

CLASSIFICATION:

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EXHIBIT R-2, RDT&E Budget Item Justification							DATE:			
APPROPRIATION/BUDGET ACTIVITY							R-1 ITEM NOMENCLATURE			
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-5							SC-21 Total Ship Systems Engineering/0604300N			
COST (\$ in Millions)	FY 2000	FY 2001	FY 2002							
Total PE Cost	160.894	289.591	355.093							
	(2)		(3)							
DD 21 Sys Des, Dev & Int ¹ /32464	113.508	153.500	234.464							
			(4)							
DC/Survivability/32465	2.997	6.260	0.000							
Multi-Function Radar (MFR)/32466	44.389	72.901	73.262							
	(5)									
Volume Search Radar (VSR)/32735	0.000	56.930	47.367							
Quantity of RDT&E Articles	0	0	**2/TBD							
<p>Notes: (1) DD 21 Systems Design, Development, and Integration. Project formerly known as Design.</p> <p>(2) (U) Contains \$3.300M to off-set VSR development requirement.</p> <p>(3) (U) Funding for efforts directly related to DD 21 design and systems integration has been reprogrammed to this project from PE 0603513N, Projects 32469 and 32470 and PE 0604300N, Project 32465 in FY 2002 and out.</p> <p>(4) Funding for this project has been reprogrammed to PE 0603513N in FY 2002 and out.</p> <p>(5) (U) FY00 funding for VSR development is included in PE 0603512N, Project 42208 (Future Carrier R&D) and PE 0604755N, Project 32735 (Ship Self Defense). All requirements in FY 2001 and beyond are consolidated in PE 0604300N, Project 32735.</p> <p>A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Program Element (PE) provides funds for development of the DD 21 Class of U. S. Navy surface combatants and advanced development R&D which is integral to DD 21. The mission of the DD 21 class is to provide affordable and credible independent forward presence/deterrence and operate as an integral part of Naval, Joint or Combined Maritime Forces. DD 21 will provide advanced land attack capability in support of the ground campaign and contribute to Naval, Joint or Combined battlespace dominance in littoral operations. DD 21 will establish and maintain surface and sub-surface superiority, provide local air defense, and incorporate signature reduction to operate in all threat environments. DD 21 will have seamless Joint Interoperability to integrate all source information for battlespace awareness and weapons direction.</p> <p>* *(U) For explanation of Test Articles, see Projects 32466 and 32735.</p>										

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EXHIBIT R-2, RDT&E Budget Item Justification		DATE: June 2001																				
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-5	R-1 ITEM NOMENCLATURE SC-21 Total Ship Systems Engineering/0604300N																					
<p>B. (U) PROGRAM CHANGE SUMMARY:</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 35%;"></th> <th style="width: 15%; text-align: center; border-bottom: 1px solid black;">FY 2000</th> <th style="width: 15%; text-align: center; border-bottom: 1px solid black;">FY 2001</th> <th style="width: 15%; text-align: center; border-bottom: 1px solid black;">FY 2002</th> </tr> </thead> <tbody> <tr> <td>(U) FY 2001 President's Budget:</td> <td style="text-align: right;">161.118</td> <td style="text-align: right;">305.274</td> <td style="text-align: right;">303.989</td> </tr> <tr> <td>(U) Appropriated Value:</td> <td style="text-align: right;">162.056</td> <td style="text-align: right;">292.274</td> <td></td> </tr> <tr> <td>(U) Adjustment to FY 2000/2001 Appropriated Value/ FY 2001 President's Budget:</td> <td style="text-align: right;">-0.224</td> <td style="text-align: right;">-15.683</td> <td style="text-align: right;">+51.104</td> </tr> <tr> <td>(U) FY 2002 PRES Budget Submit:</td> <td style="text-align: right;">160.894</td> <td style="text-align: right;">289.591</td> <td style="text-align: right;">355.093</td> </tr> </tbody> </table> <p>(U) Funding: The FY 2000 net decrease of \$0.224M is due to Small Business Innovative Research (SBIR) reductions (-\$3.210M), realignment of funds from PE 0603513N to fund a VSR shortfall (+\$2.213M), Below Threshold Reprogrammings (-\$0.250M), Federal Technology Transfer Assessment (-\$0.021), Congressional Rescission (-\$0.632M) and miscellaneous adjustments (+\$1.676M). The FY 2001 net decrease of \$15.683M is due to a Congressional reduction for design cost growth (-\$20.000M), Congressional increases for Power Node Control Centers (PNCC) (+\$3.000M) and Multi-Function Radar (+\$4.000M), Economic Assumption Reduction (-\$2.045M) and Congressional Rescission (-\$0.638M). The FY 2002 net increase of \$51.104M is due to to program element/project funding realignments within the DD21 program (+\$29.461M), PBD 807 MFR increase (+\$21.000M), NWCF Rate adjustments (-\$0.547M), Non-Pay Inflation adjustments-PBD604 (+\$.518M) and miscellaneous minor adjustments (+\$.672M).</p> <p>(U) Schedule: See individual projects</p> <p>(U) Technical Parameters: Technical parameters are contained in the DD 21 Operational Requirements Document (ORD) approved by JROC on 16 October 1997.</p>				FY 2000	FY 2001	FY 2002	(U) FY 2001 President's Budget:	161.118	305.274	303.989	(U) Appropriated Value:	162.056	292.274		(U) Adjustment to FY 2000/2001 Appropriated Value/ FY 2001 President's Budget:	-0.224	-15.683	+51.104	(U) FY 2002 PRES Budget Submit:	160.894	289.591	355.093
	FY 2000	FY 2001	FY 2002																			
(U) FY 2001 President's Budget:	161.118	305.274	303.989																			
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(U) FY 2002 PRES Budget Submit:	160.894	289.591	355.093																			

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EXHIBIT R-2a, RDT&E Project Justification					DATE: June 2001				
APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT NAME AND NUMBER			PROJECT NAME AND NUMBER				
RDT&E, N/BA-5		SC-21 Total Ship Systems Eng/0604300N			DD 21 System Design, Development & Integration ¹ /32464				
COST (\$ in Millions)		FY 2000	FY 2001	FY 2002					
Project Cost		113.508	153.500	(1) 234.464					
RDT&E Articles Qty		0	0	0					
<p>Notes: (1) Project formerly known as Design.</p> <p>(2) (U) Funding for efforts directly related to DD 21 design and systems integration has been reprogrammed to this project from PE 0603513N, Projects 32469 and 32470 and PE 0604300N, Project 32465 in FY 2002 and out.</p> <p>A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project encompasses efforts for the total ship system engineering development and integration of Hull, Mechanical and Electrical (HM&E), communications, electronics, command and control, combat, weapons and shipboard systems into the DD 21 class. These engineering development and integration efforts include systems engineering, analysis, software development, interface design, technical documentation, and system/subsystem testing to ensure fully functional systems integration. These systems engineering development efforts are required to ensure that DD 21 is a totally integrated ship system, delivering required warfighting technologies to the fleet within the reduced manning and cost goals.</p> <p>1. (U) FY 2000 ACCOMPLISHMENTS:</p> <ul style="list-style-type: none"> - (U) (\$70.250) Began Contract Phase II for the development of two competitive initial system designs for DD 21. DD 21 industry teams continued development of the system functional baseline, continued refinement of the performance specification, continued to develop and validate cost estimates, and continued to develop a detailed total ship design leading to a Preliminary Design Review (PDR). Continued development of the Smart Product Model virtual prototype, which constitutes a representation of the ship's requirements, design and capabilities at the preliminary design level. Conducted System Functional Review (SFR). - (U) (\$29.363) Continued to support the DD 21 Technical Team responsible for the participation, oversight and monitoring of the two industry designs in Contract Phase II. Evaluated contractor deliverables and conducted Engineering Review in preparation for downselect and Preliminary Design Review (PDR) in FY 2001. The Engineering team consists of Government Labs, Universities and selected technical support contractors. This Technical Team provides the expertise to evaluate/support the DD 21 industry design in the areas of Combat Systems; HM&E; Signatures; Command, Control, Communication, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR); Modeling and Simulation; Total Ship Computing; Test and Evaluation; Manning, and Life Cycle Engineering and Support (LCE&S). - (U) (\$5.230) Continued development of DD 21 Live Fire Test and Evaluation (LFT&E) Plan. The DD 21 LFT&E program focuses on the following areas: Mission Recoverability, Magazine Protection, Damaged Seaway Survival, Selected Equipment Vulnerability, and Advanced Weapon Threat Effects. These areas address critical elements of DD 21 survivability as defined in the Test and Evaluation Master Plan (TEMP), the LFT&E Management Plan, and the Operational Requirements Document (ORD). Test results were used to improve modeling and simulation capability and will support DD 21 design evaluations. 									

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EXHIBIT R-2a, RDT&E Project Justification		DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-5	PROGRAM ELEMENT NAME AND NUMBER SC-21 Total Ship Systems Eng/0604300N	PROJECT NAME AND NUMBER DD 21 System Design, Development & Integration/32464
<p>1. (U) FY 2000 ACCOMPLISHMENTS (continued):</p> <ul style="list-style-type: none"> - (U) (\$6.584) Continued identification and risk mitigation efforts in high risk areas such as manning, LCE&S, Total Ship Computing, and certification. Continued Manning/Human Systems Interface (HSI) and LCE&S IPTs to address the impact of how industry-developed concepts will impact the future Navy support infrastructure in these functional areas. Reviewed and developed proposed policy changes as a result of DD 21 industry concepts that impact Navy manning and life cycle support structure as a result of FSC proposals. - (U) (\$2.081) Developed the baseline architecture to support the introduction of time critical strike future naval capability and the system and technical architectures that describe physical, functional and organizational relationships between all operating units and systems in the Surface Combatant Land Attack programs of record. <p>2. (U) FY 2001 PLAN:</p> <ul style="list-style-type: none"> - (U) (\$104.519) Complete Initial System Design (Contract Phase II). Complete initial development of Smart Product Model virtual prototype for contract Phase II. Downselect to one DD 21 Industry team to begin system and subsystem design. Begin DD 21 Ship System Design (Contract Phase III). This includes development of the total ship computing architecture and computer programs that will integrate Combat Systems to support reduced Navy manning and improved LCE&S concepts, HM&E, and administrative functions. Conduct Preliminary Design Review (PDR). Continue development of Smart Product Model virtual prototype to support contract and detailed design of DD 21. - (U) (\$33.068) Continue support of DD 21 Technical Team responsible for the participation, oversight and monitoring of the two industry designs during Contract Phase II and following downselect to one DD 21 industry team. Participate in/evaluate SFR, downselect, and PDR. The Engineering team consists of Government Labs, Universities and selected technical support contractors. The Technical Team provides the expertise to evaluate/support the DD 21 industry design in the areas of Combat Systems, HM&E, Signatures, C4ISR, Modeling and Simulation, Total Ship Computing, Test and Evaluation, Manning, and LCE&S. - (U) (\$5.980) Continue development of DD 21 LFT&E plan. The DD 21 LFT&E program focuses on the following areas: Mission Recoverability, Magazine Protection, Damaged Seaway Survival, Selected Equipment Vulnerability, and Advanced Weapon Threat Effects. These areas address critical elements of DD 21 survivability as defined in the Test and Evaluation Master Plan (TEMP), the LFT&E Management Plan, and the Operational Requirements Document (ORD). Test results will be used to improve modeling and simulation capability and will support DD 21 design evaluations. - (U) (\$6.841) Continue identification and risk mitigation efforts in high risk areas such as manning, LCE&S, and Total Ship Computing. Continue Manning/HSI and LCE&S IPTs to address the impact of how industry-developed concepts will impact the future Navy support infrastructure in these functional areas. Review and develop proposed policy changes as a result of DD 21 industry concepts that impact Navy manning and life cycle support structure as a result of FSC proposals. - (U) (\$3.092) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638. 		

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EXHIBIT R-2a, RDT&E Project Justification		DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-5	PROGRAM ELEMENT NAME AND NUMBER SC-21 Total Ship Systems Eng/0604300N	PROJECT NAME AND NUMBER DD 21 System Design, Development & Integration/32464
<p>3. (U) FY 2002 PLAN:</p> <p>- (U) (\$180.162) Continue DD 21 System Design (Contract Phase III). This includes system and subsystem development of the HM&E, C4ISR, total ship computing and software development, modeling and simulation (including Smart Product Model), and planning, development, and implementation of the life cycle support and engineering concepts. Contract Phase III also includes the planning and development of the test and evaluation infrastructure required for the first DD 21 ship.</p> <p>- (U) (\$36.990) Continue support of DD 21 Technical Team. The Technical Team provides the expertise to evaluate/support the DD 21 industry design in the areas of Combat Systems, HM&E, C4ISR, Modeling and Simulation, Total Ship Computing, and Test and Evaluation. Establish team to review and certify Full Service Contractor (FSC) software development.</p> <p>- (U) (\$6.438) Continue development of the DD 21 LFT&E plan. The DD 21 LFT&E program focuses on the following areas: Mission Recoverability, Magazine Protection, Damaged Seaway Survival, Selected Equipment Vulnerability, and Advanced Weapons Threat Effects. These areas address critical elements of DD 21 survivability as defined in the Test and Evaluation Master Plan (TEMP), the LFT&E Management Plan, and the Operational Requirements Document (ORD). Conduct a Live Fire event using a supersonic threat missile against a ship target with some portion of distributed shipboard systems such as firemain or electrical system intact and operating on the target ship.</p> <p>- (U) (\$10.874) Continue identification and risk mitigation efforts in high risk areas such as manning, LCE&S, and Total Ship Computing. Continue Manning/HSI and LCE&S IPTs to address the impact of how industry-developed concepts will impact the future Navy support infrastructure in these functional areas. Review and develop proposed policy changes as a result of DD 21 industry concepts that impact Navy manning and life cycle support structure as a result of FSC proposals.</p>		

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EXHIBIT R-2a, RDT&E Project Justification							DATE: June 2001			
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-5			PROGRAM ELEMENT NAME AND NUMBER SC-21 Total Ship Systems Eng/0604300N			PROJECT NAME AND NUMBER DD 21 System Design, Development & Integration/32464				
B. (U) OTHER PROGRAM FUNDING SUMMARY:										
COST (\$ in Millions)		FY 2000	FY 2001	FY 2002						
Shipboard System Component Dev/0603513N		108.548	256.065	288.382						
C. (U) ACQUISITION STRATEGY: (U) The DD 21 acquisition strategy encompasses five contract phases: Phase I – System Concepts, Phase II – Initial System Design, Phase III – System Design, Phase IV – Detail Design and Construction, and Phase V – Engineering and Logistics Life Cycle Support. The Navy awarded section 845/804 agreements for Phases I and II for two DD 21 Industry teams. Downselection to a single DD 21 Contractor team will occur in mid FY 2001 to begin Contract Phase III.										

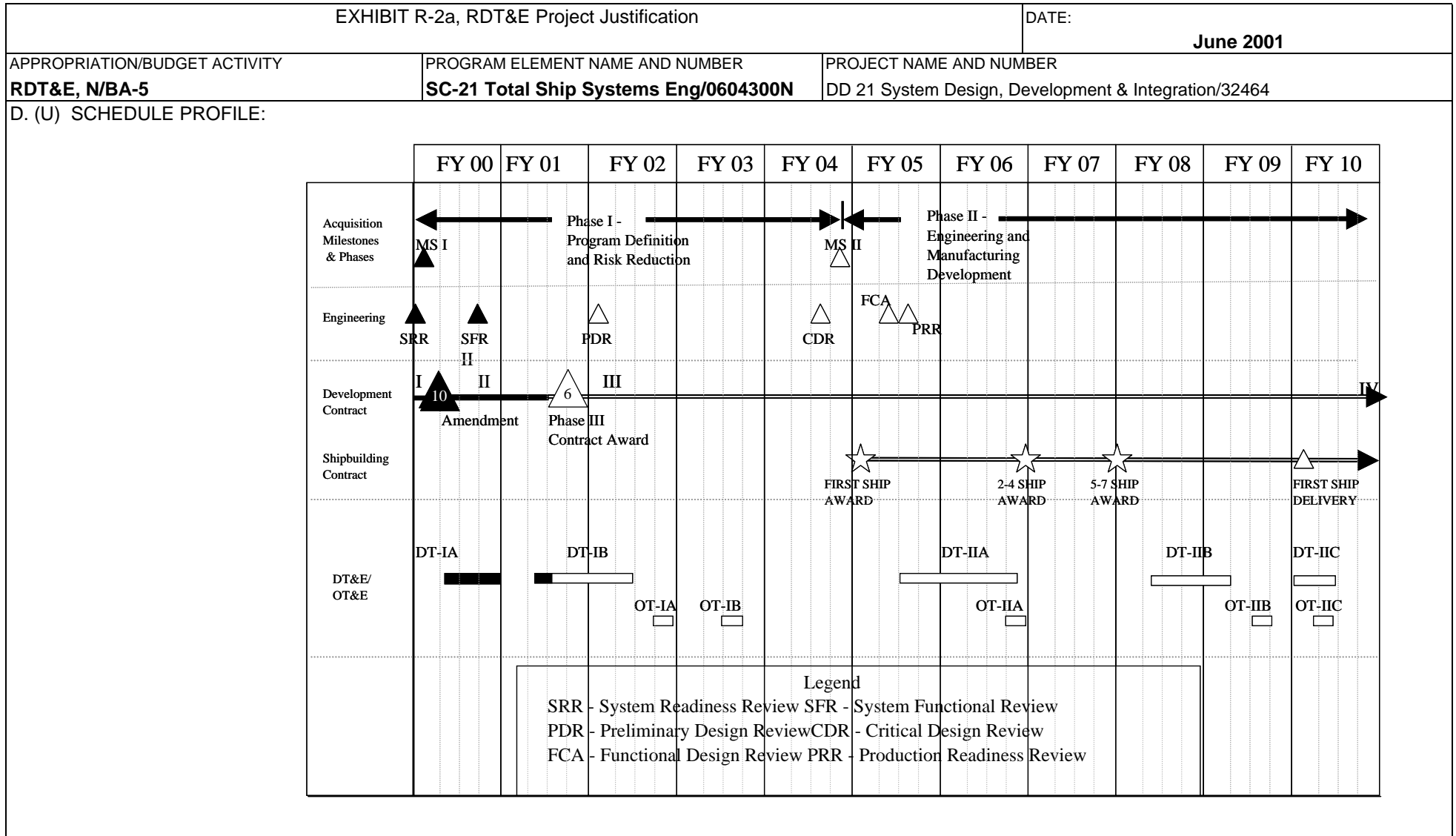
R-1 SHOPPING LIST - Item No. 110-6 of 110-24

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Exhibit R-2a, RDT&E Project Justification
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Exhibit R-3 Cost Analysis (page 1)								DATE: June 2001				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA-5			SC-21 Total Ship System Engin/0604300N			DD 21 System Design, Development & Integration/32464						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Initial System Concepts - Phase I	Sec 845/804	DD 21 Industry Team	54.800	0.000	N/A	0.000	N/A	0.000	N/A	0.000	54.800	
Initial System Design/System, Subsystem Design - Phases II & III	Sec 845/804	DD 21 Industry Team	0.000	70.250	11/99	64.019	10/00	0.000	N/A	0.000	134.269	
Primary H/W Development - Phase III	CPIF	DD 21 FSC	0.000	0.000	N/A	40.500	06/01	180.162	11/01	CONT.	CONT.	
Ancillary Hardware Development												
Systems Engineering												
Licenses												
Tooling												
GFE												
Subtotal Product Development			54.800	70.250		104.519		180.162		CONT.	CONT.	
Remarks: Funding for the DD 21 industry team for efforts directly related to DD 21 design and systems integration has been reprogrammed to this project from PE 0603513N, Projects 32469 and 32470 and from PE 0604300N, Project 32465 in FY 2002 and out.												
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks: (U) Support costs during this period are rolled up in development contracts costs.												

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Exhibit R-3, Project Cost Analysis
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Exhibit R-3 Cost Analysis (page 2)								DATE:				
APPROPRIATION/BUDGET ACTIVITY								June 2001				
RDT&E, N/BA-5			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
			SC-21 Total Ship System Engin/0604300N			DD 21 System Design, Development & Integration/32464						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Live Fire Test & Evaluation	Sec 845/804	DD 21 Industry Teams	2.425	1.750	11/99	0.000	N/A	0.000	N/A	0.000	4.175	
	CPIF	DD 21 FSC	0.000	0.000	N/A	2.450	10/00	2.100	11/01	CONT.	CONT.	
	WR	NSWC CD Bethesda, MD	6.832	3.180	12/99	3.530	11/00	3.000	11/01	CONT.	CONT.	
	WR	NSWC DD Dahlgren, VA	0.200	0.000	N/A	0.000	11/00	0.500	11/01	CONT.	CONT.	
	Various	Various	2.369	0.300	Various	0.000	N/A	0.838	11/01	CONT.	CONT.	
Subtotal T&E			11.826	5.230		5.980		6.438		CONT.	CONT.	
Remarks:												
Contractor Engineering Support	GSA	Anteon Arlington,VA	3.300	1.500	12/99	1.500	11/00	2.300	11/01	CONT.	CONT.	
	GSA	BAE Systems, Rockville, MD	2.000	1.000	12/99	0.000	N/A	0.000	N/A	CONT.	CONT.	
	GSA	GRCI, Falls Church, VA	0.000	0.000	N/A	1.500	11/00	1.500	11/01	CONT.	CONT.	
	Misc.	Various	1.800	1.427	12/99	1.800	11/00	1.600	11/01	CONT.	CONT.	
Government Engineering Support	WR	NSWC DD Dahlgren, VA	24.790	11.353	12/99	13.679	11/00	17.010	11/01	CONT.	CONT.	
	WR	NSWC CD Bethesda, MD	7.080	2.959	12/99	7.800	11/00	7.809	11/01	CONT.	CONT.	
	WR	NSWC CR Crane, IN	2.757	0.631	12/99	0.635	11/00	0.659	11/01	CONT.	CONT.	
	WR	NSWC PHD Pt Hueneme,CA	1.870	2.415	12/99	1.615	11/00	1.815	11/01	CONT.	CONT.	
	WR	SSCSD San Diego, CA	2.640	2.170	12/99	2.071	11/00	1.900	11/01	CONT.	CONT.	
	WR	NUWC/N Newport, RI	2.005	1.206	12/99	0.850	11/00	0.880	11/01	CONT.	CONT.	
	WR	NSWC/PC Panama City, FL	0.000	1.014	12/99	1.000	11/00	0.910	11/01	CONT.	CONT.	
	Various	Gov't Activities	6.680	4.698	12/99	3.034	11/00	2.502	11/01	CONT.	CONT.	
University Research	CPFF	APL/JHU Laurel, MD	4.072	2.722	12/99	2.700	11/00	3.500	11/01	CONT.	CONT.	
Program Management Support	Various	Various	7.271	3.533	12/99	3.417	11/00	3.729	11/01	CONT.	CONT.	
Travel	Various	Various	0.762	1.400	Various	1.400	Various	1.750	11/01	CONT.	CONT.	
Subtotal Management			67.027	38.028		43.001		47.864		CONT.	CONT.	
Remarks:												
Total Cost			133.653	113.508		153.500		234.464		CONT.	CONT.	
Remarks:												

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Exhibit R-3, Project Cost Analysis
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EXHIBIT R-2a, RDT&E Project Justification					DATE: June 2001				
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-5		PROGRAM ELEMENT NAME AND NUMBER SC-21 Total Ship Systems Eng/0604300N			PROJECT NAME AND NUMBER DC/Survivability/32465				
COST (\$ in Millions)	FY 2000	FY 2001	FY 2002						
Project Cost	2.997	6.260	(1) 0.000						
RDT&E Articles Qty	0	0	0						

Notes: (1) (U) Funding for this project has been reprogrammed to PE 0603513N, Project 32465 in FY 2002 and out.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project funds the engineering development of DD 21 ship protection and damage control/firefighting systems and features that reduce vulnerability against conventional weapons (e.g., missiles, mines, torpedoes) and peacetime accidents that enable an effective recovery of mission capability. The requirements for this project are based on the need to develop affordable, balanced DD 21 survivability designs that address recent wartime lessons learned and meet established DD 21 survivability goals.

(U) Additionally, this project addresses survivability requirements applicable to the existing fleet and other ship acquisition programs (e.g., LPD 17, CVX, LHX). Development areas include: 1) computer-based damage control systems that enable reduced manning through systems automation, minimizing the need for manual Damage Control (DC) actions; 2) personnel protection systems/devices that increase endurance and reduce stress on DC personnel during sustained operations; 3) tactics and doctrine for attacking major threat, ship threatening conflagration; 4) damage tolerant structures that increase hull girder survival against underwater explosions; and 5) system protection devices that enable continued system operation after damage. In FY 2001, PEO (S) was given funding to perform studies related to Power Node Control Centers (PNCCs). PNCCs have the potential to integrate all of the shipboard power functions, such as switching, conversion, distribution and system operation and protection. This technology would support present and future surface ship and submarine platforms as a building block for increased use of electrical equipment. The PNCC concept can potentially improve survivability by enabling an electrical system architecture that can locate and clear faults automatically, provide continuity of power through fast switching and rerouting of power, and provide electrical nodes capable of programmable, multi-function, operations.

1. (U) FY 2000 ACCOMPLISHMENTS:

- (U) (\$0.378) Continued development of the pre-hit Configuration Management capability. Continued DD 21 combat/damage control systems integration for monitoring advanced, projected DD 21 threats. Continued development of a lightweight firefighting/boundary suit ensemble.
- (U) (\$2.419) Began initial System Design and engineering of DD 21 DC/Survivability systems.
- (U) (\$0.200) Continued design of damage tolerant hull girder configurations that limit holing and flooding and prevent ship sinking from close-in UNDEX.

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EXHIBIT R-2a, RDT&E Project Justification							DATE: June 2001																						
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-5			PROGRAM ELEMENT NAME AND NUMBER SC-21 Total Ship Systems Eng/0604300N			PROJECT NAME AND NUMBER DC/Survivability/32465																							
<p>2. (U) FY 2001 PLAN:</p> <ul style="list-style-type: none"> - (U) (\$0.424) Continue development of the pre-hit Configuration Management capability including development of post-hit electrical fault clearing approaches for medium voltage systems. Initiate planning for electrical system T&E to evaluate system isolation performance under projected threat conditions. Complete development of a lightweight firefighting/boundary suit ensemble. - (U) (\$2.568) Complete initial System Design and engineering of DD 21 DC/Survivability systems. Begin system/subsystem development of DC/Survivability systems. - (U) (\$0.200) Continue design of damage tolerant hull girder configurations that limit holing and flooding and prevent ship sinking from close-in UNDEX. - (U) (\$3.000) Power Node Control Centers. Perform studies to assess the impact of using PNCCs on solid state breakers within the IPS architectures. Examine how PNCC concept could be integrated into the IPS design. Design/develop engineering hardware model. - (U) (\$0.068) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638. <p>3. (U) FY 2002 PLAN: See PE 0603513N, Shipboard System Component Development.</p> <p>B. (U) OTHER PROGRAM FUNDING SUMMARY:</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <th style="text-align: left;">COST (\$ in Millions)</th> <th style="text-align: center;">FY 2000</th> <th style="text-align: center;">FY 2001</th> <th style="text-align: center;">FY 2002</th> <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> </tr> <tr> <td>Shipboard System Component Dev/0603513N</td> <td style="text-align: right;">108.548</td> <td style="text-align: right;">256.065</td> <td style="text-align: right;">288.382</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table> <p>C. (U) ACQUISITION STRATEGY:</p>										COST (\$ in Millions)	FY 2000	FY 2001	FY 2002							Shipboard System Component Dev/0603513N	108.548	256.065	288.382						
COST (\$ in Millions)	FY 2000	FY 2001	FY 2002																										
Shipboard System Component Dev/0603513N	108.548	256.065	288.382																										

R-1 SHOPPING LIST - Item No. 110-11 of 110-24

Exhibit R-2a, RDT&E Project Justification
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EXHIBIT R-2a, RDT&E Project Justification		DATE: June 2001								
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-5	PROGRAM ELEMENT NAME AND NUMBER SC-21 Total Ship Systems Eng/0604300N	PROJECT NAME AND NUMBER DC/Survivability/32465								
<p>D. (U) SCHEDULE PROFILE:</p> <table><thead><tr><th><u>FY 2000</u></th><th><u>FY 2001</u></th></tr></thead><tbody><tr><td>4Q Pre-Hit Configuration Management Software Code</td><td>4Q Electrical Options (Prel)</td></tr><tr><td>1Q Initial System Design</td><td>1Q DD 21 System/Subsystem Development</td></tr><tr><td></td><td>4Q Lightweight Firefighting Boundary Suit</td></tr></tbody></table>			<u>FY 2000</u>	<u>FY 2001</u>	4Q Pre-Hit Configuration Management Software Code	4Q Electrical Options (Prel)	1Q Initial System Design	1Q DD 21 System/Subsystem Development		4Q Lightweight Firefighting Boundary Suit
<u>FY 2000</u>	<u>FY 2001</u>									
4Q Pre-Hit Configuration Management Software Code	4Q Electrical Options (Prel)									
1Q Initial System Design	1Q DD 21 System/Subsystem Development									
	4Q Lightweight Firefighting Boundary Suit									

R-1 SHOPPING LIST - Item No. 110-12 of 110-24

Exhibit R-2a, RDT&E Project Justification
(Exhibit R-2a, page 12 of 24)

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CLASSIFICATION:

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Exhibit R-3 Cost Analysis (page 1)								DATE: June 2001				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA-5			SC-21 Total Ship System Eng/0604300N			DC/Survivability/32465						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	NSWCCD Phila. Pa				3.000	03/01			0.000	3.000	
Ancillary Hardware Development												
Systems Engineering												
Product Development	Sec 845/804	DD 21 Industry Team	2.180	2.419	11/99	2.636	11/00			0.000	7.235	
	WR	NSWC CD Bethesda, MD	3.588	0.283	11/99	0.510	11/00			0.000	4.381	
	Various	Other Govt. Activities	4.956	0.295	Various	0.114	Various			0.000	5.365	
	Various	Other Contractors	1.080	0.000	N/A	0.000	N/A			0.000	1.080	
Subtotal Product Development			11.804	2.997		6.260				0.000	21.061	
Remarks: For FY 2002 and out, this effort has been reprogrammed to PE 0603513N, Project 32465. See those exhibits for FY 02 information.												
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												

R-1 SHOPPING LIST - Item No. 110-13 of 110-24

Exhibit R-3, Project Cost Analysis
(Exhibit R-3, page 13 of 24)

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CLASSIFICATION:

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Exhibit R-3 Cost Analysis (page 2)								DATE: June 2001				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA-5			SC-21 Total Ship System Eng/0604300N			DC/Survivability/32465						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation												
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support												
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Total Cost			11.804	2.997		6.260		0.000		CONT.	CONT.	
Remarks:												

R-1 SHOPPING LIST - Item No. 110-14 of 110-24

Exhibit R-3, Project Cost Analysis
(Exhibit R-3, page 14 of 24)

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CLASSIFICATION:

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EXHIBIT R-2a, RDT&E Project Justification					DATE: June 2001				
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER				PROJECT NAME AND NUMBER				
RDT&E, N/BA-5	SC-21 Total Ship Systems Eng/0604300N				Multi-Function Radar (MFR) / 32466				
COST (\$ in Millions)	FY 2000	FY 2001	FY 2002						
Project Cost	44.389	72.901	73.262						
RDT&E Articles Qty	0	0	1						

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides funds for the development of the Multi-Function Radar (MFR) in association with DD 21 and CVN 77. This provides DD 21 and other applicable surface ships with an affordable, high performance radar for ship defense well into the next century. This system is based on solid state, active array radar technology and will provide search, detect, track, and weapon control functions while dramatically reducing manning and life-cycle costs associated with multiple systems that perform these functions today. The MFR will achieve a level of force protection that greatly enhances ship defense capability against all threats envisioned in the littoral environment. A Test Article will be available in FY 02 to support DT/OA land-based and at-sea testing.

1. (U) FY 2000 ACCOMPLISHMENTS:

- (U) (\$38.400) Continued Engineering and Manufacturing Development (E&MD) phase of MFR. Developed and provided technical design data to support Critical Design Review (CDR). Procured Engineering Development Model (EDM) hardware.
- (U) (\$4.521) Provided Government Engineering Services support for E&MD. Performed oversight and assessment of MFR E&MD efforts. Conducted CDR.
- (U) (\$1.468) Provided Program Management in support of the above program milestones.

R-1 SHOPPING LIST - Item No. 110-15 of 110-24

Exhibit R-2a, RDT&E Project Justification
(Exhibit R-2a, page 15 of 24)

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EXHIBIT R-2a, RDT&E Project Justification								DATE: June 2001	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-5			PROGRAM ELEMENT NAME AND NUMBER SC-21 Total Ship Systems Eng/0604300N			PROJECT NAME AND NUMBER Multi-Function Radar (MFR) / 32466			
<p>2. (U) FY 2001 PLAN:</p> <ul style="list-style-type: none"> - (U) (\$61.000) Continue E&MD phase of MFR. Continue EDM hardware procurement and start fabrication. Transmit/Receive (T/R) Module Production Readiness Review complete. - (U) (\$4.127) Provide Government Engineering Services support for E&MD. Perform oversight and assessment of MFR E&MD efforts. - (U) (\$5.000) Begin evaluation, planning, documentation and scheduling for FY 02 Developmental Tests and Operational Assessment (DT/OA). - (U) (\$1.065) Provide Program Management in support of the above program milestones. - (U) (\$1.709) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638. <p>3. (U) FY 2002 PLAN:</p> <ul style="list-style-type: none"> - (U) (\$50.000) Continue E&MD phase of MFR. Deliver EDM to Navy Land Based Test Site. Provide test and integration support for Navy Land Based Testing. - (U) (\$10.312) Government Engineering Services and program management support for E&MD. Perform oversight and assessment of MFR E&MD efforts. Evaluate EDM delivered unit. Support Navy Land Based Testing. - (U) (\$12.000) Continue evaluation, planning, documentation and scheduling for DT/OA. Conduct DT/OA. - (U) (\$0.950) Provided Program Management in support of the above program milestones. 									
COST (\$ in Millions)		FY 2000	FY 2001	FY 2002					
Shipboard System Component Dev/0603513N		108.548	256.065	288.382					
<p>C. (U) ACQUISITION STRATEGY:</p> <p>(U) In FY 1999, the Government selected a single MFR contractor (Raytheon) to begin Phase III E&MD. EDM delivery will be in FY 2002.</p>									

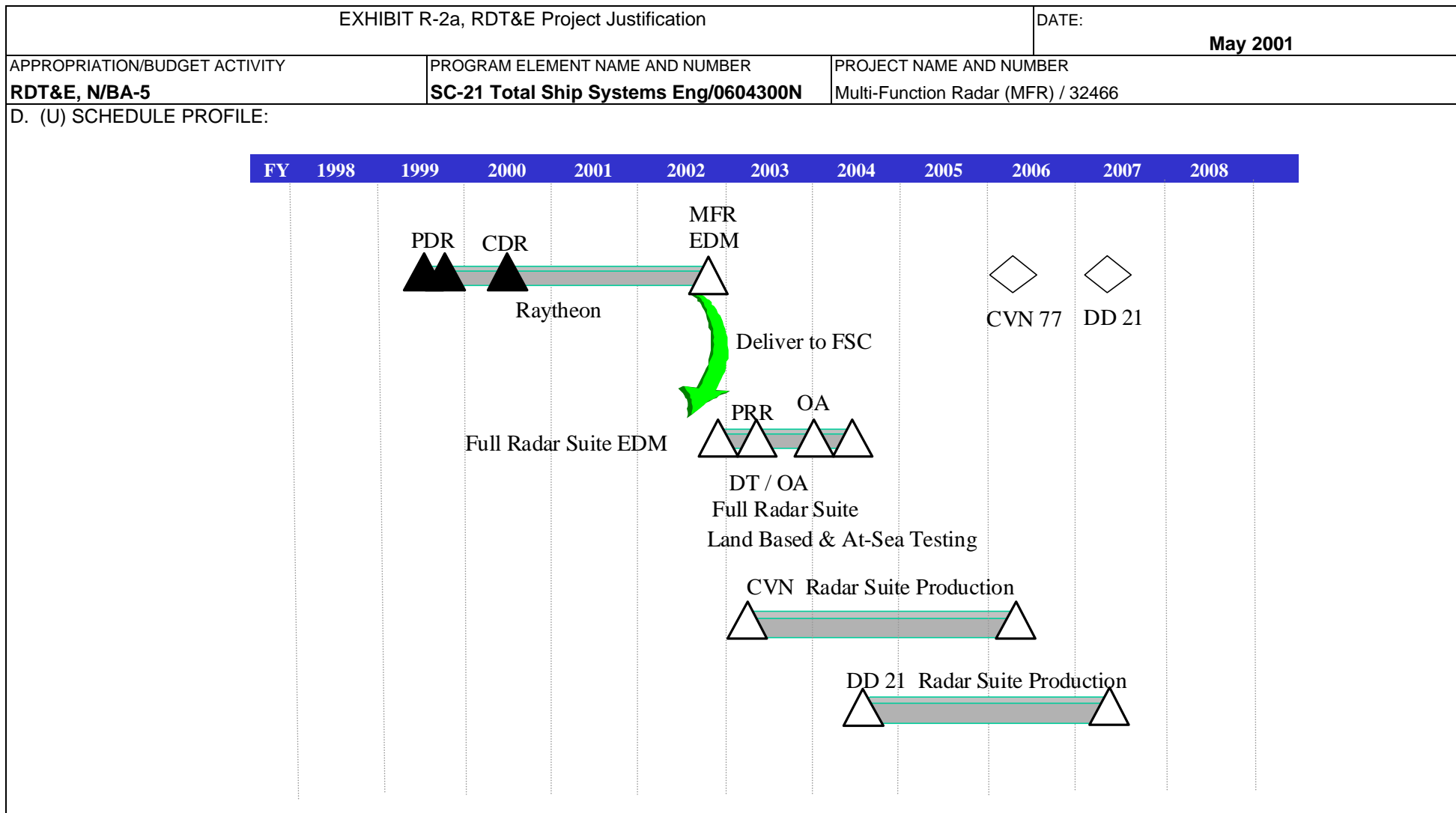
R-1 SHOPPING LIST - Item No. 110-16 of 110-24

Exhibit R-2a, RDT&E Project Justification
(Exhibit R-2a, page 16 of 24)

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R-1 SHOPPING LIST - Item No. 110-17 of 110-24

Exhibit R-2a, RDT&E Project Justification
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CLASSIFICATION:

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Exhibit R-3 Cost Analysis (page 1)								DATE: June 2001				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA-5			SC-21 Total Ship System Engin/0604300N			Multi-Function Radar (MFR) / 32466						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	CPAF/IF	Prime E&MD (Raytheon)	12.000	38.400	11/99	61.000	11/00	50.000	11/01	CONT.	CONT.	195.000
	Sec 845/804	DD 21 Industry Team	2.434	0.000	N/A	0.000	N/A	0.000	N/A	0.000	2.434	
	CP	Various	12.414	0.000	N/A	0.000	N/A	0.000	N/A	0.000	12.414	
Ancillary Hardware Development												
Systems Engineering												
Licenses												
Tooling												
GFE												
Subtotal Product Development			26.848	38.400		61.000		50.000		CONT.	CONT.	
Remarks:												
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												

R-1 SHOPPING LIST - Item No. 110-18 of 110-24

Exhibit R-3, Project Cost Analysis
(Exhibit R-3, page 18 of 24)

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CLASSIFICATION:

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Exhibit R-3 Cost Analysis (page 2)								DATE: June 2001				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA-5			SC-21 Total Ship System Engin/0604300N			Multi-Function Radar (MFR) / 32466						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	Various	Various				5.000	11/00	3.000	11/01	CONT.	CONT.	
	TBD	Land Based Test Site						9.000	11/01	CONT.	CONT.	
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			0.000	0.000		5.000		12.000		CONT.	CONT.	
Remarks:												
Government Engineering Support	WR	NSWC DD Dahlgren, VA	2.000	1.700	12/99	1.700	11/00	1.700	11/01	CONT.	CONT.	
	WR	NSWC PHD Pt Hueneme, CA	1.000	1.000	12/99	0.900	11/00	0.900	11/01	CONT.	CONT.	
	SS/CPFF	JHU/APL Laurel, MD	1.000	1.000	12/99	1.100	11/00	1.100	11/01	CONT.	CONT.	
	WR	Various	2.197	0.821	12/99	2.136	11/00	6.612	11/01	CONT.	CONT.	
Program Management Support	C/CPFF	Various	0.600	1.468	12/99	1.065	11/00	0.950	11/01	CONT.	CONT.	
Travel												
Subtotal Management			6.797	5.989		6.901		11.262		CONT.	CONT.	
Remarks:												
Total Cost			33.645	44.389		72.901		73.262		CONT.	CONT.	
Remarks:												

R-1 SHOPPING LIST - Item No. 110-19 of 110-24

Exhibit R-3, Project Cost Analysis
(Exhibit R-3, page 19 of 24)

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EXHIBIT R-2a, RDT&E Project Justification					DATE: June 2001				
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER				PROJECT NAME AND NUMBER				
RDT&E, N/BA-5	SC-21 Total Ship Systems Eng/0604300N				Volume Search Radar (VSR) / 32735				
COST (\$ in Millions)	FY 2000	FY 2001	FY 2002						
Project Cost	(1) 0.000	56.930	47.367						
RDT&E Articles Qty	0	0	1						

Note: 1. (U) FY00 funding for VSR development is included in PE 0603512N, Project 42208 (Future Carrier R&D) and PE 0604755N, Project 32735 (Ship Self Defense). All requirements in FY 2001 and beyond are consolidated in PE 0604300N, Project 32735.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project provides funds for the development of the Volume Search Radar (VSR) in association with DD 21. This provides DD 21 and other applicable surface ships with an affordable, high performance air search radar. This system is based on solid state, active array radar technology and will provide search, detect, and track while dramatically reducing manning and life-cycle costs associated with multiple systems that perform these functions today. VSR provides long range above-the-horizon surveillance and timely cueing to MFR. A Test Article will be available in FY 02 to support DT/OA land-based and at-sea testing.

1. (U) FY 2000 ACCOMPLISHMENTS:
 Note: FY 2000 accomplishments budgeted in PE 0604755N, Project 32735. All requirements in FY 2001 and beyond are consolidated in PE 0604300N, Project 32735.

- (U) (\$2.448) Began VSR Engineering and Manufacturing Development (E&MD) leading toward Preliminary Design Review (PDR).
- (U) (\$11.000) Continued Preliminary Design and conducted PDR. Continued E&MD Phase.
- (U) (\$2.591) Provided Government Engineering Services to support Radar Suite Acquisition Team (RSAT) for VSR E&MD.

2. (U) FY 2001 PLAN:

- (U) (\$51.597) Complete Critical Design Reviews (CDRs) in early FY01 for both DD 21 competing teams. After DD 21 downselect, the Full Service Contractor (FSC) will procure Engineering Development Model (EDM) hardware and start fabrication
- (U) (\$3.695) Provide Government Engineering Services support for E&MD. Perform oversight and assessment of VSR E&MD efforts and system integration.
- (U) (\$0.212) Provide Program Management in support of the above program milestones.
- (U) (\$1.426) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

R-1 SHOPPING LIST - Item No. 110-20 of 110-24

Exhibit R-2a, RDT&E Project Justification
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CLASSIFICATION:

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EXHIBIT R-2a, RDT&E Project Justification							DATE: June 2001			
APPROPRIATION/BUDGET ACTIVITY RDT&E, N/BA-5			PROGRAM ELEMENT NAME AND NUMBER SC-21 Total Ship Systems Eng/0604300N			PROJECT NAME AND NUMBER Volume Search Radar (VSR) / 32735				
<p>3. (U) FY 2002 PLAN:</p> <ul style="list-style-type: none"> - (U) (\$37.975) Continue E&MD phase of VSR, and deliver EDM to the Navy Land Based Test Site. Provide test and integration support for Navy Land Based Testing. - (U) (\$1.940) Provide Government Engineering Services support for E&MD. Perform oversight and assessment of MFR E&MD efforts. Evaluate EDM delivered unit. Support Navy Land Based Testing. - (U) (\$7.240) VSR test and evaluation, planning, documentation and scheduling. - (U) (\$0.212) Provide Program Management in support of the above program milestones. 										
B. (U) OTHER PROGRAM FUNDING SUMMARY										
COST (\$ in Millions)		FY 2000	FY 2001	FY 2002						
Shipboard System Component Dev/0603513N		108.548	256.065	288.382						
<p>C. (U) ACQUISITION STRATEGY:</p> <p>(U) In FY 2001, the Government will downselect to a single DD 21 industry team. The Full Service Contractor (FSC) will fabricate and deliver the VSR EDM in FY 2002. MFR/VSR Radar Suite DT/OA is anticipated in FY 2002 through FY 2004.</p>										

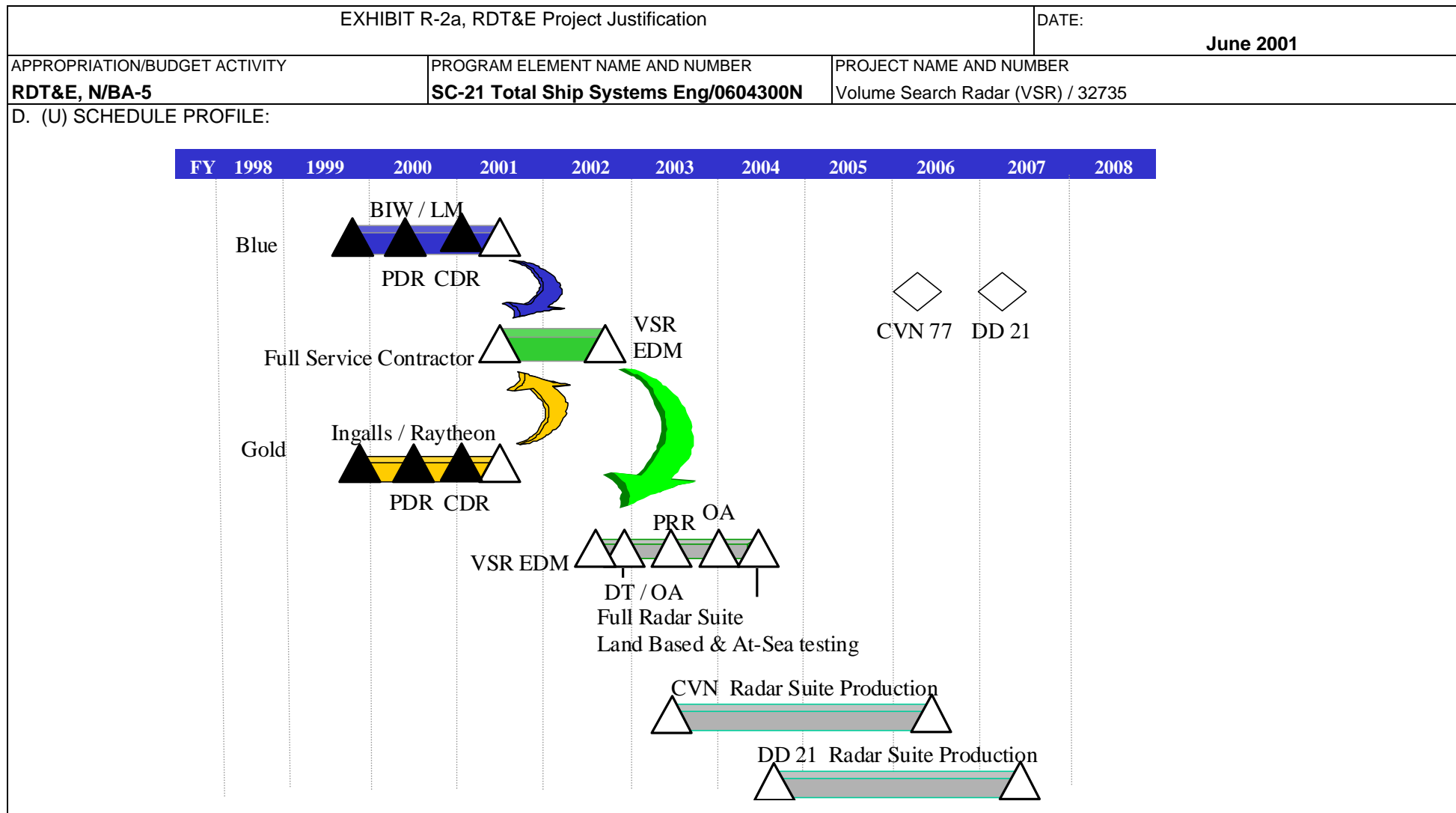
R-1 SHOPPING LIST - Item No. 110-21 of 110-24

Exhibit R-2a, RDT&E Project Justification
(Exhibit R-2a, page 21 of 24)

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R-1 SHOPPING LIST - Item No. 110-22 of 110-24

Exhibit R-2a, RDT&E Project Justification
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Exhibit R-3 Cost Analysis (page 1)								DATE: June 2001				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA-5			SC-21 Total Ship System Engin/0604300N			Volume Search Radar (VSR) / 32735						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	Sec 845/804	DD 21 Industry Team	0.000	0.000	N/A	28.597	10/00	0.000	N/A	0.000	28.597	
	CPIF	DD 21 FSC	0.000	0.000	N/A	23.000	06/01	37.975	11/01	CONT.	CONT.	
Ancillary Hardware Development												
Systems Engineering												
Licenses												
Tooling												
GFE												
Subtotal Product Development			0.000	0.000		51.597		37.975		CONT.	CONT.	
Remarks:												
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												

R-1 SHOPPING LIST - Item No. 110-23 of 110-24

Exhibit R-3, Project Cost Analysis
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CLASSIFICATION:

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Exhibit R-3 Cost Analysis (page 2)									DATE: June 2001			
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA-5			SC-21 Total Ship System Engin/0604300N			Volume Search Radar (VSR) / 32735						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test and Evaluation	TBD	Various						2.240	11/01	CONT.	CONT.	
	TBD	Land Based Test Site						5.000	11/01	CONT.	CONT.	
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			0.000	0.000		0.000		7.240		CONT.	CONT.	
Remarks: No Developmental or Operational Test and Evaluation will be conducted during FY 1999 through FY 2001.												
Government Engineering Support	WR	NSWC DD Dahlgren, VA	0.000	0.000	N/A	1.300	11/00	0.900	11/01	CONT.	CONT.	
	WR	Various	0.000	0.000	N/A	3.821	11/00	1.040	11/01	CONT.	CONT.	
Program Management Support	C/CPFF	Various	0.000	0.000	N/A	0.212	11/00	0.212	11/01	CONT.	CONT.	
Travel			0.000	0.000	N/A	0.000	11/00	0.000	11/01	CONT.	CONT.	
Subtotal Management			0.000	0.000		5.333		2.152		CONT.	CONT.	
Remarks:												
Total Cost			0.000	0.000		56.930		47.367		CONT.	CONT.	
Remarks:												

R-1 SHOPPING LIST - Item No. 110-24 of 110-24

Exhibit R-3, Project Cost Analysis
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