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FY 2002 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: June 2001

BUDGET ACTIVITY: 3 PROGRAM ELEMENT: 0603235N
PROGRAM ELEMENT TITLE: Common Picture Advanced Technology

(U) COST: (Dollars in Thousands)

PROJECT

NUMBER & TITLE	FY 2000 ACTUAL	FY 2001 ESTIMATE	FY 2002 ESTIMATE
R2919 Common Picture Advanced Technology			

 ** ** 48,583

**The Science and Technology (S&T) Program Elements (PEs) were restructured in FY 2002. The work described in FY 2000 & FY 2001 was funded in PEs 0603707N and 0603747N.

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This PE includes funds for advanced technology development, test and evaluation of a dynamic distributed common picture based on leading edge technologies that will improve situational awareness across all Command echelons from the Commander in Chief (CINC) to tactical units afloat and warfighters ashore. This effort will demonstrate a capability for building and maintaining a seamless secure, common operational and tactical picture of the total battlespace, thereby providing Naval Forces a capability for self-synchronization, increased speed of command, and optimized resource allocations. The Common Picture Program is supportive of the following Future Naval Capabilities (FNCs): Information Distribution; Decision Support System; Missile Defense; Littoral Anti Submarine Warfare (ASW); and Platform Protection. Advanced technologies to be developed, tested and demonstrated include: communication protocols and networks for secure data link operation; information networks for cooperative target tracking; information and knowledge management; tailored information, exploitation, extraction and distribution; communication security and information assurance technologies; decision support tools for use in network-centric, collaborative environments; multi-source integration for composite combat identification (ID) and target tracking; small platform situational awareness and protection; cross-platform data fusion for formulating a common tactical/environmental picture in support of littoral ASW operations; space based systems and navigational technologies that reduce the Global Positioning System's (GPS) vulnerability

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

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is budgeted within the ADVANCED TECHNOLOGY DEVELOPMENT Budget Activity because it encompasses design development, simulation, or experimental testing of prototype hardware to

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validate technological feasibility and concept of operations and reduce technological risk prior to initiation of a new acquisition program or transition to an ongoing acquisition program.

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(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

Supports the FNC in the area of Information Distribution. The emphasis is on the development of technologies supporting secure heterogeneous wireless communication networks for data (e.g. voice, multi-media) links and interconnecting air, ship, submarine and land platforms. Technology will be developed to demonstrate; (1) secure dynamic entry onto and exit from distributed user communication nodes without having to pre-plan the event in a tactical data link network environment such as Link-16; (2) Communications to support networking of unmanned sensors; (3) Architectures, Network security, and Network Resource Management in support of Networking with Coalition forces; (4) Integrated network architecture that employ existing tactical data for exchange of information with multiple legacy tactical communications systems; (5) secure robust protocols for efficient networked group communications; (6) network management techniques for effectively allocating bandwidth and computational resources across the tactical and theatre levels in support of information technology needs for network centric operations; (7) ability to rapidly analyze and validate network information system security according to the common criteria.

Secure Networked Information Systems	FY00	FY01	FY02 (\$2,483)
Initiate			<ul style="list-style-type: none"> • Tactical Data Link Dynamic Networking • Multi-national Virtual Operational Network • Secure group network protocols • Adaptive network centric systems

Communication Security - Classified Program

Communication Security	FY00	FY01	FY02 (\$15,000)

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Initiate			<ul style="list-style-type: none"> Classified Program
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Supports the FNC in the area of Decision Support. The emphasis is on developing information and knowledge management capabilities and decision aids to build and maintain a timely operational/tactical picture of the total battlespace across all Command echelons from the CINC to tactical units afloat as well as warfighter ashore. Technology developments and demonstrations include: Knowledge based operations with intuitive visualization for Command Center operations; multi-source integration; situational assessment decision aids that reduces operator workload and optimizes resource allocation; interactive distributed planning, plan monitoring and re-planning; collaborative technologies to support distributed operations.

Decision Support System	FY00	FY01	FY02 (\$11,000)
Initiate	<ul style="list-style-type: none"> Commander in Chief (CINC 21) 	<ul style="list-style-type: none"> Environment Visualization (EVIS) 	<ul style="list-style-type: none"> Marine to CINC Intelligent Cueing and Triggers Handheld Common Operational Picture (COP) Multi-Modal Workstation/Workload Management Knowledge Visualization Wall Intelligence, Surveillance, Reconnaissance & Targeting Prototype Enhancements

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Continue	<ul style="list-style-type: none"> • Virtual Information Center Technology for Open-Source Requirements (VICTOR) • Decision Support Systems for Coalition Operations (DSSCO) • Aircrew Decision Support Systems (ADSS) 	<ul style="list-style-type: none"> • VICTOR • DSSCO • ADSS • CINC 21 	<ul style="list-style-type: none"> • EVIS • Collaborative Technology (CT)for Course of Action Analysis (COA) • VICTOR • DSSCO • ADSS • COA-Interactive Decision Support (IDS) Plan/Monitor/Re-planning System • CINC 21
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Supports the FNC in the area of Missile Defense. The emphasis is on developing multi-source sensor integration for cooperative target tracking, improved combat ID and extending engagement of air targets near point of origin by using all-source data to formulate a common operational and tactical picture of the battlespace. Technologies that will be developed and demonstrated include; fusion algorithms to create and display a single integrated air picture common to all users; signal processing and target discrimination algorithms for surveillance assets; overland fire control quality tracking of cruise and ballistic missiles; target intercept integration and tracking, Combat ID techniques; and fusion of all source information.

Surface/Aero Space Surveillance Multi Source Integration & Combat ID	FY00	FY01	FY02 (\$7,500)
Initiate			<ul style="list-style-type: none"> • Platform Level Multi Source Integration • Theater Wide Multi-Source

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			Integration <ul style="list-style-type: none"> • Combat Identification For Air Defense • Affordable Ground Based Radar
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Supports the FNC in the area of Littoral Anti-Submarine Warfare (ASW). The emphasis is on developing both a common ASW tactical and environmental picture to improve detecting, tracking, and classifying neutral subsurface platforms. Technologies that will be developed and demonstrated include; cross platform data fusion, common sensor performance predictions across platforms, and captured sensor performance uncertainty.

Integrated ASW	FY00	FY01	FY02 (\$4,600)
Initiate		<ul style="list-style-type: none"> • Demonstration of Intra-Platform Data Fusion between Radar and Sonar on Surface Ship and Sonobuoys from Marine Patrol Aircraft (MPA) during Vinson Battle-Group (BG) Deployment • Demonstration of Cross Platform Data Fusion between Surface Ship and MPA in transiting BG and Area Clearance Scenarios. 	<ul style="list-style-type: none"> • Development of Algorithms for Intra Platform Sensor Performance Prediction and Real Time Inter Platform Sharing of Sensor Performance Predictions • Demonstration of Intra Platform Data Fusion between Radar and Sonobuoys on MPA • Demonstration of Cross Platform Data Fusion between Surface Ships and MPA using Multistatic Active Mode
Continue	<ul style="list-style-type: none"> • Development of Intra and Inter Platform Data Fusion Algorithms • Development of Operational 	<ul style="list-style-type: none"> • Development of Intra and Inter Platform Data Fusion Algorithms • Development of Operational 	<ul style="list-style-type: none"> • Development of Intra and Inter Platform Data Fusion Algorithms • Development of Operational

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	<p>Guidelines for Platforms engaged in Cross Platform Data Fusion</p> <ul style="list-style-type: none"> Collection of Data for Algorithm Development 	<p>Guidelines for Platforms engaged in Cross Platform Data fusion</p> <ul style="list-style-type: none"> Collection of Data for Algorithm Development 	<p>Guidelines for Platforms engaged in Cross Platform Data Fusion</p> <ul style="list-style-type: none"> Collection of Data for Algorithm Development
Complete		<ul style="list-style-type: none"> Demonstration of Intra-Platform Data Fusion between Radar and Sonar on Surface Ship and Sonobuoys from Marine Patrol Aircraft (MPA) during VINSON Battle-Group (BG) deployment Demonstration of Cross Platform Data Fusion between Surface Ship and MPA in transiting BG and Area Clearance Scenarios. 	<ul style="list-style-type: none"> Demonstration of Intra Platform Data Fusion between Radar and Sonobuoys on MPA Demonstration of Cross Platform Data Fusion between Surface Ships and MPA using Multistatic Active Mode

Supports the FNC in Platform Protection. The emphasis is on developing a compact small platform situational awareness capability that is particularly suited for man-portable smaller ships, submarines, and surveillance aircraft. The system will employ miniature millimeter-wave integrated circuit (MMIC) devices and a new antenna to form an extremely compact, low volume and light weight system that provides very accurate hemispheric direction finding and a self-protection capability against threat missile weapon systems.

Platform Awareness & Protection	FY00	FY01	FY02 (\$1,000)
Initiate			<ul style="list-style-type: none"> Advanced Prototype Compact Small Platform Situational Awareness Laboratory Demonstration of Circular-Disposed Interferometer

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			with MMIC Receiver
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Supports the FNCs association with Common Picture Advanced Technology in the area of GPS and Navigation Technology. The emphasis is on three areas: (a) Integration of the GPS and EPLRS/Link-16 (GEL) for developing GPS and Navigation. This effort draws upon the capabilities presently available in the fleet that use Link 16/Joint Tactical Informaiton Distribution System (JTIDS) and Enhanced Position Location Reporting System (EPLRS). This approach locates elements in the battle group through radio signal time-of-flight. Over all, the Relative Navigation approach draws upon a wide range of Navigation and precision clock capabilities available in the Navy Battlegroup and extends their availability through existing communications links. (b) Relative Navigation efforts: These efforts draw upon the capabilities presently available in the fleet that use Link 16/JTIDS and EPLRS system. This approach locates elements in the battle group through radio signal time-of-flight. Over-all, the Relative Navigation approach draws upon a wide range of Navigation and precision clock capabilities available in the Navy Battle group and extends their availability through available communications links. (c) Alternatives to Global Positioning System (GPS) and to Relative Navigation: This category draws upon wide-ranging physical principles and phenomena. Gravity gradient measurements, and images of the earth formed through the natural emissivity of bodies.

GPS and Navigation Technology	FY00	FY01	FY02 (\$5,000)
Continue	<ul style="list-style-type: none"> • GPS/Navigation Systems Integration (NSI) • Relative Navigation Concept • Non-GPS Navigation Technology 	<ul style="list-style-type: none"> • GPS/NSI • Relative Navigation Concept • Non-GPS Navigation Technology 	<ul style="list-style-type: none"> • GPS/NSI • Relative Navigation Concept • Non-GPS Navigation Technology

The Extending the Littoral Battlespace (ELB) effort responds to the top level military need to rapidly deploy a Naval Expeditionary Task Force with an embarked Marine Air Ground Task Force (MAGTF) as part of a larger Joint Task Force to any region of the world's littorals and conduct military operations from a sea vase across the spectrum of conflict to implement national military strategy. Forces employed ashore will be light, agile, distributed and disaggregated and capable of optimizing remote fires, to effectively deter aggression, halt attacks and secure critical areas as a

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precursor to a much larger force. Forces will be empowered by unprecedented situation understanding via a robust information infrastructure that is fully coupled to a decision/planning/execution system on a shared battlespace network (sea/land). The objective is to demonstrate an enhanced integrated command and control/fires and targeting capability to enable rapid employment, maneuver, and fires to support joint dispersed unit operations in an extended littoral battlespace.

Extended Littoral Battlespace	FY00	FY01	FY02 (\$1,000)
Initiate			<ul style="list-style-type: none"> • Transition technologies, hardware, and software to user for further military utility • Demonstration/post demonstration analysis for evaluation the system concept and assessing its military utility. • Residual support of equipment fielded with Amphibious Ready Group/Marine Expeditionary Unit (ARG/MEU) and deployment dependant on accomplishment in FY01

- Marine Mammals: Decision aids, planning tools and technologies are being developed to aid the decisionmaker in mission planning for minimal environmental impact, with particular regard to marine protected species and marine protected areas. The network centric toolkit is designed to operate seamlessly with existing and emerging common tactical displays, databases, and data integration tools. The effort includes establishing software, hardware and

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communications standards to access models and databases residing both inside and outside Department of Defense, and to present them to common tactical picture hardware/software assets.

Marine Mammals	FY00	FY01	FY02(\$1,000)
Initiate			<ul style="list-style-type: none"> • Visualization of information with Levels of Uncertainty • Develop Environmental Risk Criteria for use with displays of underwater acoustics • Common Tactical Picture access to Navy Living Marine Resources Information System (LMRIS - NavOceanO)

(U) PROGRAM CHANGE FOR TOTAL PE:

	FY 2000	FY 2001	FY 2002
FY 2001 President's Budget			
Appropriated Value:			
Adjustments from FY 2001 President's Budget:			
Program Adjustments			48,359
NWCF Adjustment			179
Inflation Adjustment			45
FY 2002 Presbudg Submission	6,089*	9055*	48,583

**The Science and Technology (S&T) Program Elements (PEs) were restructured in FY 2002. The work described in FY 2000 & FY 2001 was funded in PEs 0603707N and 0603747N.

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(U) CHANGE SUMMARY EXPLANATION

(U) Schedule: Not Applicable.

(U) Technical: Not Applicable.

(U) OTHER PROGRAM FUNDING SUMMARY: The Navy's 6.1 program contributes to this effort.

(U) NAVY RELATED RDT&E:

(U) PE 0601153N (Defense Research Science)

(U) PE 0602235N (Common Picture Applied Research)

(U) PE 0602114N (Power Projection Applied Research)

(U) PE 0602271N (RF Systems Applied Research)

(U) NON-NAVY RELATED RDT&E:

(U) SCHEDULE PROFILE: Not Applicable.

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