FY 2006/2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: Feb 2005
Exhibit R-2

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

COST: (Dollars in Thousands)

Project Number & Title	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
Total PE	83,556	83,062	60,589	53,471	31,101	45,149	50,752	70,955
R2919	COMMUNICATIONS SECURITY							
	72,599	78,703	60,589	53,471	31,101	45,149	50,752	70,955
R9020	VESSEL TRACKING							
	4,228	0	0	0	0	0	0	0
R9315	CONSOLIDATED UNDERSEA SITUATIONAL AWARENESS SYSTEM (CUSAS)							
	3,844	3,368	0	0	0	0	0	0
R9316	SHIPBOARD AUTOMATED RECONSTRUCTION CAPABILITY (SHARC)							
	1,924	0	0	0	0	0	0	0
R9317	TECHNOLOGY INSERTION SUPPORT							
	961	0	0	0	0	0	0	0
R9472	DYNAMIC BROKERING IN THE EXPEDITIONARY WARFARE TESTBED							
	0	991	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Program Element (PE) addresses the advanced technology development, test and evaluation of a dynamic distributed common picture that will improve situational awareness across command echelons. The goal is to refine technologies that exploit information and networking technology to ensure mission success in an unpredictable warfighting environment. It creates network centric capability by demonstrating 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 decisive, precise, desired engagement outcomes. The payoff is access to tailored information in near real time with

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corresponding increases in speed of command, improved decision-making, and reduction in manpower. The Common Picture Program supports the Knowledge Superiority and Assurance (KSA), Missile Defense (MD), and Fleet/Force Protection (FFP) Future Naval Capabilities (FNC). 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,” “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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PROGRAM CHANGE SUMMARY:

	FY 2004	FY 2005	FY 2006	FY 2007
FY 2005 President's Budget Submission	79,690	79,521	62,624	60,080
Cong Rescissions/Adjustments/Undist. Reductions	0	-842	0	0
Congressional Action	0	4,400	0	0
Execution Adjustments	6,202	0	0	0
FNC Realignment	0	0	-13,780	-16,796
Non-Pay Inflation Adjustments	-74	0	0	0
Program Adjustments	0	-17	-59	-45
Program Realignment	0	0	11,774	10,051
Rate Adjustments	0	0	30	181
SBIR Assessment	-2,262	0	0	0
FY 2006/2007 President's Budget Submission	83,556	83,062	60,589	53,471

PROGRAM CHANGE SUMMARY EXPLANATION:
Technical: Not applicable.

Schedule: Not applicable.

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PROGRAM ELEMENT: 0603235N PROGRAM ELEMENT TITLE: COMMON PICTURE ADVANCED TECHNOLOGY
PROJECT NUMBER: R2919 PROJECT TITLE: COMMUNICATIONS SECURITY

COST: (Dollars in Thousands)

Project Number & Title	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
R2919 COMMUNICATIONS SECURITY	72,599	78,703	60,589	53,471	31,101	45,149	50,752	70,955

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project addresses 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 goal is to refine technologies that exploit information and networking technology to ensure mission success in an unpredictable warfighting environment. It creates network centric capability by demonstrating 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 decisive, precise, 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. 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,” “Sea Based Information Operations,” “Sea Strike” Ship-to-Objective Maneuver, and “Sea Shield” Theater Air and Missile Defense.

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B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2004	FY 2005	FY 2006	FY 2007
KNOWLEDGE SUPERIORITY AND ASSURANCE (KSA)	25,642	43,594	31,944	29,275

Knowledge, Superiority, and Assurance (KSA) 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 2010-2015 time frame. Warfighter Capability Gaps being addressed by FORCEnet S&T needs include Combat Identification (CID), Ubiquitous Communications (Comm), Computer and Network Defense and Information Assurance (CND&IA). Office of Naval Research (ONR) has established groupings of S&T Projects to incrementally provide technology input to eliminate Warfighter Gaps: these are called Enabling Capabilities (EC). Each EC delivers capability-level product to acquisition in a three to five year effort, and allocates a sufficient investment to ensure a capability is provided. For example, ID EC-1A provides cryptologic management and level one fusion capability in a Global Information Grid-compliant implementation, and transitions to the warfighter in FY05. Ubiquitous Communications provides Dynamically Managed, Interoperable, High-Capacity Connectivity wireless network technology critical to the performance and robustness of naval communications by providing higher data rates, expanded coverage to disadvantaged platforms, and improved bandwidth management.

The increase in FY 05 funding is due primarily to shift of work on K/Ka/Q-band phased array antennas from PE0603271N.

FY 2004 Accomplishments:

• Continued demonstrations of the Multi-National Virtual Operation Network (MNVOC) between UK and US. Initiated development of software and system certification of secure web servers to share tactical multiple media data products with coalition forces.
• Continued development of the Airborne Communication Payload for the Firescout Unmanned Aerial Vehicle (UAV). Completed initial laboratory demonstration and initiated planning for FY 05 Airborne Flight Testing.
• Continued Battle Force Networking (Block II) and Wireless Quality of Service (QoS) Based Routing for FORCEnet.
• Completed transition for Traffic Flow Engineering to PMW179 Automated Digital Networking System (ADNS).

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• Completed transition for Real-Time Execution Decision Suite (REDS) to PMA-281 Joint Mission Planning System (JMPS).
• Completed transition for Image Processing and Exploitation Architecture (IPEX) to PMA-281 Joint Services Image Processing System - Navy (JSIPS-N).
• Completed transition for Land Attack Control Suite (LACS) to PMA-282 Tactical Tomahawk Weapon Control System (TTWCS).
• Completed transition for Integrated Decision Support Suite (IDSS) to Special Operations Command Program Manager Special Operations Mission Planning Environment (SOMPE).
• Completed transition of distributed collaborative planning and execution tools to support the Commander In Chief Twenty-First Century Advanced Concept Technology Demonstration (CINC 21 ACTD).
• Completed transition for Dynamic Reconfiguration of Link 16 (PMW-159).
• Initiated effort for Comprehensive, Analytic, Real-Time Execution in Joint Air Operations (CARTE).
• Initiated effort for Wireless Quality of Service Based Routing for FORCEnet.

FY 2005 Plans:

• Continue all efforts of FY 04 less those noted as completed above.
• Complete work on K/Ka/Q-band phased array antennas for submarine, ship, and mobile ground vehicles. (Previously funded in PE 0603271N).
• Complete work on Battle Force Composite Networking Block II and Wireless Quality of Service (QoS) Based Routing for FORCEnet and transition to ADNS (PMW 160).
• Conduct Sea Trial Experimentation on capability to access, update, and maintain the Common Operational and Tactical Picture (COTP) through an integrated and interoperable set of software applications.
• Conduct Sea Trial Experimentation on the Multi-National Virtual Operations Capability (MNVOC) Battle Force Email High Frequency (HF) Local Area Network system to carry Internet Protocol (IP) data over HF (and other Line of Site Systems) to complement satellite communications assets.
• Initiate effort for Reconfigurable Surveillance UAVs for Warfighter Protection. (Moves to PE 0603114 in FY 06).
• Initiate 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 ensure warfighting COIs access to information required from any source for rapid situation awareness assessment.
• Initiate effort for Decision Support for Dynamic Target Engagement.
• Initiate Information Assurance effort called Secure Distributed Collaboration.

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• Initiate effort on Integrated Autonomous Network Management (IANM).
• Initiate an Ultra-High Frequency (UHF)/L-Band Phased Array Antenna for Naval aircraft carrier platforms. (Moves to PE 0603271N in FY06).

FY 2006 Plans:

• Continue all efforts of FY 05 less those noted as completed above.
• Complete transition of MNVOC.
• Complete Intra Battlegroup Wireless Networking (Block II).
• Complete Airborne Communications Package(ACP).
• Initiate effort on Processing Tactical Signal Intelligence (SIGINT) (Sly Fox) (follow on to Tactical Processing and Analysis from PE 0602235N).
• Initiate Actionable Information from Multiple Intel Sources in a GIG-Electronic Surveillance (ES) Environment.
• Conduct Sea Trial Experimentation of command decision-making and dynamically managed connectivity (e.g., Decision Support for Dynamic Target Engagement; Secure Distributed Collaboration; Processing Tactical SIGINT, Integrated Autonomous Network Management (IANM); as well as replanning and rehearsals of operational and tactical forces.)

FY 2007 Plans:

• Continue all efforts of FY 06 less those noted as completed above.
• Complete development of Secure, Distributed Collaboration.
• Complete development of Integrated Autonomous Network Management.
• Initiate effort for Improved Maritime COTP in a GIG-ES Environment.
• Conduct Sea Trial Experimentation of command decision-making and dynamically managed connectivity (e.g., Decision Support for Dynamic Target Engagement; Secure, Distributed, Collaboration; Processing Tactical SIGINT, Integrated Autonomous Networking; as well as replanning and rehearsals of operational and tactical forces.
• Conduct additional Joint Limited Technology Experiment to demonstrate JCRE in the GIG environment, enabling coordination and application of strike assets in real time.

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	FY 2004	FY 2005	FY 2006	FY 2007
USCG VESSEL TRACKING	9,970	10,560	4,848	4,862

Details are of a higher classification.

	FY 2004	FY 2005	FY 2006	FY 2007
MULTI-SOURCE INTEGRATION (MSI) AND COMBAT IDENTIFICATION (CID)	4,809	9,031	8,796	8,421

Multi-Source Integration (MSI), Advanced Sensor Netting Technology (ASNT) and Composite Combat Identification (CCID) technology of the Missile Defense Future Naval Capability (FNC) 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 includes support to the FNC Enabling Capabilities for Real Time Long Range Air Defense Combat ID in Support of Early Engagements (KSA EC-1B).

FY 2004 to FY 2005 increase is due primarily to the effects of the FY 2004 transitioning of MSI and Advanced Sensor Netting Technology (ASNT) into this PE.

FY 2004 Accomplishments:

• Demonstration of an early version of advanced MSI algorithms begun in FY 2003 in PE 0602235N to integrate radio frequency (RF) sensors, Identification Friend or Foe (IFF) data, Cooperative Engagement Capability (CEC), Joint Tactical Information Distribution System (JTIDS), and correlate Satellite Communications (SATCOM) data to the integrated track file in the E-2C airborne early warning aircraft mission computer. Selected best performing of three candidate MSI algorithms for further development & testing.
• Demonstrated evolution of algorithms within the Advanced Sensor Netting Technology (ASNT) project initially developed under PE 0602235N. These algorithms are designed for integration of electronic warfare support (ES) data into CEC and transmission of track ID attributes via CEC-like network.
• Transitioned CCID algorithms to PMA-290 for use within the EP-3E aircraft. These algorithms are designed to correlate and fuse real time track data with intelligence, surveillance and reconnaissance (ISR) data processed aboard EP-3E reconnaissance aircraft. Continued development of similar CCID algorithms in Ship

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Signal Exploitation Equipment (SSEE)-equipped surface ships. Continued evolutionary development of a common reasoning algorithm for CID capability to rapidly building high confidence identification of air tracks using all available ID attributes in theater.

FY 2005 Plans:

• Continue all efforts of FY 04 less those noted as completed above.
• Deliver most recent versions of MSI, ASNT, and CCID algorithms to the Joint Single Integrated Air Picture (SIAP) Systems Engineering Organization Integrated Architecture Behavior Model for use in joint service open architecture combat system applications with plan to continue deliveries in FY06 and FY07.

FY 2006 Plans:

• Continue all efforts of FY 05 less those noted as completed above.

FY 2007 Plans:

• Continue all efforts of FY 06 less those noted as completed above.

	FY 2004	FY 2005	FY 2006	FY 2007
PLATFORM PROTECTION/ELECTRONIC WARFARE SYSTEMS	8,714	7,466	7,215	3,103

This activity supports the Fleet/Force Protection (FFP) Future Naval Capability (FNC). Currently, small surface, ground-based and airborne platforms have limited Situational Awareness (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 FNC Capability for Hostile Fire Detection and Response Spiral 1 (U/A OPS EC 1C).

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Decrease is due to the EWISSP program completing in FY 2007.

FY 2004 Accomplishments:

• Continued the development of advanced technology applications to increase the survivability of the Marine EFV.
• Continued development of the EO countermeasures subsystem.
• Continued testing prototype flexible masts for EO countermeasures sensors in parallel with compatibility testing with existing and/or planned basic physical and electrical designs and features of the EFV platform.
• Continued integration of the EWISSP with the EFV to address issues related to limited space and power available in the EFV as well as severe restrictions on modifications to the vehicle's exterior configuration.

FY 2005 Plans:

Continue all efforts of FY04 less those noted as completed above.
• Initiate assembly and integration of the Situational Awareness (SA) and Electronic Attack (EA) subsystems. Focus will be on hardware and software integration at the subsystem level.
• Initiate incremental testing of subsystems as they are assembled to ensure technical performance requirements are being met.
• Initiate implementation of design configuration management as part of the transition effort to track development and integration progress and identify technology insertion points.

FY 2006 Plans:

Continue all efforts of FY05 less those noted as completed above.
• Complete fabrication and test of EWISSP subsystems. Integrate subsystems into EWISSP prototype systems for final demonstrations and test.
• Initiate 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.
• Initiate 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, Multi-function Electro Optical System (MEOS) countermeasures, and optical augmentation for situational awareness and target detection and ID.

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FY 2007 Plans:

• Continue all efforts of FY06 less those noted as completed above.
• Complete final demonstration of EWISSP system installed on EFV in operational realistic environment to show increased EFV survivability against advanced EO/IR threats.

	FY 2004	FY 2005	FY 2006	FY 2007
GLOBAL POSITIONING SYSTEM (GPS) & NAVIGATION TECHNOLOGY	5,303	5,144	4,848	4,862

This activity enhances GPS anti-jam (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 time frame. Office of Naval Research (ONR) 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); organic Link-16 relative navigation; 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), Coherent Population Trapping (CPT) atomic clock development. These areas will provide alternatives to GPS navigation and alternatives to the availability of precision, GPS-provided, time transfer.

FY 2004 Accomplishments:

• Completed a feasibility study on the Vibrating Beam Gradiometer which could detect the gravity with the sensitivity of 100 pG based on the principle of a quartz vibrating beam accelerometer.
• Completed Link-16 Relative Navigation with corrections to latencies in precision time transfer.
• Continued the development of a 7-element Space-Time Array Processor (STAP) brassboard and successfully integrated and tested in the lab. Also developed 15-Channel STAP brassboard and fabricated 15-channel STAP.
• Continued the development of a GPS-III receiver that can acquire new M-code directly using a Frequency Hopping (FH) search technique. Designed and built the GPS-III software receiver by Field Programmable Gate Array (FPGA) that can adapt to “near-far” reception in real time operation.
• Continued the development of a GPS receiver both GPS M- and C/Y-codes that could be operated using both M- and C/Y-codes in a single unit with a minimum disruption for Navy users.

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• Continued the development of a small, lightweight Micro-Electro-Mechanical Systems (MEMS) accelerometer for navigation systems; an Electro-optic Accelerometer is fabricated.
• Continued the development of a 10cc Rb Coherent Population Trapping (CPT) atomic clock for tactical applications.
• Continued the development of an Adaptive Bathymetric Estimator, which estimates errors in sound speed profile by only own-ship and historical data; and correct bottom contact track positions for errors due to both assumed sound speed profile mismatch and own-ship position measurement drift.
• Continued the development of algorithms for distributed time scaling other supporting 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).

FY 2005 Plans:

• Continue all efforts of FY04 less those noted as completed above.
• Complete the integration of the Frequency Hopping (FH) M-code correlator, data recorder and Field Programmable Gated Array (FPGA) GPS software receiver card; conduct fast M-code acquisition tests.
• Initiate the development of an Optical Ring Gyroscope Chip; Fabricate dual-arm, 2 cm diameter, optical ring resonator in neodymium-doped substrates; incorporate an electro-optics phase modulator into the ring.
• Initiate the demonstration project of nonlinearity-constrained adaptive beamforming for defeating BPSK jammers; develop an algorithm to mitigate the loss of Signal-to-Noise Ratio (SNR) through a combination of adaptive space-time-frequency signal processing techniques.

FY 2006 Plans:

• Continue all efforts of FY05 less those noted as completed above.
• Complete the fabrication of an Applications Specific Integrated Circuit (ASIC) chip for GPS M- and C/Y-code and test with GPS II and GPS III signals
• Initiate the development of two gravity gradient devices; the first is an Octadecahedral Gravity Gradiometer in which the full-Gravity Gradient tensor is determined to separate translational and rotational effects from gravity effects; the second is a Ribbon Sensor Gravity Gradiometer whose vibrational modes in a gravitational field can be related to the gravity gradient tensor elements.

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• Initiate the development of a magnetic map requirements for Magnetic Passive Navigation (MPN); top-level MPN performance requirements, establishment of the MPN reset algorithm, development of system hardware requirements, investigation of existing magnetic maps and models, developing map and modeling requirements, determining risk areas, evaluating performance projections, and preparing a final report.

FY 2007 Plans:

• Continue all efforts of FY06 less those noted as completed above.
• Integrate the 5-cc accelerometer with the Embedded GPS Inertial (EGI) System for aircraft avionics applications.

	FY 2004	FY 2005	FY 2006	FY 2007
INFORMATION SECURITY RESEARCH	2,119	1,918	1,938	1,945

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 and 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 2004 Accomplishments:

• Developed and validated secure group network protocols within a small enclave, as well as developed the tools and methodologies to formally prove and verify scaleable assurance properties and to enable correlated analysis from passive monitoring of intrusive network behaviors in near real-time.
• Continued to examine the tools, techniques, and methodologies that ensure secure network survivability and resistance to denial of service attacks.
• Continued development of the Naval Research Laboratory (NRL) Network Pump, including development of methodologies to securely transfer data from a higher to lower level of classification, including stronger connection authentication and secure administration capabilities.

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FY 2005 Plans:

• Continue all efforts of FY04 less those noted as completed above.
• Complete development, demonstration, and common criteria evaluation of the NRL Network Pump for its ability to transfer data securely from high to lower levels of classification across dissimilar networks while providing strong authentication and secure administration capabilities.
• Initiate 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.

FY 2006 Plans:

• Continue all efforts of FY05 less those noted as completed above.
• Complete the development and demonstrate 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).
• Initiate development of the security management tool that provides a common picture of the networked environment with respect to information assurance and security, with emphasis on visualization capabilities to support active computer network defense.
• Initiate development of a tool for the development of agents that integrates unified modeling language (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 FY06 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 and survivability features to those technologies for military use.

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	FY 2004	FY 2005	FY 2006	FY 2007
MARINE MAMMALS	1,093	990	1,000	1,003

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 SECNAVINST 5090.1.b while still maintaining full operational and training exercise capabilities.

FY 2004 Accomplishments:

• Integrated passive acoustic marine mammal monitoring (M3R) tracking technology at the Atlantic Undersea Test and Evaluation Center (AUTEC); collected M3R data at the Pacific Missile Range Facility (PMRF) to calibrate passive technology with visual surveys; proposed use of M3R technology to N45 as mitigation measure in the Navy range wide tactical theater training assessment planning (TAP) FY04-FY09.
• Initiated 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.

FY 2005 Plans:

• Continue all efforts of FY04 less those noted as completed above.
• Expand M3R frequency bandwidth for tracking beaked whales. Develop classification software for identification of marine mammal species and populations. Continue AUTEC on-site analysis and PMRF data collection with visual surveys. Begin Technology Readiness Level (TRL) assessment and transition plan.

FY 2006 Plans:

• Continue all efforts of FY05 less those noted as completed above.
• Test M3R classification software for identification of species and populations, and complete M3R development at AUTEC. Continue data collection at PMRF with visual surveys. Complete TRL and transition plan with N45 and develop technology transition agreement (TTA).
• Complete TTS data collection and formulate an Acoustic Safety Criteria Model for multiple sonar pings.
• Complete model for equal loudness.

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FY 2007 Plans:

• Continue all efforts of FY06 less those noted as completed above.
• Incorporate M3R classification software for identification of species and populations at PMRF. Begin implementation of transition plan for demonstration and evaluation of M3R technology at other Navy ranges.
• Establish Acoustic Safety Criteria Model for multiple sonar pings. Transition from behavioral to electrophysical measurements to assess hearing and TTS of non-captive marine mammal species.

	FY 2004	FY 2005	FY 2006	FY 2007
JOINT PROGRAM OFFICE SPECIAL TECHNOLOGY COUNTERMEASURES	14,949	0	0	0

Details are of a higher classification.

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 0602271N (RF Systems Applied Research)
PE 0603123N (Force Protection Advanced Technology)
PE 0603271N (RF Systems Advanced Technology)
PE 0603609N (Conventional Munitions)
PE 0603640M (Marine Corps Advanced Technology Demonstrations)
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 0308610N (Modeling and Simulation and Support)

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603235N PROGRAM ELEMENT TITLE: COMMON PICTURE ADVANCED TECHNOLOGY
PROJECT NUMBER: R2919 PROJECT TITLE: COMMUNICATIONS SECURITY

NON-NAVY RELATED RDT&E:

PE 0603750D8Z (Advanced Concept Technology Demonstrations)

D. ACQUISITION STRATEGY:
Not applicable.

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603235N PROGRAM ELEMENT TITLE: COMMON PICTURE ADVANCED TECHNOLOGY
PROJECT NUMBER: Various PROJECT TITLE: Congressional Plus-Ups

CONGRESSIONAL PLUS-UPS:

R9020	FY 2004	FY 2005
VESSEL TRACKING	4,228	0

This effort determined and developed the optimum technology mix for identification, surveillance, and tracking of maritime vessels. This effort developed high resolution radar techniques from multiple aspects to verify and validate automated information system data fields. This effort emphasized small craft tracking and automatic target recognition which are essential Naval needs for operations in the littorals and harbor areas.

R9315	FY 2004	FY 2005
CONSOLIDATED UNDERSEA SITUATIONAL AWARENESS SYSTEM (CUSAS)	3,844	3,368

FY04 - This effort provided knowledge superiority to undersea warfare forces through the use of advanced, interactive information management software. The effort developed high-fidelity 2D and 3D presentation augmented with real-time tactical intelligence agent-based recommendations in a user-friendly format. It used intelligent software agents that provide timely, effective, and efficient decision support under conditions of overwhelming and uncertain data. In particular, it provided an accurate and timely situational understanding of the battlespace by a submerged submarine. Accomplishments include initial software development and transition to PEO-IWS

FY05 - This effort will continue 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 will be an agent-based software module for the ASW Combat, Command, and Control System.

R9316	FY 2004	FY 2005
SHIPBOARD AUTOMATED RECONSTRUCTION CAPABILITY (SHARC)	1,924	0

This effort assisted submarine operators with planning, executing and evaluating highly complex tactical and covert submarine missions. This effort captured and dynamically presented all relevant operational data, as well as the Commanding Officer's narrative. This automatic data capture and visual replay allowed a

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submarine's commander and crew to accurately reconstruct high interest events experienced during the mission. This system greatly enhanced continuous operational improvement through reviewing and critiquing previous missions. Accomplishments include initial software development and transition to the Virginia Class submarine and PEO-IWS 5.

R9317	FY 2004	FY 2005
TECHNOLOGY INSERTION SUPPORT	961	0

This effort investigated new information technologies which required testing and evaluation of applications throughout the Joint services.

R9472	FY 2004	FY 2005
DYNAMIC BROKERING IN THE EXPEDITIONARY WARFARE TESTBED	0	991

This effort will develop dynamic brokering capabilities in the expeditionary warfare testbed for refining the discovery process of the service-based architecture to support faster performance, better communications throughput usage, and the underpinnings of multi-level security to support user requirements. The open service-based Expeditionary Warfare Testbed architecture supports the inclusion of new web services. Scalability and usability dictate minimizing redundancy while maintaining quality of service.