (from Coupled Data Assimilation). Continued implementing WRF compatibility requirements. Explored incorporation of high-resolution Aerosol analyses and forecasts (from High-Resolution Models). Began development of Coupled Ocean/Atmosphere Meso-Scale Prediction System (COAMPS) V4. Continued investigations into improved Tropical Cyclone forecasting techniques. Began Development of Hi-Res (~27km) Global Model. Completed COAMPS Dust algorithm integration. Began COAMPS operating system Nowcast integration. Developed advanced data fusion algorithms for weather radars in support of the LBSF&I program. Formerly part of "Coupled Data Assimilation/Assimilation and Prediction Models (Atmosphere)." Incremental development of coupled air/ocean models for selected geographical locations in response to emergent requirements. Completed development of MODAS dynamic. Began development of MODAS Next Generation (NEXGEN). Continued development of HYCOM. Completed development of NCOM relocateable. Began development of NCOM Region A. Completed development of NCODA Vertical Covariance. Began development of NCODA Horizontal Covariance. Continued development of advanced ADvanced CIRCulation model (ADCIRC) and coastal wave and surf algorithms. Developed advanced data fusion algorithms in support of the LBSF&I program. Formerly part of "Basin Scale Ocean Models/Assimilation and Prediction Models (Oceans)." Continued to transition applications using next generation WindSat, MSG, the SSMIS, and MTSAT. Incorporation of Automated Expert System techniques (from Data Assimilation). Continued improvements to the Satellite Workstation. Formerly part of "Data Assimilation/Assimilation and Prediction Models (Space)."

FY08 - Develop ASW Tactical Decision Aids (TDA) asset allocation and mission planning tools to optimize deployment of environmental data collection assets. Explore presentation of mission planning and acoustic reconstruction data in a Geographic Information System (GIS) Develop a algorithms to create area acoustic assessments and analogous exercise area tools. Formerly part of "Modeling and Simulation (M&S)/Tactical Design Aids (TDA) and Mission Planning." Develop advanced data assimilation, coupled meoscale forecast systems. Test performance of 4D-Var (Degrees of Variation) for NAVDAS integration. Extend capabilities of assimilation systems to use additional satellite, remote sensed and insitu data types. Develop architecture for fully coupled ocean and atmospheric system. Continue to develop advanced atmospheric prediction/forecast models. Develop high resolution (small scale) atmospheric models to forecast environmental conditions in the littoral and riverine regions. Develop advanced global atmospheric prediction/forecast models. Develop high resolution (small scale) atmospheric models to nowcast & forecast environmental conditions in the littoral and riverine regions. Development advance aerosol small scale and large scale prediction models. Continue development of the Hazardous Weather Detection and Display Capability (HWDDC), the Tactical Environmental Processor (TEP) and associated advanced algorithms (e.g. Nowcast) that assimilate and fuse various data types such as radial wind velocity, reflectivity, rain rate, etc. generated from the HWDDC system as well as data types such as electromagnetic refractivity generated from the SPY-1 TEP. Demonstrate the HWDDC system and associated fusion algorithms. Develop automated quality control algorithms for these data types. Begin development of an end-to-end methodology to collect, fuse, and integrate these data into Navy and DoD networks and command and control nodes. Formerly part of "Coupled Data Assimilation/Assimilation and Prediction Models (Atmosphere)." Develop advanced data assimilation, coupled mesoscale forecast systems. Test performance of 3D-Var for NCODA integration. Extend capabilities of assimilation systems to use additional satellite, remote sensed and insitu data types. Development of architecture for fully coupled ocean and atmospheric system. Continue to develop advanced ocean prediction/forecast models. Develop high resolution (small scale) atmospheric models to forecast environmental conditions in the littoral and riverine regions. Develop advanced global atmospheric prediction/forecast models. Develop high resolution (small scale) atmospheric models to nowcast & forecast environmental conditions in the littoral and riverine regions. Formerly part of "Basin Scale Ocean Models/Assimilation and Prediction Models (Oceans)." Begin development of data assimilation capability using EUMETSAT (European satellite) and NASA satellite data. Formerly part of "Data Assimilation/Assimilation and Prediction Models (Space)." Develop TDA uncertainty algorithms. Formerly part of "Ambient Noise Data/TDA/Mission Planning."

FY09 - Continue advanced component development and prototype efforts associated with advanced data assimilation into environmental prediction systems. Continue development of advanced oceanographic and atmospheric prediction systems and architectures to provide improved forecasts and estimates of product accuracies. Continue development of improved data fusion techniques, data quality control technologies and accelerate the automation prediction processes. Develop data assimilation and fusion techniques and technologies for tactical radars, remote sensing and undersea sensor systems. Develope tmospheric fusion algorithms and demonstrate TEP/HWDDC reachback fusion capability. Development of network integration capability and continue to develop systems engineering plans, requirements, standards, studies, and other documentation supporting integration of these products into the SPY-1 Open Architecture and SPS-48G radars. Development of advanced data assimilation and data quality control algorithms for glider and Autonomous Undersea Vehicles (AUVs) data including, temperature, depth, saliningy, optics, hydrographic, bathymetric and other water column and ocean bottom properties.

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT NUMBER AND NAME**	**PROJECT NUMBER AND NAME**
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	2342 METOC Data Assimilation and Modeling

(U) B. Accomplishments/Planned Program

Meteorological and Oceanographic (METOC) Space-Based Sensing Capabilities	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost			3.664
RDT&E Articles Quantity			

FY09 - Continue development of NPOESS data assimilation algorithms and applications previously funded under PE 0305160N, Navy METOC Support (Space), Project 0524 using simulations and on-orbit heritage sensors. The NPOESS program constellation of satellites include the NPP satellite, the NPOESS satellites (C-1, C-2 and replacements) and the European METOP (European METeorological OPerational satellite program) .

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications	PROJECT NUMBER AND NAME 2342 METOC Data Assimilation and Modeling

(U) B. Accomplishments/Planned Program

Tactical Oceanographic Capabilities (TOC) / Undersea Warfare (USW)	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost	2.955	2.794	3.310
RDT&E Articles Quantity			

FY07 - Participated in selected Naval Exercises and delivered post exercise strawman and final reports (from Fleet Exercises). New applications and data delivered from the program and require verification and validation on an annual basis. Delivered annual report (from Fleet Applications and Data Verification and Validation). Continued development of automated Anti-Submarine Warfare (ASW) reconstruction and data collection efforts. Formerly part of "Modeling and Simulation (M&S)/Tactical Design Aids (TDA) and Mission Planning". Demonstrated and validated Range-dependent Acoustic Model (RAM) 4.0 3D (3 Degrees of Freedom) and delivered OAML. Began development of RAM 5.0 4D (4 Degrees of Freedom). Completed bottom database consolidation. Continued development of Standard Operating Activities (SOA) GAIT. Began development of active algorithms for the GAIT. Incorporated Automated Expert Systems model selection algorithms into the next generation RAM (from NEXGEN Acoustic Models). Completed integration of initial uncertainty algorithms into Fleet TDAs. Continued development of next generation mid-frequency bottom loss/bottom scatter models and databases for shallow water environments. Began development of a fully automated version of GAIT (from Shallow Water Acoustics). Continued annual upgrades to the STAPLE system. Completed SESSS 3.0 (4-10 kHz gap). Formerly part of "NEXGEN Acoustic Models/Assimilation and Prediction Models (Acoustics)".

FY08 - Begin development of an ASW mission planning tool for operational use at the ASW Reachback Cell (RBC) resident at the NAVOCEANO. Develop ASW Tactical Decision Aids (TDA) asset allocation and mission planning tools to optimize deployment of environmental data collection assets. Explore presentation of mission planning and acoustic reconstruction data in a Geographic Information System (GIS Develop algorithms to create area acoustic assessments and analogous exercise area tools. Formerly part of "Modeling and Simulation (M&S)/Tactical Design Aids (TDA) and Mission Planning". Continue development of RAM. Increase computational speed of the model on ASW TDA processors. Create an OAML Model Testbed by archiving existing passive transmission loss active reverberation datasets. Make modification to the Comprehensive Acoustic System Simulation (CASS) Gaussian Ray Bundle (GRAB) to improve model performance. Begin upgrade of NAUTILUS (a commercial product) propagation model to compute low frequency reverberation. Continue annual upgrades to the STAPLE system. Conduct Reverberation Modeling Workshop. Continue development of the SESSS algorithm. Continue to develop the Geophysical-Acoustic Bottom Interaction Model (GABIM) and GABIM-derived database. Begin development of algorithms that recommend active sonar waveforms based on the state of the environment. Develop an algorithm that validates and improves the quality of modeled low frequency active planning. Formerly part of "NEXGEN Acoustic Models/Assimilation and Prediction Models (Acoustics)". Development of the regional Ambient Noise Database (ANDB). Incorporate archived directional ambient noise time series observational data into the ANDB. Update historical shipping database with non-traditional vessel density data. Commence development of a short-term ambient noise forecasting capability using previously collected ambient noise data from tactical sensors. Incorporate Adaptive Beam Forming (ABF) techniques into existing noise models. Develop methods to aid in the collection, archiving/databasing ambient noise data for later inclusion in historical databases supporting ASW TDAs. Develop TDA uncertainty algorithms. Formerly part of "Ambient Noise Data/TDA/Mission Planning".

FY09 - Continue development of ASW mission planning, analysis and reconstruction tools, including Geographic Information Systems (GIS), for operational use at the ASW Reachback Cell (RBC.) Reconstruction and Analysis (R&A) tool set will be expanded to support all ASW communities, integrate mission planning functions and contain both acoustic/non-acoustic reconstruction data in a GIS environment. Continue to develop ASW tactical decision aid (TDA) asset allocation and mission planning tools to optimize deployment of both environmental data collection assets and tactical acoustic and no acoustic sensors. Develop ASW-related performance surface products for use at the NAVOCEANO ASW Reachback Cell and in mission planning systems to include Probability of Detection (Pd) maps. Assess uncertainty values associated with acoustic performance prediction products. Identify, develop and test environmentally-oriented, mathematically-based decision support tools for application in support of ASW operations and exercises. Begin development of models, databases and algorithms to quantify non-acoustic/acoustic uncertainty. Continue development of algorithms to create area acoustic assessments and analogous exercise area tools. Develop descriptive dynamic oceanography features assessment tool for ocean model accuracy/reliability determination. Establish a standardized environment for model and observation data. Continue spiral development of the RAM and Parobolic Equation acoustic models. Integrate upgrade NAUTILUS propagation model into fleet systems. Continue annual upgrades to the Scalable Tactical Acoustic Propagation Loss Engine (STAPLE) system. Continue development of SESSS. Develop a self-consistent semi-empirical surface loss model. Develop quantification algorithms for volume scattering. Continue development of the GABIM Version 2.0 and GABIM-derived database. Continue development of algorithms that recommend active sonar waveforms based on the state of the environment. Continue to make modification to the Comprehensive Acoustic System Simulation (CASS) Gaussian Ray Bundle (GRAB) to improve model performance in support of mission planning systems, tactical decision aids, fleet synthetic training systems and modeling and simulation tools. Upgrade the ASPM model to support IEER mission predictions. Use reverberation workshop results to develop new Navy Standard active reverberation model. Continue development of algorithms that recommend active sonar waveforms based on the state of the environment and algorithms that validate and improve the quality of modeled low frequency active planning. Develop electro-magnetic propagation and radiance models and refractive databases to support emerging non-acoustic ASW sensors. Develop models that quantify effects of near- surface turbulence and N-gradients on target detection. Develop Fish Scattering Strength (FSS) algorithm. Adapt exisitng acoustic models for better active localization. Improve realism in clutter modeling. Continue development of the regional ANDB. Continue development of a short-term ambient noise forecasting capability using previously collected ambient noise data from tactical sensors. Continue to develop methods and techniques to aid in the collection, archiving/databasing and dissemination of both omni-directional and directional ambient noise data. Engineering design for NEXGEN ambient noise model, data assimilation and forecasting tool. Continue to develop TDA uncertainty algorithms. Develop ambient noise databases for emerging airborne and submarine-based ASW systems. Develop prototype P-3 AXBT data collection system. Develop improved bathythermograph (BT) data processing system for Master Oceanographic Observation Data Set (MOODS). Develop rapid mission reconstruction, analysis & feedback system. Provide project technical and program management oversight.

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT NUMBER AND NAME**	**PROJECT NUMBER AND NAME**
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	2342 METOC Data Assimilation and Modeling

(U) C. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name

Not applicable

(U) D. ACQUISITION STRATEGY:

Acquisition, management and contracting strategies to support the METOC Data Assimilation Project which is a multi-faceted program which includes: 1) development, demonstration and validation of atmospheric and oceanographic data assimilation techniques, forecast models, database management systems, and associated software for use in both mainframe and tactical scale computers; 2) other models, which focus on ocean thermal structure and circulation, and surf and tide prediction; 3) techniques to process and manage satellite remotely-sensed environmental data at Oceanography Centers ashore and on ships equipped with the AN/SMQ-11 satellite receiver/recorder; and, 4) a family of acoustic system performance models beginning with active system models and databases in the low-, mid-, and high-frequency regimes and culminating with high fidelity simulation products, all with management oversight by Program Executive Officer for Command, Control, Communications, Computers, and Intelligence (PEO C4I).

(U) E. MAJOR PERFORMERS:

Not applicable

(U) F. METRICS:

Earned Value Management (EVM) is used for metrics reporting and risk management.

Exhibit R-3 Cost Analysis (page 1)												DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4			PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications			PROJECT NUMBER AND NAME 2342 METOC Data Assimilation and Modeling						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 07 Cost	FY 07 Award Date	FY 08 Cost	FY 08 Award Date	FY 09 Cost	FY 09 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Software/Product Development	WX	NRL	64.032	7.491	N/A	9.338	N/A	11.088	N/A	CONT	CONT	
	WX	SSCs		0.226	N/A	0.580	N/A	0.680	N/A	CONT	CONT	
	WX	MISC	1.981	0.798	N/A	0.768	N/A	1.020	N/A	CONT	CONT	
	CP	MISC	5.796	2.149	N/A	3.526	N/A	5.854	N/A	CONT	CONT	
	N/A	MISC	12.775		N/A		N/A		N/A	CONT	CONT	
	Grant	Univ. S. Miss.	2.413		N/A		N/A		N/A			
Subtotal Software/Product Development			86.997	10.664	N/A	14.212	N/A	18.642	N/A	CONT	CONT	
Remarks:												
Systems Engineering	CP	SSA/CSC	0.295		N/A		N/A		N/A	CONT	CONT	
Subtotal Systems Engineering			0.295	0.000	N/A	0.000	N/A	0.000	N/A	CONT	CONT	
Remarks:												

Exhibit R-3 Cost Analysis (page 2)										DATE: February 2008		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4			PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications			PROJECT NUMBER AND NAME 2342 METOC Data Assimilation and Modeling						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 07 Cost	FY 07 Award Date	FY 08 Cost	FY 08 Award Date	FY 09 Cost	FY 09 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation					N/A		N/A		N/A	CONT	CONT	
Subtotal Developmental T & E			0.000	0.000	N/A	0.000	N/A	0.000	N/A	CONT	CONT	
Remarks:												
Management					N/A		N/A		N/A	CONT	CONT	
Subtotal Management			0.000	0.000		0.000		0.000				
Remarks:												
Total Cost			87.292	10.664	N/A	14.212	N/A	18.642	N/A	CONT	CONT	

EXHIBIT R4, Schedule Profile | **DATE:** February 2008

APPROPRIATION/BUDGET ACTIVITY
RDT&E, N / BA-4

PROGRAM ELEMENT NUMBER AND NAME
PE 0603207N Air/Ocean Tactical Applications

PROJECT NUMBER AND NAME
2342 METOC Data Assimilation - Program: Littoral Battlespace Sensing, Fusion and Integration (LBSF&I)

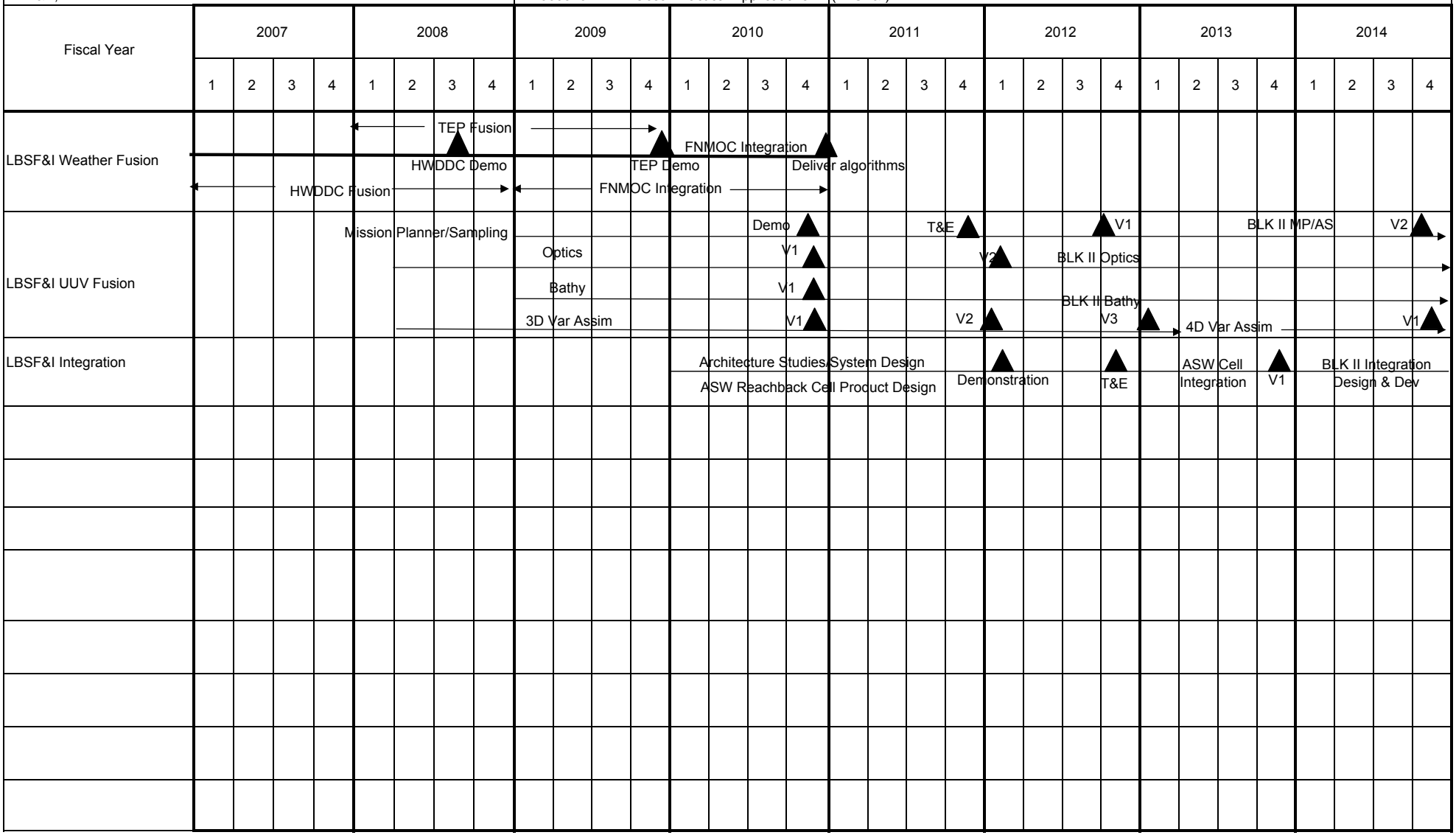


Exhibit R-4a, Schedule Detail					**DATE:** February 2008			
APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT**				**PROJECT NUMBER AND NAME**			
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications				2342 METOC Data Assimilation - Program: Littoral Battlespace Sensing, Fusion and Integration (LBSF&I)			
Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
LBSF&I Weather Fusion		3Q	4Q	4Q				
LBSF&I UUV Data Fusion/Assimilation				4Q	4Q	1Q/4Q	1Q	4Q
LBSF&I Integration						1Q/4Q	4Q	

EXHIBIT R4, Schedule Profile			DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications	PROJECT NUMBER AND NAME 2342 METOC Data Assimilation and Modeling - Program: Meteorlogical and Oceanographic (METOC) Furture Mission Capabilities (FMC)	

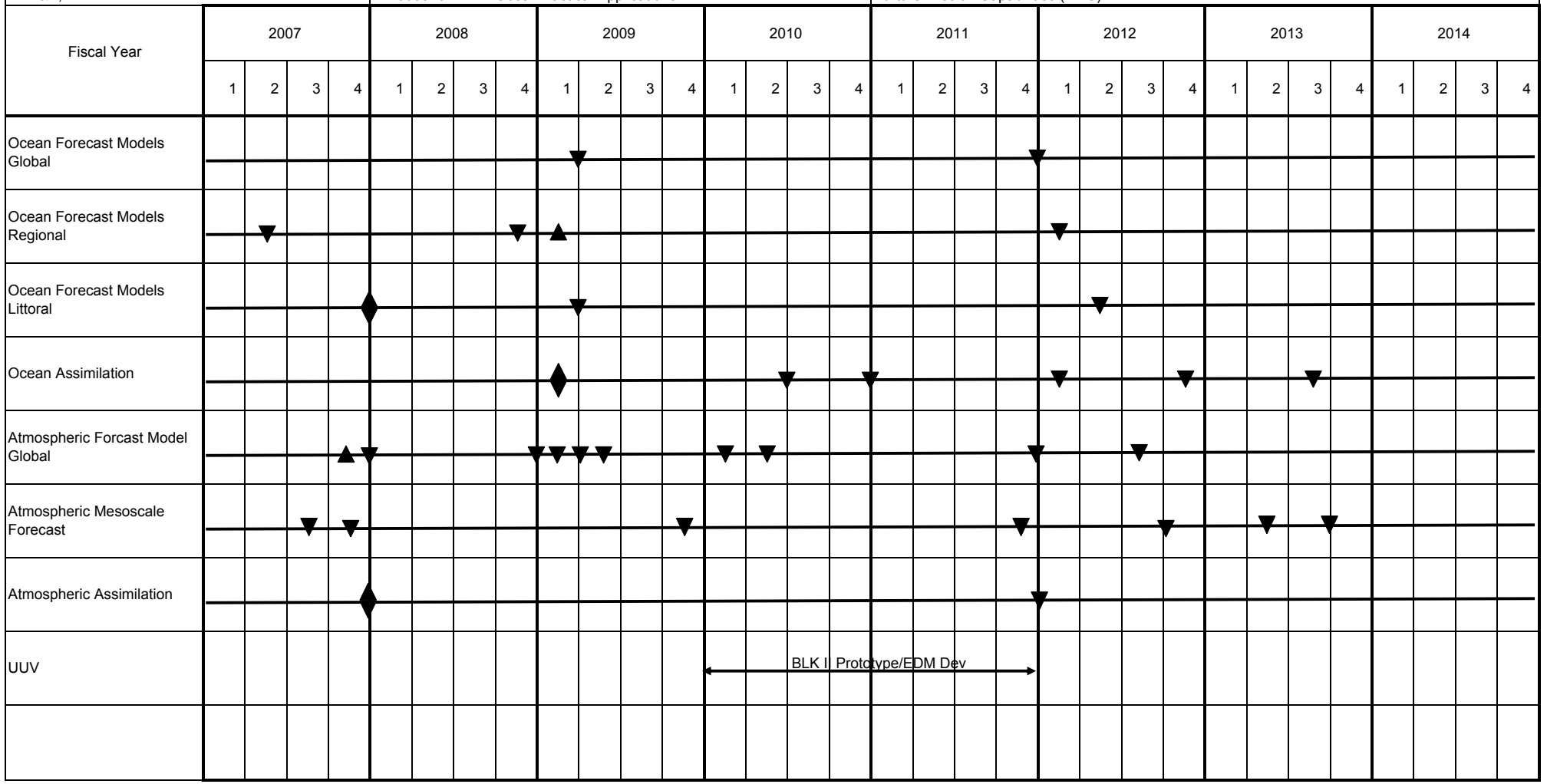


Exhibit R-4a, Schedule Detail					**DATE:** February 2008			
APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT**				**PROJECT NUMBER AND NAME**			
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications				2342 METOC Data Assimilation and Modeling - Program: Meteorological and Oceanographic (METOC) Future Mission Capabilities (FMC)			
Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
Ocean Forecast Models Global			1Q		4Q			
Ocean Forecast Models Regional	2Q	4Q	1Q			1Q		
Ocean Forecast Models Littoral	4Q		1Q			2Q		
Ocean Assimilation			1Q	2Q	1Q	1Q/4Q	3Q	
Atmospheric Forecast Model Global	4Q	1Q	1Q/2Q	1Q/2Q	4Q	3Q		
Atmospheric Mesoscale Forecast	3Q/4Q		4Q		4Q	4Q	2Q/3Q	
Atmospheric Assimilation	4Q				4Q			
UUV								

EXHIBIT R4, Schedule Profile			DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications	PROJECT NUMBER AND NAME 2342 METOC Data Assimilation and Modeling - Program: Meteorological and Oceanographic (METOC) Space-Based Sensing Capabilities	

Fiscal Year	2007				2008				2009				2010				2011				2012				2013				2014			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
NPP/NPOESS													NPP Launch															C-1 Launch				
													Data Assimilation Algorithm Development																			

Exhibit R-4a, Schedule Detail					**DATE:** February 2008			
APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT**				**PROJECT NUMBER AND NAME**			
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications				2342 METOC Data Assimilation and Modeling - Program: Meteorological and Oceanographic (METOC) Space-Based Sensing Capabilities			
Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
NPP/NPOESS			4Q				4Q	

EXHIBIT R4, Schedule Profile | **DATE:** February 2008

APPROPRIATION/BUDGET ACTIVITY
RDT&E, N / BA-4

PROGRAM ELEMENT NUMBER AND NAME
PE 0603207N Air/Ocean Tactical Applications

PROJECT NUMBER AND NAME
2342 METOC Data Assimilation and Modeling - Program: Tactical Oceanographic Capabilities (TOC) / Undersea Warfare (USW)

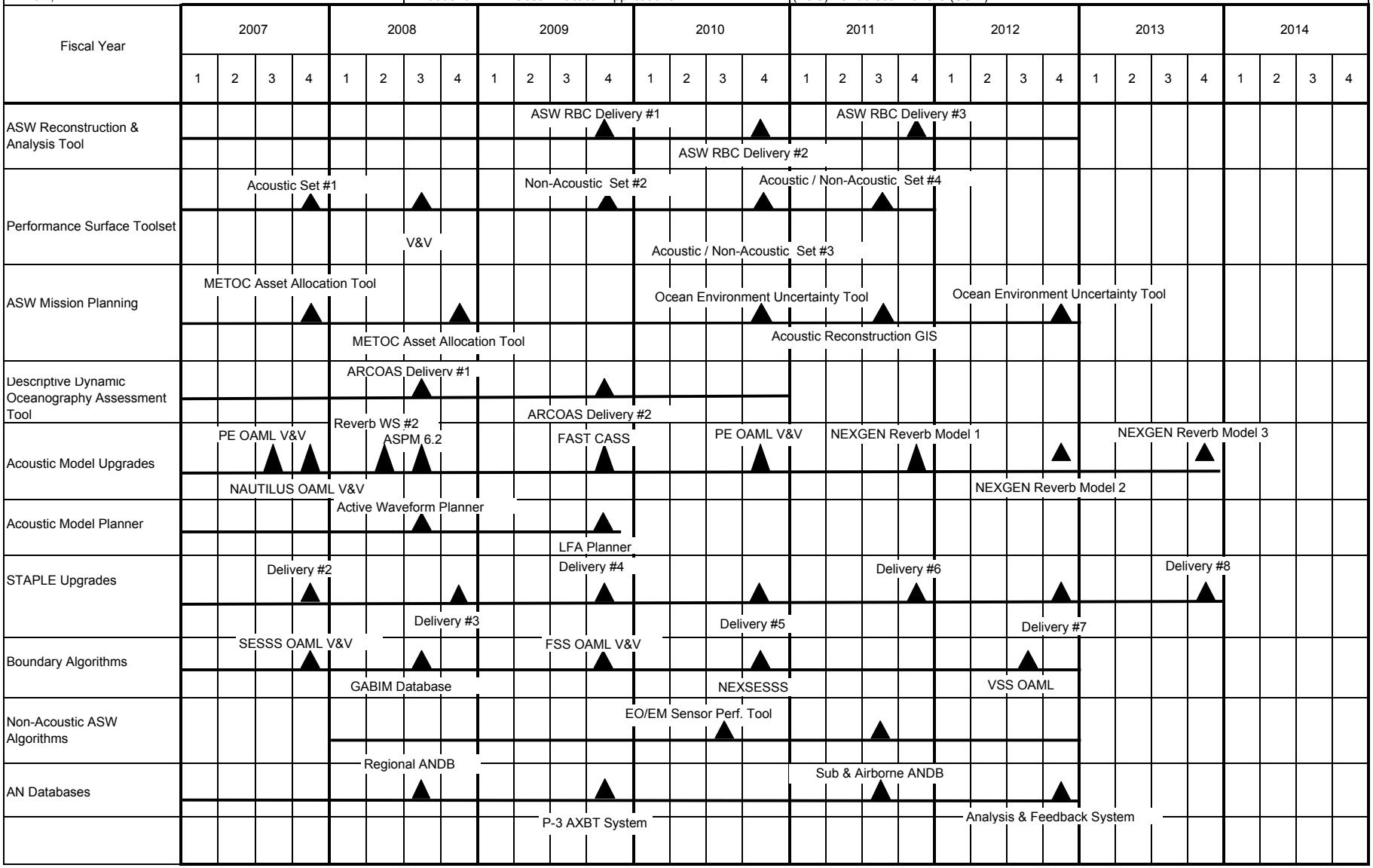


Exhibit R-4a, Schedule Detail					**DATE:** February 2008			
APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT**				**PROJECT NUMBER AND NAME**			
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications				2342 METOC Data Assimilation and Modeling - Program: Tactical Oceanographic Capabilities (TOC) / Undersea Warfare (USW)			
Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
ASW Reconstruction & Analysis Tool			4Q	4Q	4Q			
Performance Surface Toolset	4Q	3Q	4Q	4Q	3Q			
ASW Mission Planning	4Q	4Q		4Q	3Q	4Q		
Descriptive Dynamic Oceanography Assessment Tool		3Q	4Q					
Acoustic Model Upgrades	3Q/4Q	2Q/3Q	4Q	4Q	4Q	4Q	4Q	
Acoustic Model Planner		3Q	4Q					
STAPLE Upgrades	4Q	4Q	4Q	4Q	4Q	4Q	4Q	
Boundary Algorithms	4Q	3Q	4Q	4Q		3Q		
Non-Acoustic ASW Algorithms				3Q	3Q			
AN Databases		3Q	4Q		3Q	4Q		

EXHIBIT R-2a, RDT&E Project Justification						DATE: February 2008	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications				PROJECT NUMBER AND NAME 2343 Tactical METOC Applications		
COST ($ in Millions)	FY2007	FY2008	FY2009	FY2010	FY2011	FY2012	FY2013
Project Cost	**8.164**	**7.374**	**6.390**	**6.758**	**6.185**	**6.349**	**6.516**
RDT&E Articles Qty							

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

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

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT NUMBER AND NAME**	**PROJECT NUMBER AND NAME**
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	2343 Tactical METOC Applications

(U) B. Accomplishments/Planned Program

Tactical Environmental Support System/Naval Integrated Tactical Environmental Subsystem (TESS/NITES)	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost	4.480		
RDT&E Articles Quantity			

FY07 - Completed development of Target Acquisition Weapons Software (TAWS) 4.0. Began development of TAWS 4.4 Enterprise Portal. Completed development of Advanced Refractive Effects Prediction System (AREPS) JAVA port. Began development of an advanced Electromagnetic (EM) Model Server. Conducted annual update of Mine Warfare Environmental Data Applications Library (MEDAL) acoustic databases and models. Formerly part of "Electromagnetic and Electro-optical (EM/EO) Decision Aids/ TDA/Mission Planning".

FY08 - Efforts rolled into the Naval Integrated Tactical Environmental System Next Generation (NITES-Next) program.

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	**PROGRAM ELEMENT NUMBER AND NAME** PE 0603207N Air/Ocean Tactical Applications	**PROJECT NUMBER AND NAME** 2343 Tactical METOC Applications

(U) B. Accomplishments/Planned Program

Naval Integrated Tactical Environmental System Next Generation (NITES-Next)	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost	3.684	7.374	6.390
RDT&E Articles Quantity			

FY07 - Continued development of NITES-Next (formerly NITES NG). Formerly part of "Electromagnetic and Electro-optical (EM/EO) Decision Aids/ TDA/Mission Planning".

FY08 - Development of System architecture, system engineering, Preliminary Design Review (PDR), Critical Design Review (CDR), initial software development and Pre-Milestone C acquisition activities for NITES-Next (formerly NITES NG), including integration of updates to sensor data and backgrounds consistent with Joint Operations and development of upgrades to next generation Electromagnetic and Electro-optical (EM/EO) and Advanced Refractive Environmental Prediction System (AREPS) performance prediction systems to include incorporation of new Navy and Joint Sensor Suites. Develop the Mine Warfare and Environmental Data Applications Library (MEDAL) to include the incorporation of the new environmental databases and model updates . Support transition in fleet for integration of new EM/EO Target Acquisition Weapons Software (TAWS), and advanced visualization techniques for Global Command and Control Systems integration prior to NITES-Next transition in FY08 to include integration of new EM/EO, TAWS, and advanced visualization techniques. Formerly part of "Electromagnetic and Electro-optical (EM/EO) Decision Aids/ TDA/Mission Planning".

FY09 - Milestone C preparation activities and associated development of system architecture, system engineering, software development, test and integration activities for NITES-Next, including development of upgrades to next generation EM/EO and AREPS performance prediction systems. Extensive Developmental Test and Evaluation (DT&E) efforts in preparation for Initial Operational Test and Evaluation and Milestone C involving lab, fleet and site testing and early COMOPTEVFOR involvement. Develop MEDAL to include the incorporation of the new environmental databases and model updates. Formerly part of "Electromagnetic and Electro-optical (EM/EO) Decision Aids/ TDA/Mission Planning".

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications	PROJECT NUMBER AND NAME 2343 Tactical METOC Applications

(U) C. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name

Not applicable

RELATED RDT&E: PE 0604218N (Air/Ocean Equipment Engineering). TESS/NITES will incorporate METOC data applications.

(U) D. ACQUISITION STRATEGY:

Acquisition, management and contracting strategies are to support the Tactical METOC Applications project to continue the development of state-of-the-art software capabilities that provide sensor, communication, and weapon system performance assessments across the full spectrum of open ocean and littoral operating environments, meteorology and oceanography , all with management oversight incorporating these into Naval Integrated Tactical Environmental System Next Generation (NITES-Next) under JCIDS by Program Executive Officer for Command, Control, Communications, Computers, and Intelligence (PEO C4I).

(U) E. MAJOR PERFORMERS:

N/A

Exhibit R-3 Cost Analysis (page 1)												DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4			PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications			PROJECT NUMBER AND NAME 2343 Tactical METOC Applications						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 07 Cost	FY 07 Award Date	FY 08 Cost	FY 08 Award Date	FY 09 Cost	FY 09 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Software/Product Development	WX	NRL	2.343	0.345	N/A	0.300	N/A	0.250	N/A	CONT	CONT	
	WX	SSCs	3.459	0.837	N/A	0.760	N/A	0.630	N/A	CONT	CONT	
	WX	MISC	1.400	0.982	N/A	0.920	N/A	0.758	N/A	CONT	CONT	
	CP	MISC	42.805	6.000	N/A	5.394	N/A	4.752	N/A	CONT	CONT	
	N/A	MISC	6.370		N/A		N/A		N/A	CONT	CONT	
Subtotal Software/Product Development			56.377	8.164	N/A	7.374	N/A	6.390	N/A	CONT	CONT	
Remarks:												
Systems Engineering	CP	IPD	0.595		N/A		N/A		N/A	CONT	CONT	
Subtotal Systems Engineering			0.595	0.000	N/A	0.000	N/A	0.000	N/A	CONT	CONT	
Remarks:												

Exhibit R-3 Cost Analysis (page 2)										DATE: February 2008		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4			PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications			PROJECT NUMBER AND NAME 2343 Tactical METOC Applications						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 07 Cost	FY 07 Award Date	FY 08 Cost	FY 08 Award Date	FY 09 Cost	FY 09 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation					N/A		N/A		N/A	CONT	CONT	
Subtotal Developmental T & E			0.000	0.000	N/A	0.000	N/A	0.000	N/A	CONT	CONT	
Remarks:												
Management												
Subtotal Management			0.000	0.000		0.000		0.000				
Remarks:												
Total Cost			56.972	8.164	N/A	7.374	N/A	6.390	N/A	CONT	CONT	

EXHIBIT R4, Schedule Profile			DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications	PROJECT NUMBER AND NAME 2343 Tactical METOC Applications - Program: Tactical Environmental Support System/Naval Integrated Tactical Environmental Subsystem (TESS/NITES)	

Fiscal Year	2007				2008				2009				2010				2011				2012				2013				2014			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
GCCS- 4.1 Software Corrective Update of TAWS, AREPS, and other TDAs.			▲																													
Consolidate TDA and Data for NITES Integration to GCCS-M &J				▲																												

Exhibit R-4a, Schedule Detail					DATE: February 2008			
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications				PROJECT NUMBER AND NAME 2343 Tactical METOC Applications - Program: Tactical Environmental Support System/Naval Integrated Tactical Environmental Subsystem (TESS/NITES)			
Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
GCCS- 4.1 Software Corrective Update of TAWS, AREPS, and other TDAs.	3Q							
Consolidate TDA and Data for NITES Integration to GCCS-M &J	4Q							

EXHIBIT R4, Schedule Profile			DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications	PROJECT NUMBER AND NAME 2343 Tactical METOC Applications - Program: Naval Integrated Tactical Environmental System Next Generation (NITES-Next)	

Fiscal Year	2007				2008				2009				2010				2011				2012				2013				2014			
	1		3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
NITES-Next Acquisition, Preparation & Major Milestones																			MS C			IOC									FOC	
NITES-Next Development Test and Refresh/Spirals				Architecture & Prep for PDR, events toward MSC						PDR	CDR			DT&E B(1)			IOT&E B(1)					DT&E B(2)			FOT&E and OA B(2)				DT&E B(3)			B(3)
TDA/Mission Planning Updates & Integration w/ NITES-Next				TAWS EM Server	MEDAL Update				MEDAL Update	TAWS/AREPS			TAWS/AREPS				NITES-Next & LBSF&I	TAWS/AREPS			NITES-next SOA migration									IOT&E B(3)		
									Platform Vulnerability																							

B(1) - Spiral Build 1, B(2) - Spiral Build 2, B(3) - Spiral Build 3

Exhibit R-4a, Schedule Detail					**DATE:** February 2008			
APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT**				**PROJECT NUMBER AND NAME**			
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications				2343 Tactical METOC Applications - Program: Naval Integrated Tactical Environmental System Next Generation (NITES-Next)			
Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
NITES-Next Acquisition, Preparation & Major Milestones			2Q/3Q		2Q	1Q		4Q
NITES-Next Development Test and Refresh/Spirals		4Q	4Q	4Q	1Q/2Q/3Q		2Q/3Q	2Q/3Q
TDA Mission Planning Updates & Integration with NITES-Next		4Q	4Q	4Q		3Q		

EXHIBIT R-2a, RDT&E Project Justification						DATE: February 2008	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications				PROJECT NUMBER AND NAME 2344 Precise Timing and Astrometry		
COST ($ in Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	**1.517**	**1.206**	**20.270**	**1.313**	**1.311**	**1.337**	**1.364**
RDT&E Articles Qty							

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The major thrust of the Precise Timing and Astrometry Project (PTA) is to provide future capabilities that directly support the mission of the U.S. Naval Observatory (USNO). These future mission capabilities are intended to:
1) address DoD requirements for needed increases in positioning accuracies of modern weapons systems by the determination of star positions (including objects at other than optical wavelengths) and the stellar inertial reference system (to which all navigation, guidance, and positioning systems are ultimately referred); 2) develop techniques for the prediction of the Earth's instantaneous orientation with respect to the stellar inertial reference system; 3) oversee the determination and dissemination of precise time information using the Navy/DoD Master Clock System and precise time distribution networks; and, 4) develop advanced electronic light detectors and interferometry in the optical and infrared wavelength regions for very precise determination of the positions of both faint and bright stars, satellite tracking, and space debris studies. DoD Instruction 5000.2 assigns to the Navy the responsibility for coordinating Precise Time and Time Interval (PTTI) requirements and for maintaining a PTTI reference standard (astronomical and atomic) for use by all DoD Services, Federal agencies, and related scientific laboratories. The Navy is also responsible for providing astronomical data for navigation, positioning, and guidance, including space. Some operational and many emerging requirements surpass current support capabilities. In response to these DoD requirements, this project transitions Research (6.1) and Exploratory Development (6.2) efforts, as well as developments in the civilian sector, into the operational capabilities of the USNO.

FY09 funding increase for the Joint Milli-Arcsecond Pathfinder Survey (J-MAPS). Joint strike operations require extremely accurate Positioning, Navigation, and Timing (PNT) systems in order to both: locate hostile threats with space-borne Intelligence Surveillance and Reconnaissance (ISR) systems, and then to deliver ordnance on precisely selected targets. The U.S. Navy, via the U.S. Naval Observatory (USNO), provides a key component of PNT – the Celestial Reference Frame. This reference frame is defined in star catalogs that are used in conjunction with star trackers to determine orientation of space-based sensors to minimize Target Location Error (TLE) and the resultant weapon system Circular Error Probable (CEP). The accuracy of star positions (hence obtainable CEP and TLE) is degrading with time due to the movement of stars since the last highly accurate space-based measurements of star positions (order of 1 milli-arcsecond) were made in 1991 (Hipparcos star catalog). The accuracy of the catalog is approaching the minimum necessary to support current requirements, and will not meet future needs for high accuracy sensors and weapon systems. Therefore, USNO, in concert with other activities and agencies in the Space and ISR communities, has developed the J-MAPS initiative. The J-MAPS initiative will satisfy the emerging requirements for a new high accuracy star catalog through a space-based astrometry mission that will also “pathfind” new star tracker technology as a risk reduction for future ISR systems. Producing star catalogs with sufficient accuracy to meet these requirements can only be done from space platforms (satellites) due to atmospheric interference on ground-based systems and the physical limitations of high atmospheric aircraft.

This budget reflects a reorganization by program/project to better support the acquisition process.

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT NUMBER AND NAME**	**PROJECT NUMBER AND NAME**
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	2344 Precise Timing and Astrometry

(U) B. Accomplishments/Planned Program

Precise Timing & Astrometry	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost	1.517	1.206	1.270
RDT&E Articles Quantity			

FY07 - Began development of the algorithm for the atomic fountain timescale. Began a 24/7 demonstration of the Ensemble Fountain Clock Systems. Completed and demonstrated the Prototype M Code GPS receiver. Began development of the USNO Robotic Astrometric Telescope (URAT) Focal Plane Array (FPA). Conducted a pre-operational demonstration of the Charge Coupled Device (CCD) array for the USNO Robotic Astrometric Telescope. Formerly part of "Time Transfer/Precise Timing, Astrometry, & Reference Frames".

FY08 - Complete development of algorithm for ensemble clock system. 24/7 demonstration of fountain ensemble clock. Mod M-code GPS receiver to meet final specifications. Demo URAT focal plane. Formerly part of "Time Transfer/Precise Timing, Astrometry, & Reference Frames".

FY09 - Initiate ensemble demo at Alternate Master Clock (AMC) facility. Demo final M-Code receiver. Design astrometric space mission. Formerly part of "Time Transfer/Precise Timing, Astrometry, & Reference Frames".

Joint Milli-Arcsecond Pathfinder Survey (J-MAPS)	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost			19.000
RDT&E Articles Quantity			

FY09 - Joint Milli-Arcsecond Pathfinder Survey (J-MAPS) will be used to complete Phase A (conceptual design) and Phase B (preliminary design) of the overall spacecraft and mission. In addition, long lead item developments will begin immediately after the System Requirements Review (SRR). Developments will include focal plane assemblies, readout and processing electronics, and optical components. By the end of FY09, as a result of this funding, a preliminary design for the spacecraft will be delivered.

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT NUMBER AND NAME**	**PROJECT NUMBER AND NAME**
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	2344 Precise Timing and Astrometry

(U) C. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name

Not applicable.

(U) D. ACQUISITION STRATEGY:

Acquisition, management and contracting strategies are to support the Precise Timing and Astrometry Project in direct support of the U.S. Naval Observatory (USNO) in: 1) addressing DoD requirements for needed increases in positioning accuracies of modern weapons systems by the determination of star positions and the stellar inertial reference system ; 2) developing techniques for the prediction of the Earth's instantaneous orientation with respect to the stellar inertial reference system; 3) overseeing the determination and dissemination of precise time information using the Navy/DoD Master Clock System and precise time distribution networks; and, 4) developing advanced electronic light detectors and interferometry in the optical and infrared wavelength regions for very precise determination of the positions of both faint and bright stars, satellite tracking, and space debris studies, all with management oversight by Program Executive Officer for Command, Control, Communications, Computers, and Intelligence (PEO C4I).

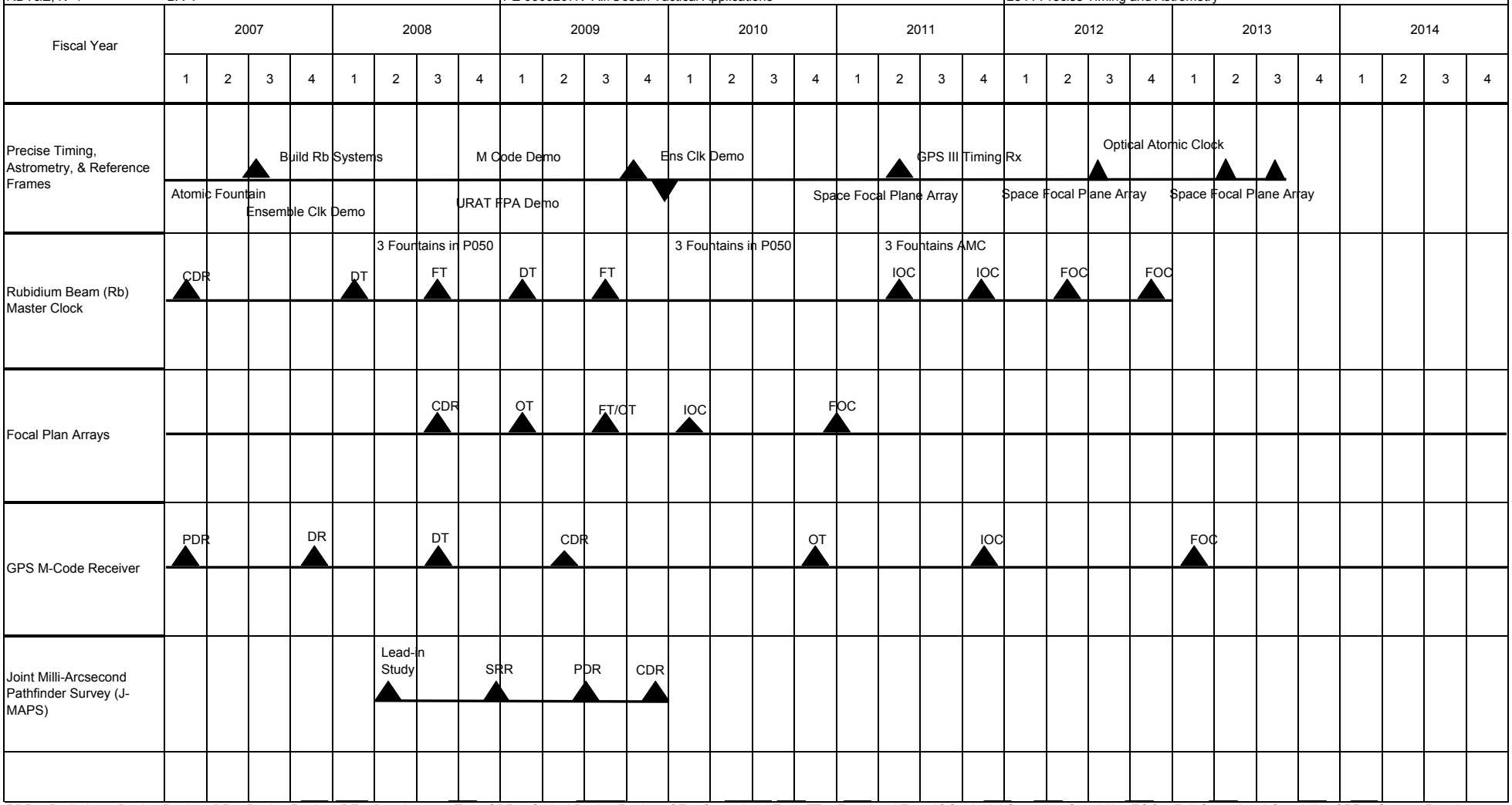
(U) E. MAJOR PERFORMERS:

N/A

Exhibit R-3 Cost Analysis (page 1)												DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4			PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications			PROJECT NUMBER AND NAME 2344 Precise Timing and Astrometry						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 07 Cost	FY 07 Award Date	FY 08 Cost	FY 08 Award Date	FY 09 Cost	FY 09 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Software/Product Development	WX	Naval Observatory	10.646	1.235	N/A	1.051	N/A	1.270	N/A	CONT	CONT	
	N/A	MISC	0.094	0.282	N/A	0.155	N/A	0.000	N/A	CONT	CONT	
	TBD	TBD						19.000				
Subtotal Software/Product Development			10.740	1.517	N/A	1.206	N/A	20.270	N/A	CONT	CONT	
Remarks:												
Systems Engineering					N/A		N/A		N/A	CONT	CONT	
Subtotal Systems Engineering			0.000	0.000	N/A	0.000	N/A	0.000	N/A	CONT	CONT	
Remarks:												

Exhibit R-3 Cost Analysis (page 2)										DATE: February 2008		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4			PROGRAM ELEMENT PE 0603207N Air/Ocean Tactical Applications			PROJECT NUMBER AND NAME 2344 Precise Timing and Astrometry						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 07 Cost	FY 07 Award Date	FY 08 Cost	FY 08 Award Date	FY 09 Cost	FY 09 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation					N/A		N/A		N/A	CONT	CONT	
Subtotal Developmental T & E			0.000	0.000	N/A	0.000	N/A	0.000	N/A	CONT	CONT	
Remarks:												
Management												
Subtotal Management			0.000	0.000		0.000		0.000				
Remarks:												
Total Cost			10.740	1.517	N/A	1.206	N/A	20.270	N/A	CONT	CONT	

EXHIBIT R4, Schedule Profile			DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications		PROJECT NUMBER AND NAME 2344 Precise Timing and Astrometry



PDR = Preliminary Design Review, DR = Design Review, DT = Development Test, CDR = Critical Design Review, OT = Operational Test, FT = Functional Test, IOC = Initial Operating Capability, FOC = Full Operational Capability, SRR = System Requirements

Exhibit R-4a, Schedule Detail					**DATE:** February 2008			
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	**PROGRAM ELEMENT** PE 0603207N Air/Ocean Tactical Applications				**PROJECT NUMBER AND NAME** 2344 Precise Timing and Astrometry			
Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
Precise Timing, Astrometry & Reference Frames	3Q		4Q		2Q	3Q	2Q/3Q	
Rubidium Beam (Rb) Master Clock	1Q	1Q/3Q	1Q/3Q		2Q/4Q	2Q/4Q		
Focal Plan Arrays		3Q	1Q/3Q	1Q	1Q			
GPS M-Code Receiver	1Q/4Q	3Q	2Q	4Q	4Q		1Q	
Joint Milli-Arcsecond Pathfinder Survey (J-MAPS)			1Q/3Q/4Q					

EXHIBIT R-2a, RDT&E Project Justification						DATE: February 2008	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications				PROJECT NUMBER AND NAME 3207 Fleet Synthetic Training		
COST ($ in Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost			**1.000**	**1.023**	**1.054**	**1.085**	**1.126**
RDT&E Articles Qty							

(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

Fleet Synthetic Training (FST) is a CNO initiative that is intended to provide naval forces with an enhanced in-port training capability. Integrating embedded shipboard training devices, aircraft and submarine simulators into an interoperable network with Joint, Coalition and Interagency partners is expected to provide more effective training for our deploying naval forces.

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

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT NUMBER AND NAME**	**PROJECT NUMBER AND NAME**
RDT&E, N / BA-4	PE 0603207N Air/Ocean Tactical Applications	3207 Fleet Synthetic Training

(U) B. Accomplishments/Planned Program

Fleet Synthetic Training (FST)	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost			1.000
RDT&E Articles Quantity			

FY09 - Begin to develop software that provides a common ocean and atmospheric environment to the federation of systems within the Fleet Synthetic Training compliant High Level Architecture. Start to enhance underwater acoustic propagation model and database software that is required to stimulate active sonar displays aboard ships. Start to develop software that is required to connect the sensor performance surface to the federation of Fleet Synthetic trainers. Initiatie software development of land mass effects (e.g., island effects) on ocean and atmospheric environments.

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	**PROGRAM ELEMENT NUMBER AND NAME** PE 0603207N Air/Ocean Tactical Applications	**PROJECT NUMBER AND NAME** 3207 Fleet Synthetic Training

(U) C. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name

Not Applicable

RELATED RDT&E: PE 0603207N / 2342

(U) D. ACQUISITION STRATEGY:

(U) E. MAJOR PERFORMERS:

Not applicable

(U) F. METRICS:

Exhibit R-3 Cost Analysis (page 1) | **DATE:** February 2008

APPROPRIATION/BUDGET ACTIVITY	**PROGRAM ELEMENT**	**PROJECT NUMBER AND NAME**
RDT&E, N / BA-4	0603207N Air/Ocean Tactical Applications	3207 Fleet Synthetic Training

Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 07 Cost	FY 07 Award Date	FY 08 Cost	FY 08 Award Date	FY 09 Cost	FY 09 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Software/Product Development	WX	Naval Oceanographic Office -			N/A		N/A	0.600	N/A	CONT	CONT	
		Stennis Space Center, MS										
	CP	Applied Research Laboratory -						0.400				
		University of Texas										
Subtotal Software/Product Development			0.000	0.000	N/A	0.000	N/A	1.000	N/A	CONT	CONT	

Remarks:

Systems Engineering					N/A		N/A		N/A	CONT	CONT	
Subtotal Systems Engineering			0.000	0.000	N/A	0.000	N/A	0.000	N/A	CONT	CONT	

Remarks:

Exhibit R-3 Cost Analysis (page 2)												DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4			PROGRAM ELEMENT 0603207N Air/Ocean Tactical Applications			PROJECT NUMBER AND NAME 3207 Fleet Synthetic Training						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 07 Cost	FY 07 Award Date	FY 08 Cost	FY 08 Award Date	FY 09 Cost	FY 09 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation					N/A		N/A		N/A	CONT	CONT	
Subtotal Developmental T & E			0.000	0.000	N/A	0.000	N/A	0.000	N/A	CONT	CONT	
Remarks:												
Management												
Subtotal Management			0.000	0.000		0.000		0.000				
Remarks:												
Total Cost			0.000	0.000	N/A	0.000	N/A	1.000	N/A	CONT	CONT	

EXHIBIT R4, Schedule Profile																																
																															DATE: February 2008	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4									**PROGRAM ELEMENT NUMBER AND NAME** PE 0603207N Air/Ocean Tactical Applications												**PROJECT NUMBER AND NAME** 3207 Fleet Synthetic Training											
Fiscal Year	2007				2008				2009				2010				2011				2012				2013				2014			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Software/Product Development for Realistic Sybthetic Environment									▲				▲				▲				▲				▲							
Acoustic Model & Database Enhancements for SQS-53c Active Sonar Displays										▲				▲				▲				▲				▲						
Software/Product Development to Connect the Sensor Performance Surface to the Federation of Trainers									▲				▲				▲				▲				▲							

Exhibit R-4a, Schedule Detail					**DATE:** February 2008			
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	**PROGRAM ELEMENT** PE 0603207N Air/Ocean Tactical Applications				**PROJECT NUMBER AND NAME** 3207 Fleet Synthetic Training			
Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
Software/Product development for Realistic Synthetic Environment			1Q	1Q	1Q	1Q	1Q	
Acoustic Model & Database Enhancements for SQS-53c Active Sonar			2Q	2Q	2Q	2Q	2Q	
Displays								
Software/Product development to connect the Sensor Performance			1Q	1Q	1Q	1Q	1Q	
Surface to the Federation of trainers								

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2008
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME PE 0603207N Air/Ocean Tactical Applications	PROJECT NUMBER AND NAME 9999 Congressional Increases

(U) B. Accomplishments/Planned Program

9891 Gateway Concept	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost	0.975	1.594	
RDT&E Articles Quantity			

FY07: Developed a new design for underwater cable connections.

FY08: Continue the development of a new design for underwater cable connections.

9999 Semi-Submersible UUV	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost		0.994	
RDT&E Articles Quantity			

FY08: Begin design and development efforts for a Semi-Submersible Unmanned Underwater Vehicle (UUV)

9999 Naval Observatory Joint Milli-Arcsecond Pathfinder Survey (J-MAPS) Program	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost		3.970	
RDT&E Articles Quantity			

FY08: Begin system engineering and technology development efforts, to include the development of the focal plane array, for the Naval Observatory Joint Milli-Arcsecond Pathfinder Survey (J-MAPS) Program.