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FY 2008/2009 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET
Exhibit R-2

DATE: February 2007

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603235N
PROGRAM ELEMENT TITLE: COMMON PICTURE ADVANCED TECHNOLOGY

COST: (Dollars in Thousands)

Project Number & Title	FY 2006 Actual	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
Total PE	71,962	65,686	40,782	22,755	38,899	48,735	48,138	47,474
2919 COMMUNICATIONS SECURITY	59,116	57,460	40,782	22,755	38,899	48,735	48,138	47,474
9999 CONGRESSIONAL PLUS-UPS	12,846	8,226	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Activities and efforts in this program address the advanced technology development, test, and evaluation of a dynamic distributed common picture based on emergent technologies that will improve situational awareness across command echelons. The promise of net-centricity and potential for persistent and pervasive sensing creates greater demand for automated fusion of large volumes of multi-sensor data, techniques to coordinate deployment of multiple diverse sensors, and tailored dissemination of information to support network centric operations. The focus of this program is to refine technologies that exploit information and networking technology to ensure mission success in unpredictable warfighting environments. These missions include the Global War on Terrorism (GWOT), urban operations, and asymmetric warfare. To ensure Maritime Domain Awareness, we must be able to collect, fuse, and disseminate enormous quantities of data drawn from US joint forces and government agencies, international coalition partners and forces, and commercial entities. To further network centric capabilities, this project demonstrates technologies that support seamless information services afloat and ashore; collaborative decision-making among geographically dispersed warfighters; a common, consistent view of the battlespace geared to user requirements; system interoperability with coalition forces; real-time information access with quality of service guarantees; and information assurance. Technologies of interest provide access to, and automated processing of, information necessary to make decisions that lead to rapid, accurate decision-making and result in decisive, precise, and desired engagement outcomes. The payoff is access to tailored information in near real time with corresponding increases in speed of command, improved decision-making, and reduction in manpower.

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The Common Picture Program supports FORCEnet, Sea Shield and Sea Strike pillars and contains investments in the following Enabling Capabilities (ECs): Secure Collaboration; Advanced Communication for FORCEnet; GIG Compliant Networking; Dynamic Target Engagement and Enhanced Sensor Capability; Next Generation Command, Control and Decision Support Services; Combatant Commander (COCOM) to Marine Combat ID; Combat ID Information Management of Coordinated Electronic Surveillance; Combat ID in the Maritime Domain to Reveal Contact Intent; Automated Control of Large Sensor Networks; and Hostile Fire Detection and Response Spiral 1.

In the context of the Naval Transformation Roadmap construct, this investment will achieve capabilities required by FORCEnet (Persistent Intelligence, Surveillance, and Reconnaissance; Time Sensitive Strike; and Sea Based Information Operations), Sea Strike (Ship-to-Objective Maneuver), and Sea Shield (Theater Air and Missile Defense).

Due to the number of efforts in this PE, the programs described herein are representative of the work included in this PE.

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B. PROGRAM CHANGE SUMMARY:

	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
FY 2007 President's Budget Submission	73,056	61,725	42,739	42,971
Congressional Action	0	8,250	0	0
Congressional Reduction	0	-4,000	0	0
Congressional Undistributed Reductions/Rescissions	-145	-289	0	0
Execution Adjustments	156	0	0	0
Non-Pay Inflation Adjustments	0	0	-345	162
Program Adjustments	0	0	2,936	-16,710
Program Realignment	0	0	-4,871	-3,960
Rate Adjustments	0	0	323	292
SBIR Assessment	-1,105	0	0	0
FY 2008/FY 2009 President's Budget Submission	71,962	65,686	40,782	22,755

PROGRAM CHANGE SUMMARY EXPLANATION:

Technical: Not applicable.

Schedule: Not applicable.

C. OTHER PROGRAM FUNDING SUMMARY:

Not applicable.

D. ACQUISITION STRATEGY:

Not applicable.

E. PERFORMANCE METRICS:

Performance metrics are discussed within the project (R2a).

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PROJECT NUMBER: 2919

PROJECT TITLE: COMMUNICATIONS SECURITY

COST: (Dollars in Thousands)

Project Number & Title	FY 2006 Actual	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
2919 COMMUNICATIONS SECURITY	59,116	57,460	40,782	22,755	38,899	48,735	48,138	47,474

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The Communications Security project supports FORCEnet, Sea Shield and Sea Strike pillars and contains investments in the following Enabling Capabilities (ECs): Secure Collaboration; Advanced Communication for FORCEnet; GIG Compliant Networking; Dynamic Target Engagement and Enhanced Sensor Capability; Next Generation Command, Control and Decision Support Services; COCOM to Marine Combat ID; Combat ID Information Management of Coordinated Electronic Surveillance; Combat ID in the Maritime Domain to Reveal Contact Intent; Automated Control of Large Sensor Networks; and Hostile Fire Detection and Response Spiral 1.

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PROJECT TITLE: COMMUNICATIONS SECURITY

In the context of the Naval Transformation Roadmap construct, this investment will achieve capabilities required by FORCENet (Persistent Intelligence, Surveillance, and Reconnaissance (ISR); Time Sensitive Strike; and Sea Based Information Operations), Sea Strike (Ship-to-Objective Maneuver), and Sea Shield (Theater Air and Missile Defense).

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2006	FY 2007	FY 2008	FY 2009
PLATFORM PROTECTION/ELECTRONIC WARFARE SYSTEMS	6,999	0	0	0

This activity is aligned with the Sea Strike pillar and supports the development of Situational Awareness (SA) capabilities for small surface, ground-based and airborne platforms. Currently, these platforms have limited SA capability, which jeopardizes their battlefield effectiveness and combat survivability. This activity develops the Electronic Warfare Integrated System for Small Platforms (EWISSP), a compact small platform electronic warfare capability providing radio frequency (RF), electro-optic (EO), and infrared (IR) sensors for platforms such as smaller ships, expeditionary fighting vehicles (EFV), and surveillance aircraft. This activity integrates successful proof-of-concept hardware and software developed under PE 0602235N into systems suitable for capability demonstration under Naval environments and tactical conditions. Responding to customer reprioritization of requirements based upon threat capabilities, the initial focus of the EWISSP program will be toward the development of an EO/IR detection, warning, and countermeasures capability with future capabilities development in the RF technology area. This activity includes support to the Sea Strike Enabling Capability for Hostile Fire Detection and Response Spiral 1.

Starting in FY 2007, the EWISSP program moved to PE 0603114N.

FY 2006 Accomplishments:

- Continued the development of advanced technology applications to increase the survivability of the Marine EFV.
- Continued implementation of design configuration management as part of the transition effort to track development and integration progress and identify technology insertion points with a maximum overall limitation of 10 percent of platform cost.
- Completed fabrication and test of EWISSP subsystems. Integrate subsystems into EWISSP prototype systems for

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final demonstration and test.

- Initiated EWISSP IR Threat Warning System (IR TWS) Operational Demonstration. Show capability of the IR TWS to detect simulated missiles in a field environment, including evaluation of response time, azimuth and elevation accuracy, and false alarm rate as compared to the performance goals of 90 deg azimuth x 45 deg elevation with .5 deg resolution.
- Initiated field demo of integrated system on surrogate vehicle (High Mobility Multi-purpose Wheeled Vehicle (HMMWV)), to demonstrate EO/IR sensor detection and cueing of laser decoy, the 310 pound Multi-function Electro Optical System (MEOS) countermeasures, and optical augmentation for situational awareness and target detection and identification.

	FY 2006	FY 2007	FY 2008	FY 2009
INFORMATION SECURITY RESEARCH	1,880	1,931	1,940	1,349

The goal of this activity is to protect the Navy and Joint information infrastructure from hostile exploitation and attack. This requires situational awareness of network assets and operations. This activity focuses, in part, on integrating successful proof-of-concept research prototypes developed under PE 0602235N. The goal is to develop tools, techniques and methodologies in order to: improve network resistance to denial of service attacks; improve indications and warnings of suspect activities; conduct traffic analysis; monitor and assess network status and health; identify new capabilities to analyze network vulnerabilities and attacks; measure the effectiveness of Information Assurance (IA) protective measures; and improve the quality and level of certification of IA software.

FY 2006 Accomplishments:

- Continued development of a secure, survivable, and dynamic service-oriented enterprise architecture to support military missions, addressing grid computing, peer-to-peer computing, and the adaptation of security and survivability features to those technologies for military use.
- Completed the development and demonstrated correlated statistical analysis of pro-active monitoring of intrusive network behaviors, specifically addressing network misuse at the lowest/slowest event level (e.g., low bandwidth, high timeline events).
- Initiated development of the security management tool that provides a common picture of the networked environment with respect to IA and security, with emphasis on visualization capabilities to support active computer network defense.
- Initiated development of a tool for the development of agents that integrates unified modeling language

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(UML) and that provides a verifiable agent programming language, an inter-agent communication protocol, security agents for enforcing run-time properties, and property checkers.

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Complete the development and demonstrate a secure, survivable, and dynamic service-oriented enterprise architecture to support military missions, addressing grid computing, peer-to-peer computing, and the adaptation of security features to those technologies for military use.
- Initiate development of integrated capabilities that support battle damage assessment and infrastructure and asset protection based on information provided by the common picture of the networked environment with respect to IA and security.

FY 2008 Plans:

- Continue all efforts of FY 2007 less those noted as completed above.
- Continue development of integrated capabilities that support battle damage assessment and infrastructure and asset protection based on information provided by the common picture of the networked environment with respect to IA and security. Evaluate and demonstrate the capabilities in an operationally representative environment and use the results to improve the capabilities.
- Initiate the development of a tool suite that will provide evidence of assurance for security products based on the foundations of formal methods. The tool will provide the automated analysis of the implementation based on the security policy, the architecture and/or the software security critical functions.
- Initiate the development of capabilities and an infrastructure that will support the management of high assurance devices/components used within Navy networks. Ensure the approach is supported by the Navy's network centric architecture.

FY 2009 Plans:

- Continue all efforts of FY 2008.
- Complete the development of integrated capabilities that support battle damage assessment and infrastructure and asset protection based on information provided by the common picture of the networked environment with respect to IA and security.

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	FY 2006	FY 2007	FY 2008	FY 2009
GLOBAL POSITIONING SYSTEM (GPS) & NAVIGATION TECHNOLOGY	4,647	4,828	4,702	3,769

This activity enhances Global Positioning System anti-jam (GPS AJ) capabilities and develops other technologies to provide alternative navigation methods. In the GPS AJ area, Space-Time Adaptive Processing (STAP) is being pursued to remove the operational risks associated with enemy jamming of GPS functions. Also, the next generation GPS receiver will be programmed with M-code; therefore, both the next generation M-code and the existing C/Y-codes must be used at the same timeframe. Office of Naval Research initiated a transitional receiver which will accommodate both the C/Y- and M-codes. The alternative navigation methods investigated include GPS receivers with a tightly coupled Inertial Navigation System (INS); gravity gradiometer development, used in a terrain-following concept; and an electro-optic accelerometer developed as an improved element in INS. This activity also develops the atomic clock for inclusion in Naval Systems. The atomic clock efforts include small, low-cost Rubidium (Rb), and Coherent Population Trapping (CPT) atomic clock development. These areas will provide alternatives to GPS navigation and alternatives to the availability of precise GPS-provided time transfer.

FY 2006 Accomplishments:

- Continued the demonstration project of nonlinearly constrained adaptive beam forming for defeating Binary Phase-Shift-Keying (BPSK) jammers. Developed an algorithm to mitigate the loss of Signal-to-Noise Ratio (SNR) through a combination of adaptive space-time-frequency signal processing techniques.
- Continued the development of a small, lightweight Micro-Electro-Mechanical Systems (MEMS) Accelerometer for navigation systems; and fabricated an Electro-Optic Accelerometer.
- Continued the development of algorithms for distributed time scaling; developed architectures necessary to establish a Navy Global Coordinated Time Scale; tested the algorithms via both simulation and using actual clock data provided by the U.S. Naval Observatory (USNO).
- Continued the development of Magnetic Passive Navigation (MPN).
- Completed the development of a 10cc Rb Coherent Population Trapping (CPT) atomic clock for tactical applications.
- Completed the fabrication of an Application Specific Integrated Circuit (ASIC) chip for GPS M- and C/Y-code and test with GPS II and GPS III signals.
- Completed the development of an Optical Ring Gyroscope Chip. Fabricated dual-arm, 2-cm diameter optical ring resonator in neodymium-doped substrates, and incorporated an electro-optics phase modulator into the ring.

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- Initiated the Integrated Optically Transduced Gyro Assembly (IOTA) project.
- Initiated the Enhanced AJ GPS Receiver Technology (EAGRT) project.
- Initiated the Advanced Anti-Spoofing Detection and Isolation for GPS Acquisition project.
- Initiated the Scaleable Integrated Micro Optical Gyroscope (SIMOG) project.
- Initiated the Navigation Grade Microfabricated Integrated Optical Gyro (MIOG) project.
- Initiated the Navigation Grade Sub-Harmonic Lateral Mode Gyro (GSLMG) project.
- Initiated the development of the Sonar Aided Inertial Navigation Technology (SAINT).

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Complete the development of Magnetic Passive Navigation (MPN).
- Initiate the 5-cc accelerometer with the Embedded GPS Inertial (EGI) System for aircraft avionics applications.
- Initiate the MEMS Gyro-cluster INS for Tactical Platforms project.
- Initiate the Precision Celestial Navigation System (PCNS) project.
- Initiate the Dead Reckoning Advanced Tight Coupling (DRATC) project.
- Initiate the Qualification of a Commercial-Off-the-Shelf (COTS) Miniature Atomic Clock project.

FY 2008 Plans:

- Continue all efforts of FY 2007 less those noted as completed above.
- Complete the demonstration project of nonlinearly constrained adaptive beam forming for defeating Binary Phase-Shift-Keying (BPSK) jammers. Developed an algorithm to mitigate the loss of Signal-to-Noise Ratio (SNR) through a combination of adaptive space-time-frequency signal processing techniques.
- Complete the development of the Sonar Aided Inertial Navigation Technology (SAINT).
- Initiate the GPS anti-spoofing antenna electronics effort using Electronic Support Measures (ESM) and tracking/location-based system.
- Initiate the navigation grade Inertial Navigation System (INS) using fiber optic/Micro-Electronic Mechanical System (MEMS) gyros and electro-optic accelerometers.
- Initiate the Adaptive Temporal Suppression of GPS Structured Interference project.
- Initiate the Simultaneous localization and Mapping (SLAM) Inertial Measurement Unit (IMU) non-GPS Navigator (SINGN) project.
- Initiate the GPS Synchronization of a Chip-scale Atomic Clock project.

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FY 2009 Plans:

- Continue all efforts of FY 2008 less those noted as completed above.
- Complete the development of IOTA.
- Complete the development of EAGRT.
- Complete the Advanced Anti-Spoofing Detection and Isolation for GPS Acquisition project.
- Complete the development of SIMOG.
- Complete the development of MIOG.
- Complete the development of GSLMG.
- Complete the development of SAINT.

	FY 2006	FY 2007	FY 2008	FY 2009
USCG VESSEL TRACKING	4,215	2,817	0	0

Details are of a higher classification.

All effort in this activity completes in FY 2007.

	FY 2006	FY 2007	FY 2008	FY 2009
MARINE MAMMALS	970	995	0	0

This initiative provides data and technology for making informed decisions regarding the interaction of naval activities with protected marine life and habitats to enable platform operation and force projection, and maximize use of Navy training ranges within environmental constraints. Ensure Navy compliance with national environmental laws, Executive Order 12114, and OPNAVINST 5090.1B while still maintaining full operational and training exercise capabilities.

All Marine Mammal efforts within this activity transfer to PE 0602435N effective FY 2008.

FY 2006 Accomplishments:

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- Continued Temporary Threshold Shift (TTS) data collection to determine time, energy trade-off and recovery rates for long duration sound exposures and multiple pings typical of Navy operations and training.
- Continued to expand Marine Mammal Monitoring on Navy Ranges (M3R) capability for tracking beaked whales and develop classification software for identification of marine mammal species and populations.
- Continued M3R Atlantic Undersea Test Evaluation Center (AUTEK) on-site analysis and Pacific Missile Range Facility (PMRF) data collection with visual surveys.
- Completed M3R Technology Readiness Level (TRL) assessment and transition plan.
- Completed M3R technology development at AUTEK.
- Initiated TTS Acoustic Safety Criteria Model for multiple sonar pings on dolphins and toothed whales.
- Initiated TTS data collection to develop cumulative sound exposure model for seals and sea lions.
- Initiated technology transition agreement (TTA) with CNO N45.

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Complete multiple ping TTS data collection for dolphins.
- Complete TTS Acoustic Safety Criteria Model for multiple sonar pings on dolphins and toothed whales.
- Initiate transition from behavioral to electrophysiological measurements of hearing/TTS in marine mammals.
- Initiate transition plan for demonstration and evaluation of M3R technology at other Navy ranges.
- Initiate sound exposure study at AUTEK to develop effective M3R mitigation methodology for Navy ranges.

	FY 2006	FY 2007	FY 2008	FY 2009
KNOWLEDGE SUPERIORITY AND ASSURANCE (KSA)	31,609	40,508	33,140	17,637

This activity is aligned with the FORCENet pillar and explores fundamental technologies that enhance the Navy's capability to exploit, manage and integrate complex, heterogeneous, multi-source information for the next generation common picture. Science and Technology (S&T) work is being focused on Navy and Marine Corps Warfighter Capability Gaps identified through analysis of operational and exercise lessons learned, as well as campaign analysis of capabilities required in the 2010-2024 time frame.

The increase from FY 2006 to FY 2007 reflects the reorganization of Future Naval Capabilities (FNC) Program investments into Enabling Capabilities (ECs). As a result of this reorganization, the funding for each EC has been aligned to a Budget Activity 2 and Budget Activity 3 PE as appropriate. Warfighter Capability Gaps are

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being addressed by Enabling Capabilities (EC). Each EC delivers capability-level products to acquisition in a three to five-year effort, and allocates a sufficient investment to ensure a capability is provided. ECs addressed include: Secure Collaboration; Advanced Communication for FORCENet; GIG Compliant Networking; Dynamic Target Engagement and Enhanced Sensor Capabilities; Next Generation Command, Control and Decision Support Services; COCOM to Marine Combat ID; Combat ID Information Management of Coordinated Electronic Surveillance; Combat ID in the Maritime Domain to Reveal Contact Intent; Automated Control of Large Sensor Networks; and Globally Netted Joint/Coalition Force Maritime Component Commander.

The decrease from FY 2007 to FY 2008 is due to the completion of efforts on Tactical Signal Intelligence (SIGINT) (SLYFOX) in connection with completion of the overall EC COCOM to Marine Combat ID in FY 2009.

The decrease from FY 2008 to FY 2009 is applied to the Globally Netted Joint/Coalition Force Maritime Component Commander, Combat ID in the Maritime Domain to Reveal Contact Intent, and the Combat ID Information Management of Coordinated Electronic Surveillance FNC efforts within this activity.

FY 2006 Accomplishments:

- Continued efforts on Joint Coordinated Real-Time Engagement (JCRE) Advance Concepts Technology Demonstration (ACTD) to provide Global Information Grid (GIG)-compliant core enterprise Services and Community of Interest (COI) Services which ensured warfighting COIs access to information required from any source for rapid situation awareness assessment.
- Continued effort on Processing SIGINT (Sly Fox) (follow on to Tactical Processing and Analysis initiated in PE 0602235N). Automated back-end software that supports the Shipboard Information Warfare and Cryptologic System Acquisition Front-end, resulting in 75% reduction of operator effort associated with processing intercept reports, and a 50% decrease in operator errors and a 50% reduction in training hours.
- Completed Airborne Communications Package (ACP). Transitioned to FIRESOUL program, Program Management Warfare (PMW) 760 as a mission module for the Littoral Combat Ship. Also this extends the penetrating surveillance range to an area greater than 80 nautical miles.
- Completed effort for Comprehensive, Analytic, Real-Time Execution in Joint Air Operations (CARTE). Transitioned to Program Management (PM) Coherent Analytical Computing Environment (CACE) Marine Corps Systems Command (MCSC)/Joint Strike Fighter (JSF). Automated Squadron-level coordinated Operations and Maintenance scheduling tools for AV8-Bs (reduce scheduling time from six hours to two minutes).
- Completed transition of Intra Battlegroup Wireless Networking to Automated Digital Network System (ADNS) (PMW 160).

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- Completed transition of Multi-National Virtual Operation Network, including Domino One-way Replication Services (DORS) and Unit Level Multi-level Thin Client Prototype, with transition to PMW-160. Significantly enhances network centric interoperability among allies and coalition partners by providing at-sea reliable, secure, and timely exchange of releasable tactical information through use of virtual private networks and secure web servers.
- Initiated Sea Trial Experimentation of command decision-making and dynamically managed connectivity including Decision Support for Dynamic Target Engagement; Secure Distributed Collaboration; Processing Tactical SIGINT, Integrated Autonomous Network Management (IANM) and network management tools; as well as planning and rehearsals of operational and tactical forces.

Efforts move to PE 0602235N in FY 2007.

- Initiated Actionable Information from Multiple Intel Sources in a Global Information Grid Enterprise Services (GIG-ES) Environment. Automated integration of multi-INT surveillance & reconnaissance of red, white, and blue force locations for Combat ID by providing software integrated into Navy and Marine Corps Command Control & Combat Systems.
- Initiated effort for Improved Maritime Common Operational Tactical Picture in a GIG-ES Environment. Provided software to perform level one fusion of intelligence sources and tactical organic sensors to provide knowledge about battlespace objects including location, track, and Combat Identification. Improved planning and resource management of ISR assets allocated to fill ISR coverage gaps, with 100X improvement over current performance. More effective allocation of assets to eliminate redundant coverage, with 100% more coverage or 50% reduction in planned sensor asset usage.
- Initiated design of tools enabling mission-specific tactical sensor fields for at least two separate mission areas.
- Initiated design of tactical distributed data analysis and automated indications and warnings for 50% of tactical data.
- Initiated design of automated tactical platform and sensor planning and management sufficient for one operator to control multiple sensors.

FY 2007 Plans:

- Continue all efforts of FY 2006 less those noted as completed above.
- Complete effort on SIGINT (Sly Fox).
- Complete the Innovative Tactical Beyond Line of Sight (BLOS) Communications Relay (previously reported in

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PE 0603236N).

- Complete Network Management Tools effort.
- Complete development of Integrated Autonomous Network Management (IANM) by transitioning to ADNS Integrated Ship Network System (ISNS)/ADNS PMW-160. This enables central monitoring of as many as 15 distributed network management systems, tactical shore and ship, in a 1500 nm area. This network automatically assesses the environment and recommends changes to optimize network performance in real time (10s of seconds). As a result, there will be manpower savings, fewer personnel required to manage computers, and communication networks for big-deck ships.
- Initiate smart algorithms for tactical sensors.
- Initiate Combat ID in the Maritime Domain to Reveal Combat Intent.

FY 2008 Plans:

- Continue all efforts of FY 2007 less those noted as completed above.
- Complete development of Secure, Distributed Collaboration effort. Transition to the PEO for C4I and Space, for the PMW 160 program the Combined Enterprise Regional Information Exchange System (CENTRIXS) for secure collaboration across multiple coalition boundaries and security levels in the maritime environment. This enhances real-time collaboration among coalition partners and own forces and increases decision speed based on the integrated and shared tactical picture. It also enforces security policy providing increases in assurance level.
- Complete Ultra High Frequency (UHF)/L-Band phased array antennas for carriers (previously PE 0603271N).
- Complete the High Altitude Airborne Relay and Router Package to deliver relay/router packages for a high and medium altitude platforms across UHF/VHF and Ku-Bands (previously reported in PE 0603271N).
- Initiate development of technology to enable the coordinated Global Joint and Coalition Force Maritime Component Commander (J/CFMCC) capture and share information from sources and processes; with the intended result of managing at least 10,000 tracks per day in a consistent manner to support user awareness and control (current capability is approximately 200 tracks per day globally).

FY 2009 Plans:

- Continue all efforts of FY 2008 less those noted as completed above.
- Complete the Joint Coordinated Real-Time Engagement (JCRE) Advance Concepts Technology Demonstration (ACTD) to provide GIG-compliant core enterprise Services and COI Services which will ensure warfighting COIs access

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DATE: February 2007

BUDGET ACTIVITY: 03

PROGRAM ELEMENT: 0603235N

PROGRAM ELEMENT TITLE: COMMON PICTURE ADVANCED TECHNOLOGY

PROJECT NUMBER: 2919

PROJECT TITLE: COMMUNICATIONS SECURITY

to information required from any source for rapid situation awareness assessment.

- Initiate development of advanced technologies that support delivery of Technology Oversight Group (TOG) approved FNC enabling capabilities structured to close operational capability gaps that involve the common picture.
- Initiate packaging of advanced common picture technologies into deliverable FNC products and ECs that can be integrated into acquisition programs within a five year period.
- Initiate effort to mature common picture technologies that support naval requirements identified within the FORCENet naval capability pillar.

	FY 2006	FY 2007	FY 2008	FY 2009
MULTI-SOURCE INTEGRATION (MSI) AND COMBAT IDENTIFICATION (CID)	8,796	6,381	1,000	0

This activity is aligned with the Sea Shield pillar. Multi-Source Integration (MSI), Advanced Sensor Netting Technology (ASNT), and Composite Combat Identification (CCID) technology address theater air and missile defense (TAMD) needs for data fusion, correlation of and reasoning over attributes leading to target Identification, and sensor fusion/management. The goal is to develop algorithms for use by air defense combat systems which will then be able to fuse, filter, and correlate on-board sensor and off-board battlespace information from all sources to achieve one common Combat Identification (CID) solution using Theater-wide information. This activity supports the Sea Shield Enabling Capability for Real Time Long Range Air Defense CID in Support of Early Engagements and related CID Science & Technology to be worked under FORCENet.

All efforts within this activity complete in FY 2008.

FY 2006 Accomplishments:

- Continued laboratory demonstrations of ASNT and CCID.
- Continued MSI project development and testing of algorithms to integrate real time and non-real time sensor data and correlate satellite communications (SATCOM) data in the E-2C mission computer.
- Continued development of ASNT algorithms for integration of electronic warfare support (ES) data into the Open Architecture Track Manager in future combat systems and transmission of track ID attributes via real time sensor networks.
- Continued development of CCID algorithms to correlate and fuse real time tracks with intelligence, surveillance, and reconnaissance data in Ship Signal Exploitation Equipment (SSEE) equipped surface ships and

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common reasoning algorithms for CID capability to rapidly build high confidence identification of air tracks using all available ID attributes in theater.

FY 2007 Plans:

- Complete laboratory demonstrations of ASNT and CCID.
- Complete MSI project development and testing of algorithms to integrate real time and non-real time sensor data and correlate satellite communications (SATCOM) data in the E-2C mission computer.
- Complete development of ASNT algorithms for integration of electronic warfare support (ES) data into the Open Architecture Track Manager in future combat systems and transmission of track ID attributes via real time sensor networks.
- Complete development of CCID algorithms to correlate and fuse real time tracks with intelligence, surveillance, and reconnaissance data in SSEE equipped surface ships and common reasoning algorithms for CID capability to rapidly build high confidence identification of air tracks using all available ID attributes in theater.

FY 2008 Plans:

- Complete technology transition to the E-2C/D Program Management Office (PMA-231), Intelligence, Surveillance, Reconnaissance, and Information Operations Program Office (PMW-180), and PEO-IWS.

C. OTHER PROGRAM FUNDING SUMMARY:

NAVY RELATED RDT&E:

PE 0601153N (Defense Research Sciences)
PE 0602114N (Power Projection Applied Research)
PE 0602123N (Force Protection Applied Research)
PE 0602131M (Marine Corps Landing Force Technology)
PE 0602235N (Common Picture Applied Research)
PE 0602236N (Warfighter Sustainment Applied Research)
PE 0602271N (RF Systems Applied Research)
PE 0603114N (Power Projection Advanced Technology)
PE 0603123N (Force Protection Advanced Technology)

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PE 0603236N (Warfighter Sustainment Advanced Technology)
PE 0603271N (RF Systems Advanced Technology)
PE 0603609N (Conventional Munitions)
PE 0603640M (USMC Advanced Technology Demonstration (ATD))
PE 0603658N (Cooperative Engagement)
PE 0604307N (Surface Combatant Combat System Engineering)
PE 0604518N (Combat Information Center Conversion)
PE 0204152N (E-2 Squadrons)
PE 0205601N (HARM Improvement)
PE 0206313M (Marine Corps Communications Systems)
PE 0303140N (Information Systems Security Program)
PE 0308601N (Modeling and Simulation Support)

NON-NAVY RELATED RDT&E:

PE 0603750D8Z (Advanced Concept Technology Demonstrations)

D. ACQUISITION STRATEGY:

Not applicable.

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PROGRAM ELEMENT: 0603235N

PROJECT NUMBER: 9999

PROGRAM ELEMENT TITLE: COMMON PICTURE ADVANCED TECHNOLOGY

PROJECT TITLE: Congressional Plus-Ups

CONGRESSIONAL PLUS-UPS:

	FY 2006	FY 2007
4D DATA FUSION VISUALIZATION	0	1,594

This effort is investigating new techniques to display and integrate 4 dimensional information over time and methods for visualizing the time latency of informational content.

	FY 2006	FY 2007
AUTONOMOUS SERVICE AGGREGATION FOR THE EXPEDITIONARY WARFARE TESTBED	958	0

This project automated and provided dynamic brokering of services for web-enabled information discovery, accessing, and conditioning to allow for computer-independent processing of disparate data sources for disadvantaged Naval users. All development occurred in the Expeditionary Warfare Testbed at Naval Surface Warfare Center Panama City, FL.

	FY 2006	FY 2007
CIP ADVISOR FOR GLOBAL MARITIME AWARENESS	958	0

This effort supported research and assessment of Critical Infrastructure Protection (CIP) tools and techniques for global maritime awareness research.

	FY 2006	FY 2007
CONSOLIDATED UNDERSEA SITUATIONAL AWARENESS SYSTEM (CUSAS)	2,778	0

This effort continued development of the openly-architected agent-based decision support software for the Undersea Warfare Decision Support System and the Aircraft Carrier Tactical Support Center. The deliverable was an agent-based software module for the Anti-Submarine Warfare Combat, Command, and Control System.

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	FY 2006	FY 2007
IMPROVED SHIPBOARD COMBAT INFORMATION CENTER	1,915	1,345

FY06: Integrated and explored various decision-making and display technologies for improving combat information. Demonstrated the capability of emerging technologies to further automate and improve the warfighting operations of surface ship combatants, streamlining and integrating information workflow to improve speed of decision-making and improved operational effectiveness in combat situations.

FY07: This project enhances combat operations while reducing the number of Combat Information Centers (CIC) by allowing watch standers to better receive, comprehend, and respond to incoming data during combat operations.

	FY 2006	FY 2007
INTERNET PROTOCOL VERSION 6	967	0

This effort developed the Internet Protocol Version 6 (IPv6) testbed consisting of servers, clients and infrastructure, including external site partners. The project developed remote facilities required to model, simulate and test IPv6 in stressed mobile RF environments. Validation of the testbed and preparation to test draft IPv6 protocols addressing Mobile Ad-Hoc Network (MANET), Load Balancing and Auto-Configuration of network participations occurred.

	FY 2006	FY 2007
MARITIME IDENTIFICATION SURVEILLANCE TECHNOLOGY (MIST)	958	996

FY06: Developed a high performance data translation and correlation capability to identify a full range of emitters to include low probability of intercept (LPI) radars and others difficult to detect and catalogue.

FY07: MIST will continue to develop technologies to provide continuous surveillance, identification and tracking of all surface ships around naval platforms at sea, or in coastal waters and harbors.

	FY 2006	FY 2007
MIST AFFORDABLE HIGH RESOLUTION PHASED ARRAY RADAR	2,874	0

Developed low-cost multi-function X-band phased array radar to support Maritime Identification Surveillance

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Technology (MIST).

	FY 2006	FY 2007
RAIL SENSOR TESTBED	0	1,295

This project develops technologies to support the real-time detection, identification, and assessment of chemical, biological, radiological, and nuclear threats to the United States.

	FY 2006	FY 2007
SHIPBOARD AUTOMATED RECONSTRUCTION CAPABILITY	1,438	0

This effort assisted submarine operators with planning, executing and evaluating highly complex tactical and covert submarine missions, presenting relevant operational data and supporting accurate reconstruction of high interest events experienced during the mission. The system permitted the ship to conduct post-analysis of encounters in near real-time and to provide the intelligence community with pre-processed data that enabled more rapid and accurate analysis of interactions of operational value.

	FY 2006	FY 2007
SITUATIONAL AWARENESS IMPROVEMENTS AT FORWARD OPERATING BASES IN IRAQ	0	2,000

This project develops learning algorithms to incorporate multiple sensor signature recognition and integration for alerting an operator to anomalous or suspect activity. This will develop the pattern/signature recognition of battlespace entities by automating a lot of the manual target feature processing.

	FY 2006	FY 2007
URBAN DATA DELIVERY IN THE VIRTUAL BATTLE LAB	0	996

Funds are in support of Urban Data Delivery in the Virtual Lab Environment