EXHIBIT R-2, RDT&E Budget Item Justification							DATE: **February 2002**		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 4**	PROGRAM ELEMENT NAME AND NUMBER **ADV COMBAT SYS TECH/0603382N**				R-1 ITEM NOMENCLATURE Advanced Combat System Technology /0603382N				
COST ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost	**6.600**	**3.427**	**3.350**	**3.574**	**3.524**	**2.070**	**1.124**	**CONT.**	**CONT.**
Advanced Combat System Technology/K0324	**6.600**	**3.427**	**3.350**	**3.574**	**3.524**	**2.070**	**1.124**	**CONT.**	**CONT.**
Quantity of RDT&E Articles	**Not Applicable**								

A. (U) Mission Description and Budget Item Justification

The Advanced Combat System Technology line funds studies and 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) architecture with an open, distributed architecture planned for introduction in Baseline 7 Phase II. A significant priority of task will be complex TIM of the flow and display of tactical information through the "detect-control-engage" process to better support the operator/decision maker. These advanced technologies are candidate systems for future baseline upgrades.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY01 ACCOMPLISHMENTS:
- (U) ($1.358) Continued system engineering experiments with currently emerging COTS and DARPA computer technologies to assess their applicability in meeting ACS performance requirements and open system architecture objectives. Provided feedback on any existing shortfalls for future enhancements. Worked within the commercial standards communities to address the shortfalls in computing capabilities for Navy applications.
- (U) ($3.097) Conducted an integrated demonstration in the Computing Testbed of selected AWS capabilities focused on transitioning them to the target Distributed Tactical Computing Environment (DTCE), based on emerging COTS technologies and DARPA Quality of Service (QoS) technologies (attributes included: portability, scalability, fault tolerance and dynamic resource management).
- (U) ($.984) Continued integration of lessons learned in the FY00 DTCE risk reduction experiments, whose technologies include resource management, networking, operating systems, and middleware targeted at the ACS. Worked with baseline development teams to identify emerging issues associated with transitioning to baselines 6.3, 7.1 and cruiser conversion baselines to an open architecture based on these technologies.

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- (U)FY01 ACCOMPLISHMENTS CONT:
- (U) ($0.961) Developed an approach to certify AWS based on dynamically allocated system functions – critical to certifying operational combat system programs based on these technologies.
- (U) ($0.200) Assessed system engineering and development tools and provided feedback to AEGIS program and prime contractor.

- (U) FY02 PLAN:
- (U) ($0.385) Continue development and integration of DTCE capability based on COTS and DARPA technologies.
- (U) ($1.955) Conduct experiments focused on transition of selected 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.
- (U) ($0.087) Provide feedback to DARPA and to the AEGIS prime contractor for incorporation into baseline developments.
- (U) ($1.000) Assess capability of DTCE to meet projected requirements of future baseline upgrades and missions, e.g. Area and Navy Theatre Wide (NTW) Theatre Ballistic Missile Defense (TBMD).

(U) FY03 PLAN:
- (U) ($1.800) 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 the AEGIS Open Architecture initiative (Baseline 7 Phase II) in order to provide guidance and implement lessons learned from the advanced computing testbed.
- (U) ($0.100) Work with Science & Technology (S&T) communities (e.g. DARPA and Office of Naval Research (ONR)) to provide challenge domain problems on which to focus investment and validation of candidate technologies against these challenge domain problems. Provide engineering quality lessons learned and benchmarking information back to S&T sponsors and technology developers for enhancements.
- (U) ($0.200) Continue development and integration of DTCE capability based on advanced hardware and software technologies emerging from computing industry providers.
- (U) ($0.300) 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.
- (U) ($0.950) Explore techniques to enable enhanced weapons employment 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.

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APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	R-1 ITEM NOMENCLATURE
RDT&E, N / BA 4	**ADV COMBAT SYS TECH/0603382N**	Advanced Combat System Technology /0603382N

Program Change Summary:	FY 2001	FY 2002	FY 2003
FY 2002 President's Budget	6.879	3.458	
Appropriated Value:	6.943	3.458	
Adjustments to FY 2001/2002 Appropriated Value/ FY 2002 President's Budget	-0.343	-0.031	
FY 2003 Pres Budget Submit:	6.600	3.427	3.350

FY01: Funding change is due to reductions for Small Business Innovative Research (SBIR) (-$0.126), a Below Threshold Reprogramming (BTR) to AIEWS (-$0.136), and Minor Pricing Adjustments (-$.081).
FY02: Funding change to minor Pricing Adjustments (-$.031).

Schedule: Not applicable.

Technical: Not applicable.

	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	To Complete	Total Cost
RDT&E, N / 1319 / BA 5									
PE0604307N	184.843	326.625	300.748	212.601	189.352	215.402	173.220	CONT.	CONT.

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

D. Schedule Profile: Not Applicable

Exhibit R-3 Cost Analysis (page 1)								DATE: **February 2002**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N / BA 4**		PROGRAM ELEMENT NAME AND NUMBER **ADV COMBAT SYS TECH/0603382N**			PROJECT NAME AND NUMBER: Advanced Combat System Technology /K0324						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	FY 03 Cost	FY 03 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Systems Engineering	SS/CPFF	APL, Baltimore, MD	7.579	1.710	11/00	0.866	11/01	0.759	11/02	CONT.	CONT.	
Systems Engineering	WR	NSWC, Dahlgren,VA	9.905	4.500	12/00	2.241	12/01	2.241	12/02	CONT.	CONT.	
Systems Engineering	WR	NAWCAD, St. Inigoes, MD	2.000							CONT.	CONT.	
Subtotal Product Development			19.484	6.210		3.107		3.000		CONT.	CONT.	0.000
Remarks:												
Support	WR	Miscellaneous	0.405	0.055	11/00	0.041	11/01	0.072	11/02	CONT.	CONT.	
Subtotal Support			0.405	0.055		0.041		0.072		CONT.	CONT.	
Remarks:												
Test & Evaluation	WR	Miscellaneous	0.315	0.056	11/00	0.000	11/01	0.000	11/02	CONT.	CONT.	
Subtotal T&E			0.315	0.056		0.000		0.000		CONT.	CONT.	
Remarks:												
Program Management Support	WR	Miscellaneous	0.443	0.279	11/00	0.279	11/01	0.278	11/02	CONT.	CONT.	
Subtotal Management			0.443	0.279		0.279		0.278		CONT.	CONT.	
Remarks:												
Total Cost			20.647	6.600		3.427		3.350		CONT.	CONT.	