EXHIBIT R-2, RDT&E Budget Item Justification							DATE: June 2001			
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**					R-1 ITEM NOMENCLATURE Shipboard System Component Development/0603513N					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Total PE Cost	**108.548**	**256.065**	**288.382**							
DC/Survivability/32465	**(1) 0.000**	**(1) 0.000**	**(2) 5.036**							
AGS-Advanced Gun System/32467	**27.357**	**101.020**	**140.285**							
Undersea Warfare (USW)/32468	**13.200**	**21.040**	**25.541**							
Open Systems Architecture (OSA)[3]/32469	**23.508**	**21.906**	**(4) 5.606**							
Integrated Topside Design (ITD)/32470	**15.052**	**14.941**	**(5) 5.396**							
Integrated Power Systems (IPS)/32471	**24.561**	**90.222**	**106.518**							
Man Overboard Indicator/32729	**2.913**	**0.000**	**0.000**							
Ship Survivability & Personnel Protection/32730	**0.978**	**0.000**	**0.000**							
Advanced Water Jet Technology/S2751	**0.979**	**0.000**	**0.000**							
MTTC/IPI/32858	**0.000**	**6.936**	**0.000**							
Quantity of RDT&E Articles	**0**	**0**	**0**							

Notes: (1) (U) In FY 2000 and 2001, funding for this project is contained in PE 0604300N, SC-21 Total Ship Systems Engineering.
(2) (U) Funding for efforts directly related to DD 21 design and systems integration has been reprogrammed from this project to DD 21 Design (PE 0604300N, Project 32464) in FY 2002 and out. Funding for efforts supporting the development of DD 21 ship survivability and auxiliary systems has been reprogrammed to this project from Project 32469 in FY 2002 and out.
(3) Project formerly known as Consolidated Hull, Mechanical, and Electrical (HM&E).
(4) (U) Funding for efforts directly related to DD 21 design and systems integration has been reprogrammed from this project to DD 21 Design (PE 0604300N, Project 32464) in FY 2002 and out. Funding for efforts supporting the development of DD 21 ship survivability and auxiliary systems has been reprogrammed from this project to Project 32465 in FY 2002 and out.
(5) (U) Funding for efforts directly related to DD 21 design and systems integration has been reprogrammed from this project to PE 0604300N, Project 32464 in FY 2002 and out.

* (U) For explanation of Test Articles see Project 32467.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**	R-1 ITEM NOMENCLATURE Shipboard System Component Development/0603513N

A. (U) Mission DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Program Element (PE) was modified in FY 2000 and out to focus on DD 21 associated systems development. Specific DD 21 associated systems development efforts that were realigned under this PE include: the Advanced Gun Systems; Undersea Warfare; Integrated Topside Design; and Integrated Power Systems. In addition, a number of HM&E development tasks were incorporated into a consolidated HM&E Project (32469) focused on DD 21. In FY 00, DD 21 was provided Congressional funding for Man Overboard Indicator, Ship Survivability & Personnel Protection, and Advanced Water Jet Technology. Man Overboard Indicator funds were used to test and evaluate devices that improve the safety of flight and helicopter deck personnel. Ship Survivability & Personnel Protection funds were used for the evaluation of commercial off-the-shelf, non-developmental items(COTS/NDI) for personnel protection and survivability equipment and technologies including personnel locators and NDI devices to facilitate improved casualty response. Advanced Water Jet (AWJ) Technology funds were used to validate the performance of AWJ-21 using hydronumeric modeling and simulation design tools and small scale physical model tests. In FY 2001, PEO (S) was provided funding to perform Manufacturing Technology (MANTECH) studies at the McConnel Technology Transition Center, operated by Innovative Productivity, Inc. (MTTC/IPI). The funds will be used to establish the National Surface Treatment Center which will collect and disseminate surface coating systems application and performance data, qualify surface coating systems for military applications, and develop new coating systems.

(U) In FY 2002 and out, DD 21 design and systems integration elements of Consolidated HM&E (Project 32469) and Integrated Topside Design (Project 32470) were reprogrammed to PE 0604300N, Project 32464. Also in FY 2002 and out, ship survivability and auxiliary system elements of Project 32469 were moved to Project 32465, and Project 32465 was reprogrammed to this PE. This PE focuses on the development of shipboard system components for the DD 21 Class of U. S. Navy surface combatants. 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. It 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.

B. (U) PROGRAM CHANGE SUMMARY:

	FY 2000	FY 2001	FY 2002
(U) FY 2001 President's Budget:	113.474	244.437	317.176
(U) Appropriated Value:	113.334	258.437	
(U) Adjustment to FY 2000/2001 Appropriated Value/ FY 2001 President's Budget:	-4.926	11.628	-28.794
(U) FY 2002 PRES Budget Submit:	108.548	256.065	288.382

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/BA-4**	R-1 ITEM NOMENCLATURE Shipboard System Component Development/0603513N

(U) Funding:
The FY 2000 net decrease of $4.926M is due to Small Business Innovative Research (SBIR) reductions (-$2.421M); a Below Threshold Reprogramming (-$1.600M); realignment of funds to PE 0604300N to fund VSR shortfall (-$2.108M); Congressional Rescission (-$0.445M); and miscellaneous adjustments ($1.648M). The FY 2001 net increase of $11.628M is due to Congressional increases for Permanent Magnet Motor (+$7.000M) and McConnel Technology Transfer Center (+$7.000M), Economic Assumption Reduction (-$1.810M); and Congressional Rescission (-$0.562M). The FY 2002 net decrease of $28.794M is due to program element/project funding realignments within the DD21 program (-$29.461M), NWCF rate adjustments (-$0.391M), Non-pay Inflation adjustments-PBD604 (+$.478M) and miscellaneous minor reductions (+$.580M).

(U) Schedule: See individual projects

(U) Technical Parameters: Technical parameters are contained in the DD 21 Operational Requirements Document (ORD) approved by JROC on 16 October 1997.

EXHIBIT R-2a, RDT&E Project Justification									DATE: **June 2001**	
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Shipboard Sys Component Dev/0603513N**				PROJECT NAME AND NUMBER DC/Survivability/32465					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**(1) 0.000**	**(1) 0.000**	**(2) 5.036**							
RDT&E Articles Qty	**0**	**0**	**0**							

Notes: (1) (U) In FY 2000 and 2001, funding for this project is contained in PE 0604300N, SC-21 Total Ship Systems Engineering, Project 32465.
(2) (U) Funding for efforts directly related to DD 21 design and systems integration has been reprogrammed from this project to DD 21 Design (PE 0604300N, Project 32464) in FY 2002 and out. Funding for efforts supporting the development of DD 21 ship survivability and auxiliary systems has been reprogrammed to this project from Consolidated HM&E (Project 32469) in FY 2002 and out.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project funds development of DD 21 applicable and future surface combatant survivability and damage control (DC)/ firefighting systems and features that reduce vulnerability against weapons (e.g., missiles, mines, torpedoes) and enable effective recovery of mission capability under reduced manning conditions. Additionally, this project supports development of systems that reduce susceptibility to magnetic and acoustic influence mines. The requirements for this project are based on the need to develop affordable, balanced survivability designs that address recent wartime lessons learned and emerging and future threats.

(U) System development areas include: 1) automated degaussing control system that maintains a reduced, constant electromagnetic signature level for an extended deployment and provides on-board, real-time, tactical information on safe operating areas; 2) underwater shock and acoustic main machinery isolation systems that use rafting and semi-active mounts to provide increased survivability while operating in littoral environments; 3) ship design modeling and simulation program that predicts the vulnerability and recoverability response time of the ship, systems, and crew to primary and secondary weapons effects 4) damage tolerant structures that increase hull girder survival against close-in underwater explosions; 5) advanced damage control (DC) and auxiliary system architectures and control methods that enable continued system operation after damage through automated pre and post hit isolation and reconfiguration actions; 6) personnel protection devices that reduce stress and increase performance; and 7) portable firefighting devices that provide for remote operation with a minimally manned fire party.

1. (U) FY 2000 ACCOMPLISHMENTS
- Budgeted in PE 0604300N, Project 32465.

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-4	**Shipboard Sys Component Dev/0603513N**	DC/Survivability/32465

2. (U) FY 2001 PLAN
- Budgeted in PE 0604300N, Project 32465.

3. (U) FY 2002 PLAN
- (U) ($ 0.858) Continue development of survivable, medium voltage, electrical system architectures/components that enable uninterrupted damage control operations and continued combat capability after damage. Develop hardware and software requirements for a fault-clearing device that rapidly isolates the damaged portion of the system preserving power to the surviving electrical components. Prepare software development plan and initiate control logic coding.
- (U) ($ 0.658) Initiate development of survivable control methods and networks for distributed fluid systems (e.g. firemain) that enable automated, reliable isolation and reconfiguration following damage. Initiate evaluation of the survivability of alternative commercial control methods, including component level control, programmable logic controllers, and centralized processing.
- (U) ($ 0.615) Initiate development of machinery isolation systems (structural support raft and shock/acoustic mounts) that enable continued operation after close-in underwater explosion and provide for acoustic quieting. Develop an advanced shock and acoustic mount concept that provides significant shock protection and characterize response.
- (U) ($ 1.450) Continue demonstration of real-time, closed loop degaussing control system aboard USS Higgins, DDG 76. Deperm the USS Higgins and recalibrate the system for maintaining a low magnetic signature. Monitor stability of control algorithm/ system and conduct ranging. (This is a transition of effort from Project 32469, Consolidated HM&E.) Initiate development of a real-time tactical decision aid that provides safe operating areas as a function of the mine threat; prepare software development plan.
- (U) ($ 0.965) Continue development of the ship survivability design modeling and simulation program, Advanced Survivability Assessment Program (ASAP). Complete development of DC/ crew casualty and electrical models. (This is a transition of effort from Project 32469, Consolidated HM&E.) Initiate development of verification and validation (V&V) plan in accordance with applicable guidance. Prepare configuration management and product improvement plans.
- (U) ($0 .490) Close-out the composite pump development contract.

EXHIBIT R-2a, RDT&E Project Justification			DATE: **June 2001**
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Shipboard Sys Component Dev/0603513N**	PROJECT NAME AND NUMBER DC/Survivability/32465	

B. (U) OTHER PROGRAM FUNDING SUMMARY:

COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
SC-21 Total Ship Systems Engineering/0604300N	**160.894**	**289.591**	**334.093**							

C. (U) ACQUISITION STRATEGY:

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-4	**Shipboard Sys Component Dev/0603513N**	DC/Survivability/32465	

D. (U) SCHEDULE PROFILE:

FY 2000	FY 2001	FY 2002
See PE 0604300N Exhibits	See PE 0604300N Exhibits	4Q - Survivable Electrical Power Software Development Plan 4Q- Shock and Acouctic Mount 3Q- Closed Loop Degaussing Ranging 4Q- ASAP DC and Electrical Models

Exhibit R-3 Cost Analysis (page 1) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Shipboard Sys Component Dev/0603513N**	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												
Ancillary Hardware Development												
Systems Engineering												
Product Development												
	WR	NSWC CD Bethesda, MD						4.400	11/01	CONT.	CONT.	
	Various	Other Contractors						0.486	Various	CONT.	CONT.	
Subtotal Product Development								4.886		CONT.	CONT.	

Remarks: See PE 0604300N, Project 32465 Exhibits for FY 00 and FY 01 information.

Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support								0.000		0.000	0.000	

Remarks:

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**		PROGRAM ELEMENT **Shipboard Sys Component Dev/0603513N**				PROJECT NAME AND NUMBER 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	
Remarks:												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support	Various	Various Gov't Activities						0.150	11/01	CONT.	CONT.	
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management								0.150		CONT.	CONT.	
Remarks: See PE 0604300N, Project 32465 Exhibits for FY 00 and FY 01 information.												
Total Cost								5.036		CONT.	CONT.	
Remarks: See PE 0604300N, Project 32465 Exhibits for FY 00 and FY 01 information.												

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Shipboard Sys Component Dev/0603513N**				PROJECT NAME AND NUMBER AGS-Advanced Gun System/32467					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**27.357**	**101.020**	**140.285**							
RDT&E Articles Qty	**0**	**0**	**0**							

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: These funds provide for the development of the Advanced Gun System (AGS) associated with the development of DD 21. The AGS will consist of a major caliber gun, an automated ammunition handling system, and a family of munitions/propelling charges. The AGS will, at a minimum, meet the Land Attack and Surface Dominance Missions assigned to the gun system. The system will provide a high rate of fire (approximately 12 rounds per minute) with a magazine capacity sufficient in size for meeting USMC operational requirements. Land based testing of EDM hardware components to verify system design will commence in FY 2003.

1. (U) FY 2000 ACCOMPLISHMENTS
- (U) ($13.826) Initiated AGS Sub-system design phase.
- (U) ($4.005) Completed AGS munitions concepts; developed performance and interface specifications.
- (U) ($1.600) Developed EDM test fixture.
- (U) ($7.926) Developed Validation and Verification (V&V) tools for AGS.

2. (U) FY 2001 PLAN
- (U) ($60.502) Complete AGS Sub-system design phase.
- (U) ($16.288) Initiate Risk Reduction Phase for AGS munitions; conduct Industry competition based on performance specification.
- (U) ($5.141) Continue EDM text fixture development.
- (U) ($16.500) Continue with the development of V&V tools for AGS and AGS munitions.
- (U) ($2.589) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

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-4	**Shipboard Sys Component Dev/0603513N**	AGS-Advanced Gun System/32467	

3. (U) FY 2002 PLAN:
- (U) ($27.235) Initiate AGS System design.
- (U) ($58.362) Commence EDM fabrication for Gun, magazine, and Control system.
- (U) ($34.237) Complete Risk Reduction Phase for AGS Long Range Land Attack Projectile (LRLAP).
- (U) ($17.751) Validate and verify the suitability and effectiveness of V&V tools for AGS and AGS munitions.
- (U) ($ 2.700) Continue EDM test fixture development.

B. (U) OTHER PROGRAM FUNDING SUMMARY:

COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
SC-21 Total Ship Systems/Engineering/0604300N	**160.894**	**289.591**	**334.093**							

C. (U) ACQUISITION STRATEGY:

(U) The Navy conducted a comparison of concepts for the DD 21 Advanced Gun System, the results of which were reported to Congress by SECNAV on 10/99. The Advanced Gun System will be acquired in conjunction with the DD 21 development schedule. Initial phases will be conducted under section 845/804 other transaction authority. Initial phases include: Phase I – Concept Formulation, Phase II - Initial Prototype Development, Phase III - Subsystem Testing and Validation.

EXHIBIT R-2a, RDT&E Project Justification		DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Shipboard Sys Component Dev/0603513N**	PROJECT NAME AND NUMBER AGS-Advanced Gun System/32467

D. (U) SCHEDULE PROFILE:

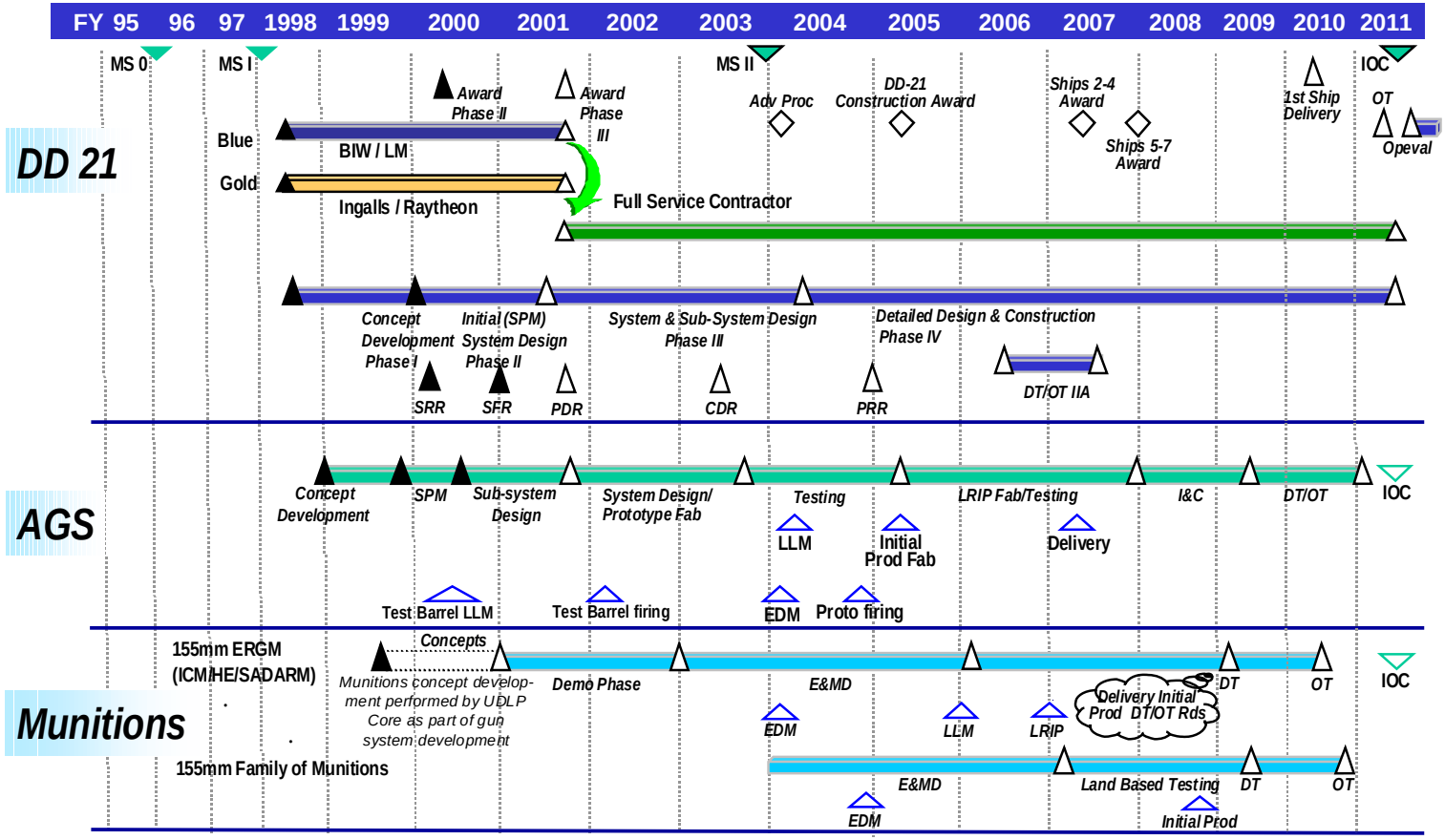

Exhibit R-3 Cost Analysis (page 1) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT	PROJECT NAME AND NUMBER
RDT&E, N/BA-4	**Shipboard Sys Comp Dev/0603513N**	AGS-Advanced Gun System/32467

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	Sec845/804	DD 21 Industry Teams	12.000	22.866	10/99	71.739	10/00	0.000	N/A	0.000	106.605	N/A
	CPIF	DD 21 FSC	0.000	0.000	N/A	25.000	06/01	137.615	11/01	CONT.	CONT.	
Ancillary Hardware Development												
Systems Engineering												
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			12.000	22.866		96.739		137.615		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:

Exhibit R-3 Cost Analysis (page 2) | DATE: **June 2001**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, N/BA-4** | PROGRAM ELEMENT: **Shipboard Sys Comp Dev/0603513N** | PROJECT NAME AND NUMBER: AGS-Advanced Gun System/32467

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: (U) No developmental or operational evaluation is scheduled during this period.												
Contractor Engineering Support												
Government Engineering Support	WR	NSWC DD Dahlgren, VA	0.908	2.660	12/99	2.102	11/00	0.800	11/01	CONT.	CONT.	CONT.
	WR	NSWC PHD Pt Hueneme, CA	0.475	1.189	12/99	1.154	11/00	1.150	11/01	CONT.	CONT.	CONT.
	WR	Other Gov't activities	1.642	0.642	Various	1.025	Various	0.720	Various	CONT.	CONT.	CONT.
Program Management Support												
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management			3.025	4.491		4.281		2.670		CONT.	CONT.	
Remarks:												
Total Cost			15.025	27.357		101.020		140.285		CONT.	CONT.	
Remarks:												

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Shipboard Sys Component Dev/0603513N**				PROJECT NAME AND NUMBER Undersea Warfare (USW)/32468					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**13.200**	**21.040**	**25.541**							
RDT&E Articles Qty	**0**	**0**	**0**							

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: The Undersea Warfare (USW) project provides advanced development demonstration and validation of technology through a build-test-build process for potential surface sonar and combat system application. Efforts focus on resolution of technical issues associated with providing capability against the year 2000 and beyond threat with emphasis on shallow water/littoral area USW and on Demonstration and Validation (DEM/VAL) of DD 21 Integrated Undersea Warfare (IUSW-21) Advanced Development Model (ADM). Key technology areas being investigated include: improvements in signal processing, advanced information processing, and multi-sensor data fusion to improve target detection and classification performance and reduce system manning requirements; and towed array, hull array and transducer technology to improve multi-static operation and in-stride mine avoidance. FY 2001 and subsequent efforts will focus on major technological and performance thrusts for DD 21 USW, which will define surface combatant USW capability for the Navy in the next century. These efforts will continue beyond DD 21 and provide improvements that apply across surface ship USW platform

1. (U) FY 2000 ACCOMPLISHMENTS
- (U) ($6.467) DD 21 Industry Teams - Began DD 21 USW initial system design. Participated in IUSW peer group and evaluated USW technologies.
- (U) ($3.857) IUSW-21 BAA risk reduction contracts/tasks - Exercised FY00 option of Broad Agency Announcements (BAAs) awarded in FY99 to further define advanced information processing for automated detect classify and localize, data fusion, automated environmental adaptation, mine avoidance, and displays for reduced manning.
- (U) ($2.876) IUSW-21 ADM Development - Performed Integrated Peer Group (IPG) engineering reviews of IUSW-21 advanced technologies. Performed IUSW-21 ADM system engineering in preparation for FY02 at sea demonstration. Developed draft interface specifications and draft demonstration plan.

2. (U) FY 2001 PLAN
- (U) ($3.182) DD 21 Industry Teams - Continue DD 21 USW system design. Participate in IUSW peer group and evaluate USW technologies. Prepare for FY 02 At-Sea test.

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-4	**Shipboard Sys Component Dev/0603513N**	Undersea Warfare (USW)/32468	

2. (U) FY 2001 PLAN (CONTINUED):

- (U) ($4.168) IUSW-21 BAA risk reduction contracts/tasks - Exercise FY01 option of BAAs awarded in FY99 and other risk reduction efforts to further define advanced information processing for automated detect classify and localize, data fusion, automated environmental adaptation, mine avoidance, torpedo defense, and displays for reduced manning. Start integration of BAAs into the ADM for the FY02 at sea demonstration.
- (U) ($11.349) IUSW 21 ADM Development - Perform IPG engineering reviews of IUSW-21 advanced technologies. Begin development and integration of IUSW-21 advanced technologies into ADM demonstration system. Finalize ADM interface specifications and sea test demonstration plan.
- (U) ($1.824) FY02 Sea Test - Conduct installation planning and develop TEMPALT. Prepare equipment, buy hardware and integrate Multi-Function Towed Array (MFTA) into ADM.
- (U) ($0.517) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2002 PLAN

- (U) ($5.037) DD 21 Industry Teams - Continue IUSW System Design. Participate in At-Sea test.
- (U) ($4.137) IUSW-21 Risk reduction contracts/tasks - Finish integration of FY99 BAAs into the ADM. Award new BAA contracts to support the build-test-build process and the FY04 sea test. BAAs will further define advanced information processing for automated detect classify and localize, data fusion, automated environmental adaptation, mine avoidance, torpedo defense, and displays for reduced manning.
- (U) ($14.342) IUSW-21 ADM Development - Perform IPG engineering reviews of IUSW-21 advanced technologies. Finish the development and integration of IUSW-21 advanced technologies into ADM demonstration system for FY02 sea test. Begin development of IUSW-21 advanced technologies for the FY04 sea test.
- (U) ($2.025) FY02 Sea Test - Finish equipment preparation. Ship and install equipment. Conduct Test. Collect data and begin data analysis

B. (U) OTHER PROGRAM FUNDING SUMMARY:

COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
SC-21 Total Ship Systems/Engineering/0604300N	**160.894**	**289.591**	**334.093**							

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-4	**Shipboard Sys Component Dev/0603513N**	Undersea Warfare (USW)/32468	

C. (U) ACQUISITION STRATEGY:

(U) In Contracting Phase I and II, DD 21 used Section 845/804 agreement authority for the efforts conducted by the DD 21 Industry Teams. BAAs will be competitively awarded to further refine advanced information processing for automated detect classify and localize, data fusion, automated environmental adaptation, mine avoidance, torpedo defense, and displays for reduced manning to provide further risk mitigation for DD 21 USW activities. In Contract Phase III responsibility for IUSW-21 ADM development for the FY04 and FY05 sea tests will be with the DD 21 Full Service Contractor (FSC).

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-4	**Shipboard Sys Component Dev/0603513N**	Undersea Warfare (USW)/32468

D. (U) SCHEDULE PROFILE:

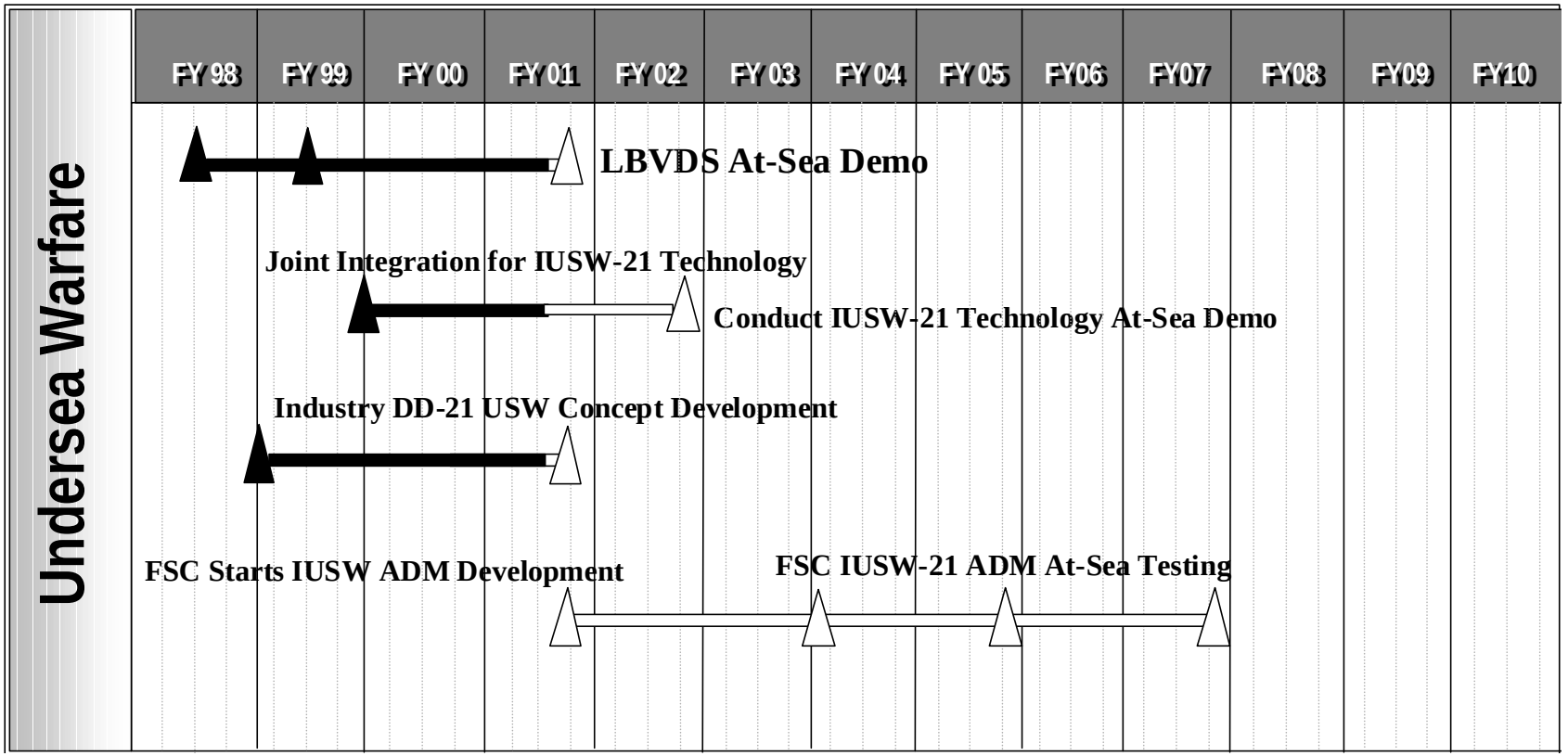

Exhibit R-3 Cost Analysis (page 1)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Shipboard Sys Comp Dev/0603513N**			PROJECT NAME AND NUMBER Undersea Warfare (USW)/32468						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & 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	Sec845/804	DD 21 Industry Teams	2.000	6.467	11/99	3.699	10/00	0.000	N/A	0.000	12.166	
	CPIF	DD 21 FSC	0.000	0.000	N/A	0.000	04/01	5.037	11/01	CONT.	CONT.	
	BAA/CPFF	Competition	6.944	3.857	Various	4.168	Various	4.137	Various	CONT.	CONT.	
Ancillary Hardware Development												
Systems Engineering	C/CPFF	LMC, Syracuse, NY	0.000	0.813	Various	0.000	N/A	0.000	N/A	0.000	0.813	
(ADM Development)	C/CPFF	RSC, Newport, RI	0.000	0.827	Various	0.000	N/A	0.000	N/A	1.000	0.827	
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			8.944	11.964		7.867		9.174		CONT.	CONT.	
Remarks:												
Development Support Equipment												
Software Development	C/CPFF	LMC, Syracuse, NY	0.000	0.000	N/A	5.000	11/00	6.350	11/01	CONT.	CONT.	
(ADM Development)	C/CPFF	RSC, Newport, RI	0.000	0.000	N/A	4.954	11/00	6.350	11/01	CONT.	CONT.	
Training Development												
Integrated Logistics Support												
Configuration Management												
Engineering Support	WR	NUWC/N Newport, RI	1.550	0.528	12/99	0.500	11/00	0.500	11/01	CONT.	CONT.	
(ADM Development)	WR	NSWC DD Dahlgren, VA	0.275	0.075	12/99	0.075	11/00	0.075	11/01	CONT.	CONT.	
	WR	NSWC/CSS, Panama City	0.000	0.000	N/A	0.040	11/00	0.040	11/01	CONT.	CONT.	
	SS/CPFF	APL/JHU Laurel, MD	0.562	0.126	12/99	0.150	11/00	0.150	11/01	CONT.	CONT.	
	SS/CPFF	APL/UW Seattle, WA	0.150	0.100	12/99	0.150	11/00	0.150	11/01	CONT.	CONT.	
	SS/CPFF	ARL/UT Austin., TX	0.150	0.150	12/99	0.150	11/00	0.150	11/01	CONT.	CONT.	
	SS/CPFF	ARL/PSU State Col, PA	0.150	0.066	12/99	0.150	11/00	0.150	11/01	CONT.	CONT.	
GFE												
Subtotal Support			2.837	1.045		11.169		13.915		CONT.	CONT.	
Remarks:												

Exhibit R-3 Cost Analysis (page 2)											DATE: June 2001		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Shipboard Sys Comp Dev/0603513N**			PROJECT NAME AND NUMBER Undersea Warfare (USW)/32468							
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	WR	NUWC/N Newport, RI	0.000	0.000	N/A	0.824	11/00	2.025	11/01	CONT.	CONT.	
	C/CPFF	Competition	0.000	0.000	N/A	1.000	11/00	0.000	N/A	0.000	1.000	
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			0.000	0.000		1.824		2.025		CONT.	CONT.	
Remarks:												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support	GSA	Anteon Arlington, VA	0.231	0.100	12/99	0.100	11/00	0.100	11/01	CONT.	CONT.	
Miscellaneous	PD/WR	Various	0.000	0.091	Various	0.080	Various	0.327	Various	CONT.	CONT.	
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.231	0.191		0.180		0.427		CONT.	CONT.	
Remarks:												
Total Cost			12.012	13.200		21.040		25.541		CONT.	CONT.	
Remarks:												

EXHIBIT R-2a, RDT&E Project Justification							DATE: **June 2001**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Shipboard Sys Component Dev/0603513N**				PROJECT NAME AND NUMBER Open Systems Architecture (OSA)[1] /32469					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**23.508**	**21.906**	**(2) 5.606**							
RDT&E Articles Qty	**0**	**0**	**0**							

Notes: (1) Project formerly known as Consolidated Hull Mechanical and Electrical (HM&E)
(2) (U) Funding for efforts directly related to DD 21 design and systems integration has been reprogrammed from this project to the DD 21 Design line (PE 0604300N, Project 32464) beginning in FY 2002. Funding for efforts supporting the development of DD 21 ship survivability and auxiliary systems has been reprogrammed from this project to the DC/Survivability line (PE 0603513N, Project 32465) beginning in FY 2002.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: In FY 2000 and 2001, this project supports the advanced development of DD 21 HM&E ship survivability, auxiliary machinery, Affordability Through Commonality (ATC) technologies, and systems that will enable DD 21 survivability, manning, and life cycle cost goals to be met. This project also supports several fleet-focused research and development efforts. Beginning in FY 2002, DD 21 design and systems integration elements of this project have been shifted to PE 0604300N, Project 32464, and ship survivability and auxiliary system elements were moved to PE 0603513N, Project 32465. As a result, beginning in FY 2002, this project will focus on the development of open systems architecture for PEO(S), with the efforts for several fleet-focused initiatives continuing as well. The following provides a mission description for each major development area (i.e., Survivability, Auxiliary, and Affordability):

(U) Survivability: The survivability area supports development of systems and protection concepts that reduce vulnerability to conventional weapons and peacetime accidents and enables, under reduced manning conditions, a rapid recovery of mission capability. Development categories include damage control computer-based systems that provide for rapid systems restoration, fire protection devices that improve probability of ship survival with a reduced crew, and ship protection concepts that reduce magazine and commercial equipment vulnerability.

(U) Auxiliary: For existing and future ships, this funding: 1) improves reliability/maintainability of fluid, electrical, and mechanical systems and 2) supports reduced manning through automation of operational, maintenance, and day-to-day functions traditionally performed by the crew, and supports development of auxiliary systems to reduce ship magnetic signature and vulnerability to mines.

(U) Affordability Through Commonality: The Affordability Through Commonality program promotes and enables the PEO(S) implementation of Total Open Systems Architecture (TOSA) solutions that result in mission, technology, and market adaptability and increased competition to achieve reduced Total Ownership Costs. Working with industry, other NAVY acquisition programs and the Fleet, ATC focus areas are total open systems architecture interfaces, processes, and business cases; market research and projections; and technology insertion.

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-4	**Shipboard Sys Component Dev/0603513N**	Open Systems Architecture (OSA)/32469

1. (U) FY 2000 ACCOMPLISHMENTS:

(U) SURVIVABILITY/AUXILIARY SYSTEMS:
- (U) ($1.389) Completed evaluation/fabrication of Auxiliary Multi-Function Power Module (AMF PM). Completed development of the Integrated Magazine Protection System (IMPS) technologies. Completed laboratory demonstration of automated chilled water and other auxiliary systems with component level control. Validated design tools. Continued development of the time-dependent, computer-based Advanced Survivability Assessment Program (ASAP) for use in evaluating ship designs. Completed development of the ASAP fire and smoke model and continued development of the crew casualty/damage control model. Continued full scale testing aboard the DDG 76 of the advanced closed loop degaussing system. Completed development of the ROV power system.
- (U) ($12.366) Began initial system design and engineering of DD 21 survivability/auxiliary systems.

(U) AFFORDABILITY THROUGH COMMONALITY:
- (U) ($2.304) Across Program Total Ship Open Systems Architecture: Continued Navy-Industry effort to develop, demonstrate, validate and implement fleet-wide open systems architectures (OSA) and non-proprietary standard interfaces. The OSA will employ commercial processes and commercial off the shelf material and equipment to the greatest extent practicable. Continued to refine the Total Ship Open Systems Architecture Framework, including improved guidance on the architecture definition, definition of standard interfaces, and market surveillance and technology projection processes. Continued to define risk mitigation and demonstration and validation projects for the TOSA concept.
- (U) ($4.611) Continued Total Ship Open System Architecture Demonstration and Validation.

(U) FUEL CELL
- (U) ($0.400) Developed conceptual/preliminary designs of 2.5 megawatt (MW) Ship Service Fuel Cell (SSFC) Power Module and initiated detailed design of 0.5 MW reduced scale demonstrator.

(U) SALVAGE AND UNDERWATER SHIP HUSBANDRY
- (U) ($0.500) Initiated development of improved Shaft Coating System and Smart Tow Monitoring System.

(U) TOC INITIATIVES
- (U) ($1.938) Initiated development of improved commercial-based distribution systems, composite components, and improved ventilation methods/materials that reduce sailor workload.

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-4	**Shipboard Sys Component Dev/0603513N**	Open Systems Architecture (OSA)/32469

2. (U) FY 2001 PLAN:

(U) SURVIVABILITY/AUXILIARY SYSTEMS:

- (U) ($2.320) Continue development of the time-dependent, computer-based ASAP for use in evaluating ship designs. Continue development of the ASAP crew casualty/damage control model. Continue full scale testing aboard the DDG 76 of the advanced closed loop degaussing system; update prediction algorithm. Continue development of advanced auxiliary systems, components, and control systems.
- (U) ($8.967) Complete initial system design and engineering of DD 21 survivability/auxiliarysystems. Begin system/subsystem development of survivability/auxiliary systems.

(U) AFFORDABILITY THROUGH COMMONALITY:

- (U) ($0.916) – TOSA Business Architecture, Process, Impact Assessments: Continue development with Industry of TOSA architectures, framework, and processes for Fleet-wide implementation of open systems architecture in support of future DD 21 use. Continue development of new business architecture, business case analyses, and strategies for TOSA implementation for cross-platform application. Document metrics to assess system architecture openness for technology upgradability and competition. Complete prioritization with Industry of high payoff opening candidates.
- (U) ($0.889) – Total Open Systems Architecture Implementation: Transition TOSA concepts with Industry to the existing and future Fleet in support of future DD 21 use. Complete the engineering development of Open C4ISR Zone concepts for surface combatants and implementation in support of future DD 21 use. Complete development of architecture concepts for open sensor interfaces for surface combatants. Complete development of architecture interface requirements for Advanced TOSA concepts selected with Industry for surface combatants.
- (U) ($5.603) – Complete Total Ship OSA Concept Demonstration and Validation for DD 21 Initial System Design.

(U) FUEL CELL

- (U) ($0.474) Complete design and initiate fabrication of 0.5 MW reduced scale demonstrator. Using current designator, initiate ship impact assessment and cost analysis of SSFC for notional ships and compare with IPS baseline.

(U) SALVAGE AND UNDERWATER SHIP HUSBANDRY

- (U) ($0.379) Continue development of the Smart Tow Monitoring System and materials to be used in the Improved Shaft Coating System.

(U) TOC Initiatives

- (U) ($1.895) – Continue development of composite components and improved ventilation methods/materials that reduce sailor workload for the existing Fleet.

- (U) ($0.463) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

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-4	**Shipboard Sys Component Dev/0603513N**	Open Systems Architecture (OSA)/32469

3. (U) FY 2002 PLAN:

(U) AFFORDABILITY THROUGH COMMONALITY:

- (U) ($1.733) TOSA Business Architecture, Process, Impact Assessments: Complete prioritized projections of technology, operational and technical architectures, regulatory, market and cost drivers, benchmarking and market research for use in assessing PEO(S) system's architecture and interface openness. Complete processes and metrics to assess system architecture and interface openness for technology insertion and competition. Develop with industry the TOSA architectures, framework, and processes for PEO(S) implementation of open systems architecture: Complete new business architecture, business case analyses, and strategies for TOSA implementation. Complete economic and other assessments of TOSA implementation for DD-21.

- (U) ($2.197) TOSA Implementation: Transition TOSA concepts with industry. Complete the engineering development and impact assessments of C4I Zone Open Structure and Cooling for surface combatants in support of future DD 21 use. Complete the engineering development and impact assessments of Open Data implementation in support of DD 21 use. Complete the engineering development of open vehicle/material interfaces for surface combatants and implementation of existing surface combatants in support of DD 21 use. Complete development of open sensor interfaces in support of DD 21 use.

(U) FUEL CELL

- (U) ($0.986) Continue SSFC ship impact assessments and model analysis of molten carbonate reduced scale demonstrator and PEM integrated fuel processor.

(U) SALVAGE AND UNDERWATER SHIP HUSBANDRY

- (U) ($0.394) Perform prototype assembly and testing for the Smart Tow Monitoring System. Continue development of materials for the improved Shaft Coating System. Acquire application hardware for the improved Shaft Coating System.

(U) TOC INITIATIVES

- (U) ($0.296) – Continue development of improved fuel system training that reduce's sailor workload for the existing fleet.

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-4	**Shipboard Sys Component Dev/0603513N**	Open Systems Architecture (OSA)/32469	

B. (U) OTHER PROGRAM FUNDING SUMMARY:

COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
SC-21 Total Ship Systems/Engineering/0604300N	**160.894**	**289.591**	**334.093**							

C. (U) ACQUISITION STRATEGY:

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-4	**Shipboard Sys Component Dev/0603513N**	Open Systems Architecture (OSA)/32469	

D. (U) SCHEDULE PROFILE:

PROGRAM MILESTONES	FY 2000	FY 2001	FY 2002
Survivability/Auxiliary Systems Fuel Cell Salvage and Underwater Ship Husbandry TOC Initiatives	1Q Initial System Design 4Q ASAP Fire and Smoke Model 4Q Complete ROV Power System study and monitor thrusters 4Q 2.5 MW Ship Service Fuel Cell Power Module 2Q Initiate Smart Tow Monitoring System 3Q CLDG Ranging of DDG 76 4Q Validate Chilled Water Simulation & Design Tools 2Q Initiate Improved Shaft Coating System 4Q Complete AMF PM	1Q System/Subsystem Development 4Q ASAP Crew Casualty/DC Model 4Q SSFC Ship Impact Assessments	4Q SSFC Fuel Cell and Processor assessments

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-4	**Shipboard Sys Component Dev/0603513N**	Open Systems Architecture (OSA)/32469

PROGRAM MILESTONES	FY 2000	FY 2001	FY 2002
Affordability Through Commonality (ATC)	4Q Open Systems Architecture Guidance development 4Q SEALINK TRANSITION 4Q DD21 Alliance Teams Flexibility, Upgradability, Supportability, Adaptability preliminary design efforts & technology transfer 4Q Advanced material handling Architectures 4Q Advanced Accommodation Architectures 4Q Open C4ISR Zone concept development 4Q Open Structure Technology Development 4Q Open distributed data interface development	2Q Complete TOSA process and strategy 2Q Complete engineering development of C4ISR Zone Open Foundations 2Q Concept for open sensor and C4ISR Zone data architecture and interfaces 4Q TOSA business case and impact assessments 4Q Concept for open C4ISR Zone electric architecture and interfaces 4Q DD 21 Alliance Teams technology transfer and assessments	1Q Initiate technology, operational and technical architectures, regulatory, market and cost driver projections 2Q Refined TOSA business architecture and metrics 2Q Complete implementation of C4ISR Zone Open Foundations 2Q Open sensor interface requirements 4Q TOSA Process and economic impact assessments complete 4Q Interface requirements for C4ISR Zone open distributed data and electric for surface combatants 4Q DD 21 Industry team partnering and assessments

Exhibit R-3 Cost Analysis (page 1)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Shipboard Sys Comp Dev/0603513N**			PROJECT NAME AND NUMBER Open Systems Architecture (OSA)/32469						
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
SURVIVABILITY												
Primary Hardware Development												
Product Development	Sec845/804	DD 21 Industry Teams	2.020	12.366	11/99	8.967	10/00			0.000	23.353	
	WR	NSWC CD Bethesda, MD	6.848	1.000	Various	2.000	Various			0.000	9.848	
	Various	Other Govt Activities	4.354	0.389	Various	0.687	Various			0.000	5.430	
	Various	Other Contractors	2.635	0.000	Various	0.096	Various			0.000	2.731	
Ancillary Hardware Development												
Systems Engineering												
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Survivability			15.857	13.755		11.750		0.000		0.000	41.362	
Remarks: Funding for survivability efforts was reprogrammed to PE 0603513N, Project 32465 in FY 2002 and out.												
AFFORDABILITY THROUGH COMMONALITY (ATC)												
Engineering Dev, Demo & Eval	Sec845/804	DD-21 Industry Teams	2.500	4.611	11/99	5.603	10/00	0.000	N/A	0.000	12.714	
	WR	NSWC CD Bethesda, MD	4.936	1.739	10/99	0.800	10/00	0.800	11/01	CONT.	CONT.	
	RC	NSWC CD Bethesda, MD	2.034	0.393	10/99	0.801	11/00	0.950	11/01	CONT.	CONT.	
	Various	Other Govt Activities	2.113	0.172	10/99	0.204	10/00	0.730	11/01	CONT.	CONT.	
	Various	Other Contractors	3.041	0.000	Various	0.000	Various	1.450	11/01	CONT.	CONT.	
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal ATC			14.624	6.915		7.408		3.930		CONT.	CONT.	
Remarks: Funding for DD 21 Industry Teams has been reprogrammed to DD 21 Design (PE 0604300N, Project 32464) in FY 2002 and out.												

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Shipboard Sys Comp Dev/0603513N**			PROJECT NAME AND NUMBER Open Systems Architecture (OSA)/32469						
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:												
AUXILIARY SYSTEMS, FUEL CELL, SALVAGE AND UNDERWATER SHIP HUSBANDRY, TOC INITIATIVES												
Contractor Engineering Support												
Product Development	SEC 845/804	DD 21 Industry Teams	4.950	0.000	11/99	0.000	N/A	0.000	N/A	0.000	4.950	
	WR	NSWC CD Bethesda, MD	9.734	1.369	11/99	0.890	11/00	0.000	N/A	CONT.	CONT.	
	WR	NSWC CD Philadelphia, PA	0.000	0.743	11/99	0.944	11/00	1.282	11/01	CONT.	CONT.	
	Various	Other Govt Activities	0.811	0.726	11/99	0.465	N/A	0.000	N/A	CONT.	CONT.	
	Various	Other Contractors	0.624	0.000	N/A	0.449	Various	0.394	11/01	CONT.	CONT.	
Program Management Support												
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Auxiliary Systems			16.119	2.838		2.748		1.676		CONT.	CONT.	
Remarks: Funding for auxiliary system efforts was reprogrammed to PE 0603513N, Project 32465 in FY 2002 and out.												
Total Cost			46.600	23.508		21.906		5.606		CONT.	CONT.	
Remarks:												

EXHIBIT R-2a, RDT&E Project Justification									DATE: **June 2001**	
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Shipboard Sys Component Dev/0603513N**				PROJECT NAME AND NUMBER Integrated Topside Design (ITD)/32470					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**15.052**	**14.941**	**(1) 5.396**							
RDT&E Articles Qty	**0**	**0**	**0**							

Note (1): (U) Funding for efforts directly related to DD 21 design and systems integration has been reprogrammed from this project to the DD 21 Design line (PE 0604300N, Project 32464) beginning in FY 2002.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project develops and integrates the necessary technologies to achieve a total integrated topside design focused on DD 21 and future surface combatant ships. Technology areas including topside signature control, sensor and antenna integration, weapon system integration, HM&E integration, related decision-making tools, and composite materials will be addressed. Other stand alone technology programs will be integrated with this effort to assure total ship systems integration for future ship design efforts. Surface combatants will need an added (stealth) layer of defense to support hardkill and softkill systems in defeating future threats. Composite materials that provide improved corrosion control and enable reduced maintenance and reduced manning will also be considered. This project also develops improved equipments that are small but critical components of non-propulsion HM&E systems. This program is directed toward improved affordability, performance, reduced life cycle cost, reliability and maintainability, signature reduction, standardization, and weight and manning reductions for the existing and future fleet. In FY 2002 and out, DD 21 design and systems integration elements of this project have been shifted to PE 0604300N, Project 32464.

1. (U) FY 2000 ACCOMPLISHMENTS:
- (U) ($2.420) Continued validation of composite material design procedures and revision of the PC-based composite materials database. Continued evaluation of composite materials for their corrosion control and reduced maintenance attributes. Continued development of Radar Cross Section (RCS), Infra-red (IR), and Electronic Warfare (EW) prediction codes. Validated and improved EM Engineering Tools. Developed Infrared Signature Database Update. Validated and published Low Observable (LO) Model scaling techniques.
- (U) ($9.803) Initiated engineering efforts required to begin initial system design of an Integrated Topside Design for DD 21.
- (U) ($0.910) Continued development of affordable HM&E machinery and architectures for existing and future fleet. Completed advance gas turbine generator set feasibility design study. Completed specification for heat pipe based bleed air heat exchanger. Completed composite ball valve development, issued final report and delivered ILS package. Initiated investigation of hydrogen power generation and alternate power sources for future platforms.

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-4	**Shipboard Sys Component Dev/0603513N**	Integrated Topside Design (ITD)/32470	

- (U) ($1.919) Collect and analyze existing surface combatant topside design issues for application to future generation ships with sensor and communication systems that support future Time Critical Strike and Land Attack weapon systems delivery systems and conduct an assessment using Fleet Battle Experiment India experience.

2. (U) FY 2001 PLAN:
- (U) ($3.421) Continue validation of composite material design procedures materials database. Continue development of RCS, IR, and EW prediction codes. Continue to validate and improve EM Engineering Tools.
- (U) ($10.238) Complete engineering efforts required for initial system design of DD 21 ITD. Begin ITD system/subsystem design for DD 21.
- (U) ($0.947) Complete investigation of hydrogen fuel and other alternate shipboard power sources. Continue development of affordable HM&E machinery and architectures for existing and future fleet and create HM&E future machinery development roadmaps.
- (U) ($0.335) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

3. (U) FY 2002 PLAN:
-(U) ($0.760) Continue development of RCS, IR, and EW prediction codes. Continue validation of composite material design procedures materials database.
-(U) ($3.636) Continue to validate and improve EM Engineering Tools. Continue validation of composite material design procedures materials database.
-(U) ($1.000) Continue development of affordable HM&E machinery and architectures for existing fleet.

COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
SC-21 Total Ship Systems/Engineering/0604300N	**160.894**	**289.591**	**334.093**							

C. (U) ACQUISITION STRATEGY:

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-4	**Shipboard Sys Component Dev/0603513N**	Integrated Topside Design (ITD)/32470	

D. (U) SCHEDULE PROFILE:

PROGRAM MILESTONES

FY 2000	FY 2001	FY 2002
4Q EM Engineering Tool Validation & Upgrade	2Q Hydrogen assessment report	4Q HM&E assessment report and roadmap
4Q RCS, IR, EW Code Updates	4Q RCS/IR/EW Code Updates	
4Q Composite Design Guide Updates	4Q EM Engineering Tool Validation & Improvement	
2Q G.T. Genset Assessment Report	4Q Composite Design Guide Updates	
4Q 2 Way ball valve ILS package	4Q HM&E future machinery roadmap	
4Q Heatpipe heat exchanger performance specifications		

Exhibit R-3 Cost Analysis (page 1)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Shipboard Sys Comp Dev/0603513N**			PROJECT NAME AND NUMBER Integrated Topside Design/32470						
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	Sec845/804	DD 21 Industry Teams	4.515	9.803	11/99	10.238	11/00	0.000	N/A	0.000	24.556	
Ancillary Hardware Development												
Systems Engineering												
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			4.515	9.803		10.238		0.000		0.000	24.556	
Remarks: Funding for DD 21 Industry Teams has been reprogrammed to DD 21 Design (PE 0604300N, Project 32464) in FY 2002 and out.												
Engineering Support	Various	Gov't Activities	14.005	4.545	12/99	3.203	Various	5.096	Various	CONT.	CONT.	
	Various	Contractors	2.430	0.529	12/99	0.100	11/00	0.200	11/01	CONT.	CONT.	
	WR	NSWC CD Bethesda	0.000	N/A	N/A	1.400	10/00	N/A	N/A	CONT.	CONT.	
Software Development	C/CPFF	TBD	2.146	0.175	12/99	0.000	N/A	0.100	12/01	CONT.	CONT.	
Development Support Equipment												
Software Development												
Training Development												
Integrated Logistics Support												
Configuration Management												
Technical Data												
GFE												
Subtotal Support			18.581	5.249		4.703		5.396		CONT.	CONT.	
Remarks:												

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Shipboard Sys Comp Dev/0603513N**			PROJECT NAME AND NUMBER Integrated Topside Design/32470						
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												
Program Management Support												
Miscellaneous												
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.000	0.000		0.000		0.000		CONT.	CONT.	
Remarks:												
Total Cost			23.096	15.052		14.941		5.396		CONT.	CONT.	
Remarks:												

EXHIBIT R-2a, RDT&E Project Justification								DATE: June 2001		
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Shipboard Sys Component Dev/0603513N**				PROJECT NAME AND NUMBER Integrated Power Systems (IPS)/32471					
COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
Project Cost	**24.561**	**90.222**	**106.518**							
RDT&E Articles Qty	**0**	**0**	**0**							

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project supports the Integrated Power Systems (IPS) program. IPS provides total ship electric power, including electric propulsion, power conversion and distribution, and mission load interfaces to the electric power system. IPS supports multiple ship class applications for future surface ships, with DD 21 being the primary ship application target. On 6 January 2000, SECNAV announced Navy intent that DD 21 be an electric drive ship with integrated power architecture. The goals of the IPS are to reduce acquisition and operating costs of naval ships and increase military effectiveness. These goals are to be accomplished by leveraging investments in technologies that will be useable by both military and commercial sectors.

- (U) IPS has the potential to revolutionize the design, construction, and operation of U.S. naval ships by using electricity as the primary energy transfer medium aboard ship. The flexibility of electric power transmission allows power generating modules with various power ratings to be connected to propulsion loads and ship service in any arrangement that supports the ship's mission at lowest overall cost. Systems engineering in IPS is focused on increasing the commonality of components used across ship types and in developing modules which will be integral to standardization, zonal system architectures, and generic shipbuilding strategies. The purpose of increased commonality is to reduce the total cost of ship ownership by using common modules composed of standard components and/or standard interfaces.

- (U) IPS addresses ship platform program goals through: reduced ship acquisition cost through integration of propulsion and ship's service prime movers; lower ship operational costs resulting from more flexible operating characteristics and more efficient components; reduced ship construction costs by allowing more extensive modular construction of power generation, distribution, and loads; improved ship survivability and reduced vulnerability through increased arrangement flexibility and improved electrical system survivability; reduced manning through improved power management systems and reduced on-board maintenance requirements; improved ship signature characteristics; improved design adaptability to meet future requirements of multiple ship types or missions; integrating power management and protection by fully utilizing the power electronics in the system to perform fault protection as well as power conversion and load management functions; simplified technology insertion which allows new technologies to be installed within IPS much less expensively than presently possible; and, reduced machinery system acquisition costs through utilization of commercially shared technologies and components. The efforts in this project are divided into three major areas as follows:

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-4	**Shipboard Sys Component Dev/0603513N**	Integrated Power Systems (IPS)/32471

- (U) System development: consists of the efforts necessary to develop and demonstrate broadly applicable warfighting improvements and cost reductions as well as related efforts for ship platform and mission load interface applications.

- (U) Platform Specific Development: includes all efforts to design, develop, qualify, and test integrated power system equipment for ship specific application including DD 21. This includes Permanent Magnet (PM) motor and motor drive technologies

- (U) At Sea Testing: At Sea Testing of IPS subsystems and components will be conducted on the RV Triton Trimaran Demonstrator developed and built under a US/UK cooperative Memorandum of Understanding (MOU) signed 3 September 1997. The RV Triton was launched on 6 May 2000 under the contract for construction awarded in July 1998. The RV Triton is constructed with a commercial electric drive system as well as provisions for fitting and testing of IPS components. Initial testing on the RV Triton is non-IPS and will focus on Naval Architectural and sea-keeping aspects of the trimaran hull form. An opportunity for the US to backfit IPS components and conduct follow-on at sea testing is built into the MOU. The US financial contribution to the MOU is also funded from this project. The efforts in this project support the procurement, installation, and at sea testing of IPS components on the RV Triton.

1. (U) FY 2000 ACCOMPLISHMENTS:

- (U) ($13.140) Systems Development: Continued IPS design, development, and integration including performance analysis and testing, modeling and simulation, life cycle cost analysis, producibility studies, manning studies, module development, ship integration, architecture design and related efforts. Completed Advanced Development (AD) Phase I Land Based Engineering Site (LBES) data analyses and issued Phase I test reports. Completed AD Phase II testing at NSWCCD, Philadelphia, PA that included controls and power management upgrades, demonstrated ship service system operation through various modes, and incorporated multi-workstation control and automated reconfiguration. Awarded 804/845 Agreements in December 1999 for Integrated Fight Through Power (IFTP). IFTP Agreements were awarded to mitigate potential risks associated with a fielded IPS system. Efforts included review and modification of IFTP requirements to better leverage commercial product lines, completed preliminary design, and began detailed design of hardware required to replace Functional Equivalent Modules (FEMs) and populate IPS baseline configuration for fight through power and survivability testing. Continued propulsion motor analysis using the reduced scale Laboratory Drive Motor. Conducted mission load interface survivability, availability, and survivability studies. Continued development of VSD motor controller for auxiliary applications. In conjunction with United Defense, DD21 gun system manufacturer, and Raytheon, DD21 multi-functioning radar (MFR) manufacturer, provided recommendations that optimize power interfaces of their respective system. Provided characterization of IPS configurations for the range of ship variants in support of JCC (X) Design Ship Study Group Phase I studies. Began development of notional command ship power requirements. Refined IPS designs for JCC (X) ship variants that were carried into Phase II studies. Initiated definition and characterization of IPS configurations for LH (X) pre-MS 0 preparatory studies. Initiated development of ship power system Smart Product Model to support cost/performance tradeoffs of alternative IPS ship configurations and evaluation of emerging electric power system and component technologies.

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-4	**Shipboard Sys Component Dev/0603513N**	Integrated Power Systems (IPS)/32471

- (U) ($10.971) Platform Specific Development: DD 21 industry teams evaluated alternative DD 21 power system configurations. Completed concept studies and began preliminary design of competing PM motors and motor drives. Began IPS platform specific risk reduction.

- (U) ($0.450) At Sea Testing: Initiated IPS systems requirements definition and began development of IPS control system requirements for use during at-sea testing.

2. (U) FY 2001 PLAN

- (U) ($32.322) Systems Development: Continue IPS design, development, and integration including performance analysis and testing, modeling and simulation, life cycle cost analysis, producibility studies, manning studies, module development, ship integration, architecture design and related efforts. Conduct AD Phase III testing at NSWCCD, Philadelphia PA. Demonstrate the total system operation through various modes and the survivability and zonal isolation/fight through features of the advanced development system. Demonstrate automated system reconfiguration and start up. Continue IFTP and solid state power conversion efforts to mitigate potential risks associated with a fielded IPS system. Efforts include completing detailed design and risk reduction and begin fabrication of hardware required to populate IPS baseline configuration fight through testing. Conduct initial combat systems/survivability demonstration to show improved performance and potential to reduce combat system costs. Test and demonstrate VSD motor controller for auxiliary applications. Continue IPS configuration development in support of JCC (X) Design Ship Study Group Phase II studies and AoA. Continue support for LH (X) studies. Initiate development/modification of IPS ship configuration documentation including CONOPS, System Level Description/Requirements, and module performance specifications as necessary to support power system requirements for JCC (X). Continue development of ship power system Smart Product Model to support cost/performance tradeoffs of alternative IPS ship configurations and evaluation of emerging electric power system and component technologies.

- (U) ($52.276) Platform Specific Development: Complete preliminary design of competing PM motors and motor drives and incorporate preferred motor options into DD 21 IPS system designs. Begin detailed design of PM motor and PM motor risk reduction. DD 21 industry teams finalize proposed configurations. Navy evaluate competing DD 21 team proposals and down-select to single vendor. Selected vendor to: continue detailed ship system design of DD 21 IPS system and DD21 IPS system risk reduction, and begin ordering Long Lead Material (LLM).

- (U) ($3.550) At Sea Testing: Perform preliminary design of RV Triton IPS components. Begin detailed design of hardware required for at sea testing. Continue development of IPS control system for use during at-sea testing.

- (U) ($2.074) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

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-4	**Shipboard Sys Component Dev/0603513N**	Integrated Power Systems (IPS)/32471	

3. (U) FY 2002 PLAN:

- (U) ($11.892) Systems Development: Continue IPS design, development, and integration including performance analysis and testing, modeling and simulation, life cycle cost analysis, producibility studies, manning studies, module development, ship integration, architecture design and related efforts. Continue to demonstrate automated system reconfiguration and start-up. Continue IFTP efforts to mitigate potential risks associated with a fielded IPS system. Efforts include continuing hardware fabrication and conducting factory acceptance testing of hardware required to populate IPS baseline configuration for fight through testing. Begin modification of test site design for IPS integrated fight through power testing at NSWCCD, Philadelphia PA. Evaluate emerging technologies for ship applications to determine future feasibility and development requirements. Emerging technologies include technologies such as fuel cells and power electronics. Conduct combat systems/survivability demonstration to show improved performance and potential to reduce combat system costs. Continue IPS configuration development in support of JCC (X) and LH (X) ship programs. Continue to develop/modify IPS ship configuration documentation including CONOPS, System Level Description/Requirements, and module performance specifications as necessary to support power system requirements for JCC (X) and LH (X). Continue development of ship power system Smart Product Model to support cost/performance tradeoffs of alternative IPS ship configurations and evaluation of emerging electric power system and component technologies.

- (U) ($91.526) Platform Specific Development: Complete detailed ship system design of DD 21 IPS system. Complete detailed design of PM motor. Continue PM motor and DD 21 IPS system risk reduction. Begin fabrication of full scale PM motor. Continue ordering other material for test. Determine representative test hardware configuration and begin modification of test site design for IPS qualification and testing at NSWCCD, Philadelphia PA.

- (U) ($3.100) At Sea Testing: Complete detailed design and begin procurement of hardware required for at sea testing. Continue detailed development and design of the RV Triton IPS configuration for at sea testing. Continue development of IPS control system modifications for use during at-sea testing.

B. (U) OTHER PROGRAM FUNDING SUMMARY:

COST ($ in Millions)	FY 2000	FY 2001	FY 2002							
SC-21 Total Ship Systems/Engineering/0604300N	**160.894**	**289.591**	**334.093**							

C. (U) ACQUISITION STRATEGY:

(U) IPS is a candidate system for DD 21 and all other future surface ships.

EXHIBIT R-2a, RDT&E Project Justification		DATE: June 2001
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**	PROGRAM ELEMENT NAME AND NUMBER **Shipboard Sys Component Dev/0603513N**	PROJECT NAME AND NUMBER Integrated Power Systems (IPS)/32471

D. (U) SCHEDULE PROFILE:

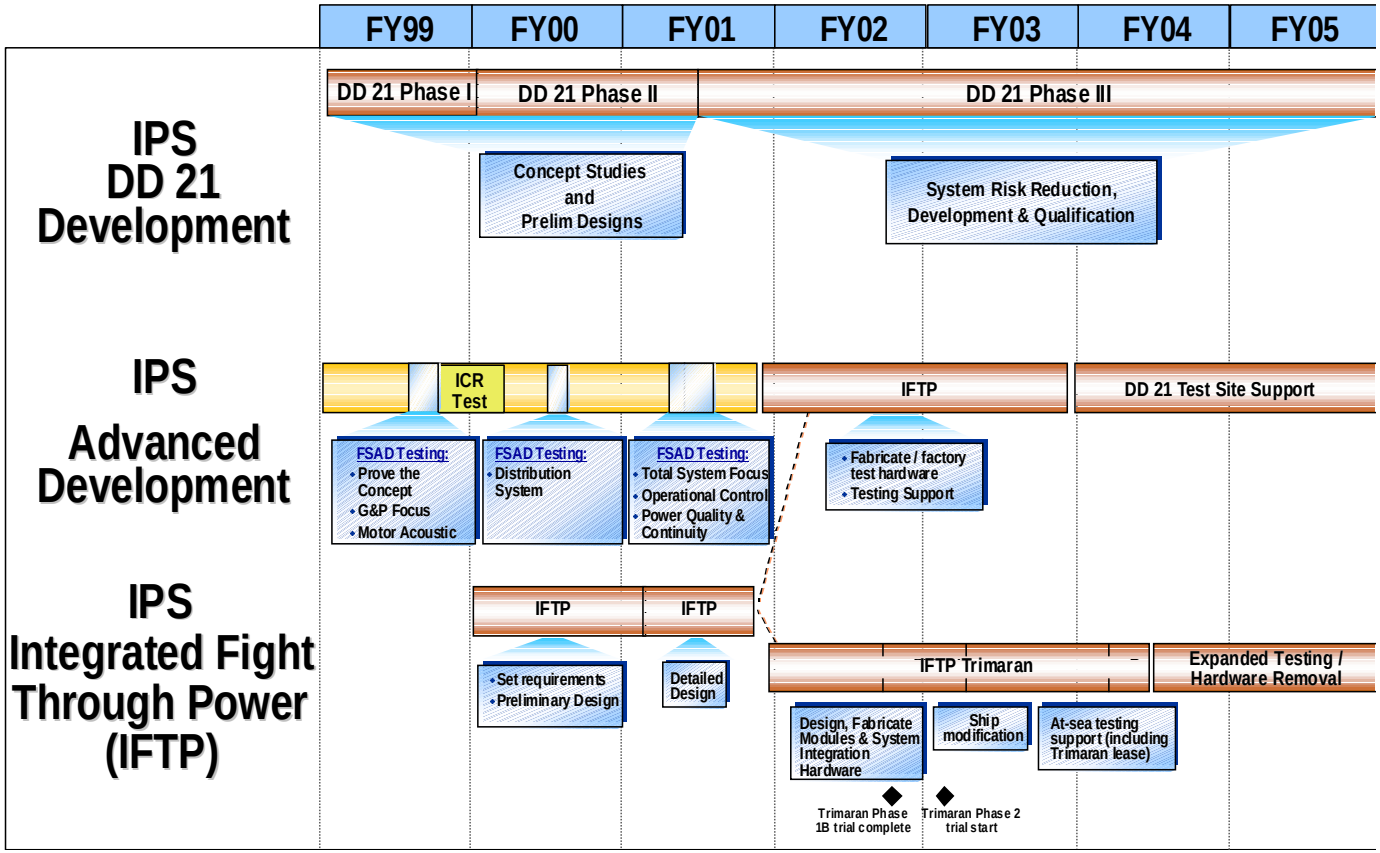

Exhibit R-3 Cost Analysis (page 1)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N/BA-4			**Shipboard Sys Comp Dev/0603513N**			Integrated Power System/32471						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract 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	C/CPAF	Lockheed M Syracuse, NY	22.072	0.000	N/A	2.500	02/01	0.000	01/02	CONT.	CONT.	
	Sec845/804	DD 21 Industry Teams	4.000	10.971	11/99	10.154	01/01	0.000	N/A	0.000	25.125	
	CPIF	DD 21 FSC	0.000	0.000	N/A	42.122	06/01	91.526	11/01	CONT.	CONT.	
	Sec845/804	IFTP Teams	1.200	2.248	12/99	24.337	12/00	11.042	12/01	CONT.	CONT.	
	US/UK MOU	DERA, UK	0.000	0.000	N/A	1.550	12/00	0.550	12/01	CONT.	CONT.	
	WR	NSWCCD Philadelphia, PA	7.888	3.911	12/99	6.100	12/00	1.800	12/01	CONT.	CONT.	
	MISC	Other Contractors	2.685	3.038	12/99	1.294	12/00	0.900	12/01	CONT.	CONT.	
	MISC	Other Govt Activities	0.845	0.180	12/99	0.100	12/00	0.100	N/A	CONT.	CONT.	
Ancillary Hardware Development												
Systems Engineering												
Licenses												
Tooling												
GFE												
Subtotal Product Development			38.690	20.348		88.157		105.918		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:												

Exhibit R-3 Cost Analysis (page 2)								DATE: **June 2001**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N/BA-4**			PROGRAM ELEMENT **Shipboard Sys Comp Dev/0603513N**			PROJECT NAME AND NUMBER Integrated Power System/32471						
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	WR	NSWC CD Philadelphia, PA	9.038	4.100	12/99	1.940	12/00	0.500	12/01	CONT.	CONT.	
Operational Test & Evaluation												
Tooling												
GFE												
Subtotal T&E			9.038	4.100		1.940		0.500		0.000	CONT.	
Remarks:												
Contractor Engineering Support												
Program Management Support												
Miscellaneous	Various	Various	0.201	0.113	12/99	0.125	12/00	0.100	12/01	CONT.	CONT.	
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.201	0.113		0.125		0.100		CONT.	CONT.	
Remarks:												
Total Cost			47.929	24.561		90.222		106.518		CONT.	CONT.	
Remarks:												