CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification						DATE: **February 2003**		
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-4**					R-1 ITEM NOMENCLATURE 0603382N Advanced Combat System Technology			
COST ($ in Millions)	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Total PE Cost	**3.111**	**3.276**	**3.394**	**3.346**	**1.918**	**0.981**	**0.985**	**0.999**
K0324/Advanced Combat System Technology	**3.111**	**3.276**	**3.394**	**3.346**	**1.918**	**0.981**	**0.985**	**0.999**

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Advanced Combat System Technology line funds engineering studies, real time instrumentation and risk reduction experiments that are conducted in distributed computer architecture, radar technology, and Tactical Informational Management (TIM) Concepts in the Computing Testbed to mature them as transition candidates for introduction into the AEGIS Weapon System (AWS). This program takes a disciplined systems engineering approach to find how these advances can be integrated into the AEGIS system and subsequent combat systems, and to plan combat system baseline upgrade schedules. Fully Distributed Computing Architecture is the first advanced development effort, leveraging the joint AEGIS/Defense Advanced Research Projects Agency (DARPA) High Performance Distributive Computing (Hiper-D) technology effort. It implements the results of system engineering experiments with currently emerging Commercial-off-the-Shelf (COTS) computer technologies and distributed processing advances to replace the current AEGIS Combat System (ACS) computing architecture with an open, distributed architecture planned for introduction in Baseline 7 Phase II. A secondary priority will be the design of the flow and display of tactical information through the "detect-control-engage" process to provide decision quality information. These advanced Human Systems Interface (HSI) technologies are candidate systems for future baseline upgrades.

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EXHIBIT R-2, RDT&E Project Justification		DATE: **February 2003**
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RDT&E, N / BA-4	0603382N Advanced Combat System Technology	K0324/Advanced Combat System Technology

B. Accomplishments/Planned Program

	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	0.390	0.200		
RDT&E Articles Quantity				

Continue development and integration of Distributed Tactical Computing Environment (DTCE) capability based on Commercial Off-The-Shelf (COTS) and Defense Advanced Research Project Agency) DARPA technologies. Continue development and integration of DTCE capability based on advanced hardware and software technologies emerging from computing industry providers.

	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.617			
RDT&E Articles Quantity				

Conducted experiments focused on transition of selected Aegis Weapons System (AWS) elements to the DTCE and document lessons learned with respect to performance and open system attributes. Mature certification methodologies and develop trial certification procedures.

	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	0.104			
RDT&E Articles Quantity				

Provided feedback to DARPA and to the AEGIS prime contractor for incorporation into baseline developments.

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B. Accomplishments/Planned Program (Cont.)

	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost	1.000			
RDT&E Articles Quantity				

Assessed capability of DTCE to meet projected requirements of future baseline upgrades and missions, e.g. Ship Based Midcourse (SBM).

	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost			0.300	0.300
RDT&E Articles Quantity				

Continue to conduct experiments focused on assessing advanced technologies for applicability to the AWS. Technologies to be assessed include emerging software technologies (including developmental tools, environments and design patterns), distributed data communications technologies, QoS middleware and architectures, operating system technologies and networking technologies. These experiments will be focused on support for Aegis Baseline 7 Phase II in order to provide guidance and implement lessons learned from the advanced computing testbed.

	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost		1.726	1.988	1.940
RDT&E Articles Quantity				

Continue development of the Dynamic Resource Management (DRM) technology in preparation for transitioning DRM to a production status. DRM provides vital capabilities for managing a system-wide configuration of computers and sustaining real-time performance objectives despite damage and mission priority changes. DRM can divert resources initially devoted to lower priority tasks so that the resources can be used for urgent warfighting tasks and missions or to replace damaged components. In addition, since DRM treats all computer resources as a pool of computers, any one of which may be used for important functions, DRM can also serve as a manning reduction enabler. Using this approach, the shipboard computing pool can be fully configured with a given level of sparing at the beginning of a deployment. Any equipment that breaks or is damaged during the deployment can then be "configured out" of the system by DRM until the ship returns from the deployment. At that point, repairs and replacement can be effected by land based personnel rather than repaired by maintenance technicians at sea. Tasks remaining to be performed prior to productization of DRM include: making DRM itself fault tolerant and scalable, adding a network Quality-of-Service (QoS) control mechanism and integrating it into DRM, integrating system failure management policies across DRM, communication middleware and network services, integrating instrumentation data correlation services with resource allocation processing, and providing amplified operator explanatory services. Continue to demonstrate and validate advanced technologies for applicability to the AWS. Technologies to be assessed include emerging software technologies (including developmental tools, environments and design patterns), distributed data communications technologies, QoS middleware and architectures, operating system technologies and networking technologies. These experiments will be focused on support for AEGIS Baseline 7 Phase II in order to provide guidance and implement lessons learned from the advanced computing testbed.

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EXHIBIT R-2, RDT&E Project Justification		DATE: **February 2003**
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RDT&E, N / BA-4	0603382N Advanced Combat System Technology	K0324/Advanced Combat System Technology

B. Accomplishments/Planned Program (Cont.)

	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost		0.300		
RDT&E Articles Quantity				

Address the information security needs for the AWS. Based on the rapidly evolving COTS components, define and validate architectural approaches to providing information security. Identify candidate technologies and make assessments of maturity for adopting or adapting these into the AWS in future upgrades.

	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost		0.950	1.000	1.000
RDT&E Articles Quantity				

Explore techniques to enable enhanced weapons employment (in contrast to merely weapons coordination efforts at the command level) based on sensor netting of SPY-1 with other remote sensors. Explore techniques to enable C&D and Weapons Control Systems (WCS) to perform distributed weapons employment using external links to support the information exchange between AWS's on other platforms and other weapon systems as well.

	FY 02	FY 03	FY 04	FY 05
Accomplishments/Effort/Subtotal Cost		0.100	0.106	0.106
RDT&E Articles Quantity				

Work with Science & Technology (S&T) communities (e.g. DARPA and Office of Naval Research (ONR)) to provide domain specific (real time weapons control) problems on which to focus S&T investment and validation of candidate technologies against these challenge domain specific performance requirements. Provide engineering quality lessons learned and benchmarking information back to S&T sponsors and technology developers for enhancements.

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C. PROGRAM CHANGE SUMMARY:

Funding:	FY 2002	FY 2003	FY 2004	FY 2005
Previous President's Budget: (FY 03 Pres Controls)	3.427	3.350	3.574	3.524
Current BES/President's Budget: (FY04/05 Pres Controls)	3.111	3.276	3.394	3.346
Total Adjustments	-0.316	-0.074	-0.180	-0.178
Summary of Adjustments				
SBIR/STTR Transfer	-0.058			
Economic Assumtions	-0.191	-0.074	-0.180	-0.178
Reprogrammings	-0.067			
Congressional increases				
Subtotal	-0.316	-0.074	-0.180	-0.178

Schedule:

N/A

Technical:

N/A

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EXHIBIT R-2, RDT&E Project Justification		DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME
RDT&E, N / 1319 BA-4	0603382N Advanced Combat System Technology	K0324/Advanced Combat System Technology

D. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. & Name	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	To Complete	Total Cost
PE 0604307 N Aegis Combat System Engin	320.187	340.426	205.733	208.048	217.746	217.286	230.800	206.056	Continuing	Continuing

E. ACQUISITION STRATEGY: *

Risk reduction efforts are lead by NSWC/Dahlgren, the ACS Lifetime Support Engineering Agent (LSEA). Results are transitioned to industry for cost and risk mitigation in the production of ACS.

F. MAJOR PERFORMERS: **

NSWC/ Dahlgren - Dahlgren, Virginia - Lifecycle Support Engineering Agent 12/02
Johns Hopkins University / Applied Physics Lab (JHU/APL) - Baltimore, Maryland - Laboratory 11/02

*** Not required for Budget Activities 1,2,3, and 6**
**** Required for DON and OSD submit only.**

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)								DATE: **February 2003**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**			PROGRAM ELEMENT 0603382N Advanced Combat System Technology			PROJECT NUMBER AND NAME K0324/Advanced Combat System Technology						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development											0.000	
Ancillary Hardware Development											0.000	
Component Development											0.000	
Systems Engineering	SS/CPFF	APL / Baltimore, MD	10.155	0.759	11/02	0.822	11/03	0.811		Continuing	Continuing	
Systems Engineering	WR	NSWC / Dahlgren, VA	16.388	2.167	12/02	2.218	12/03	2.186		Continuing	Continuing	
Systems Engineering	WR	NAWCAD / St. Inigoes, MD	2.000							Continuing	Continuing	
Training Development											0.000	
Licenses											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees											0.000	
Subtotal Product Development			28.543	2.926		3.040		2.997		Continuing	Continuing	
Remarks:												
Development Support	WR	Miscellaneous	0.501	0.072	11/02	0.071	11/03	0.071		Continuing	Continuing	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Award Fees											0.000	
Subtotal Support			0.501	0.072		0.071		0.071		Continuing	Continuing	
Remarks:												

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Exhibit R-3 Cost Analysis (page 2)								DATE: **February 2003**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**			PROGRAM ELEMENT 0603382N Advanced Combat System Technology			PROJECT NUMBER AND NAME K0324/Advanced Combat System Technology						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 03 Cost	FY 03 Award Date	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	Miscellaneous	0.371	0.000		0.000		0.000		Continuing	Continuing	
Operational Test & Evaluation											0.000	
Live Fire Test & Evaluation											0.000	
Test Assets											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees											0.000	
Subtotal T&E			0.371	0.000		0.000		0.000		Continuing	Continuing	
Remarks:												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support	WR	Miscellaneous	0.943	0.278	11/02	0.283	11/03	0.278		Continuing	Continuing	
Travel											0.000	
Labor (Research Personnel)											0.000	
SBIR Assessment											0.000	
Subtotal Management			0.943	0.278		0.283		0.278		Continuing	Continuing	
Remarks:												
Total Cost			30.358	3.276		3.394		3.346		Continuing	Continuing	
Remarks:												

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CLASSIFICATION:

EXHIBIT R4, Schedule Profile																															DATE: **February 2003**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA-4**									PROGRAM ELEMENT NUMBER AND NAME 0603382N Advanced Combat System Technology												PROJECT NUMBER AND NAME K0324/Advanced Combat System Technology											
Fiscal Year	2002				2003				2004				2005				2006				2007				2008				2009			
	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
Acquisition Milestones																																
Test & Evaluation Milestones																																
Production Milestones																																
Deliveries																																

Not Applicable: The Advanced Combat System Technology line is LOE and Scientific Research. See R-2 Page 1.

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* Not required for Budget Activities 1, 2, 3, and 6

CLASSIFICATION:

Exhibit R-4a, Schedule Detail						DATE: **February 2003**		
APPROPRIATION/BUDGET ACTIVITY **RDT&BA-4**	PROGRAM ELEMENT 0603382N Advanced Combat System Technology				PROJECT NUMBER AND NAME K0324/Advanced Combat System Technology			
Schedule Profile	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009
Prototype Phase								
System Design Review (SDR)								
Milestone II (MSII)								
Contract Preparation								
Software Specification Review (SSR)								
Preliminary Design Review (PDR)								
System Development								
Critical Design Review (CDR)								
Quality Design and Build								
Test Readiness Review (TRR)								
Developmental Testing (DT-IIA)								
Eng Dev Model (EDM) Radar Delivery - Lab								
Software Delivery 1XXSW								
Preproduction Readiness Review (PRR)								
EDM Radar Delivery - Flt Related								
Milestone C (MS C)								
Operational Testing (OT-IIA)								
Start Low-Rate Initial Production I (LRIP I)								
Software Delivery 2XXSW								
Developmental Testing (DT-IIB1)								
Developmental Testing (DT-IIB2)								
Start Low-Rate Initial Production II								
Operational Testing (OT-IIB)								
Developmental Testing (DT-IIC)								
Functional Configuration Audit (FCA)								
Low-Rate Initial Production I Delivery								
Technical Evaluation (TECHEVAL)								
Physical Configuration Audit								
Operational Evaluation (OT-IIC) (OPEVAL)								
Low-Rate Initail Production II Delivery								
IOC								
Full Rate Production (FRP) Decision								
Full Rate Production Start								
First Deployment								

Not Applicable: The Advanced Combat System Technology line is LOE and Scientific Research. See R-2 Page 1.

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