CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification						DATE: **February 2002**			
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/4**				R-1 ITEM NOMENCLATURE SHIP CONCEPT ADVANCED DESIGN, PE 0603563N					
COST ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost	**5.031**	**20.665**	**5.820**	**8.054**	**7.909**	**2.036**	**2.029**	**Continuing**	**Continuing**
Design Tools, Plans & Concepts / S2196	**0.208**	**1.932**	**5.820**	**8.054**	**7.909**	**2.036**	**2.029**	**Continuing**	**Continuing**
Human Integration Information System/S2862	**4.823**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**4.823**
Small Combatant Craft/S9041	**0.000**	**8.326**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**8.326**
Sealion Tech Demo/S9042	**0.000**	**0.991**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.991**
Metallic Materials Adv Dev & Certification/S9043	**0.000**	**3.370**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**3.370**
DocumentAutomation Of ICAS Maint/S9044	**0.000**	**2.577**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**2.577**
Planning and Design LHD-Type Ship/S9045	**0.000**	**3.469**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**0.000**	**3.469**
Quantity of RDT&E Articles	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

A. (U) Mission Description and Budget Item Justification:

The mission of the PE is to explore alternative surface ship force structures, the advanced surface ship & unmanned surface vehicles concepts, and the potential technologies for these force structures and the advanced concepts in support pre-acquisition mission needs analysis, mission area analysis, SCN and R&D planning. The objective is more affordable mission capable surface ship force including ships with reduced manning, increased producibility, reduced operating and support costs, and greater utilization of the latest technology. The program directly supports the Navy Shipbuilding Plan with state-of-the-art design tools and methods for surface ship force structure alternative studies, ship & unmmanned vehicle concept studies, and the actual conduct of surface ship force structure alternative studies and advanced design concept studies for the ships that may become part of the SCN plan.

(U) Project S2196 - This project funds concept develop engineering, mission effectiveness analysis, and other analysis for formulation of future surface ship force structure along with development of the tools to accomplish these efforts. Advanced ship concept studies, ship and ship systems technology assessments, and the development and upgrade of ship concept design and engineering tools, methods, and criteria are also funded in this project.

(U) Project S2862 - This project funds Human Systems Integration development for an Automated Maintenance Environment (AME) for surface ships. AME for surface ships was a Congressional add project in FY 2000 in this PE. (Congressional adds)

(U) Project S9041 - This project funds only acquisition, test and evaluation of a high speed variable freeboard planning craft and related special warfare high speed support craft and equipment.

(U) Project S9042 - This project funds Situation Awareness Module.

EXHIBIT R-2, RDT&E Budget Item Justification	DATE: February 2002
APPROPRIATION/BUDGET ACTIVITY **RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY/4**	R-1 ITEM NOMENCLATURE SHIP CONCEPT ADVANCED DESIGN, PE 0603563N

(U) Project S9043 - This project funds the Metellic Material Advanced Development and Certification Program.

(U) Project S9044 - This project funds Documentation Automation of Integrated Condition Assessment System (ICAS) Maintenance and other Navy prcedures in XML format.

(U) Project S9045 - This project funds Planning and Design of LHD-type ship.

B. Program Change Summary:

	FY 2001	FY 2002	FY 2003
(U) FY 2002 President's Budget:	0.162	1.949	
(U) Appropriated Value:	5.162	20.849	0.000
(U) Adjustments to FY 2002/2003 Appropriated Value/FY 2002 President's Budget:	4.869	18.716	3.843
(U) FY 2003 Pres Budget Submit:	5.031	20.665	3.843

(U) Funding: FY 2001: Human Integration Information System (+$5.000M), and FY01 SBIR Apr-27-01 (-$.131M) .
FY 2002: Congressional plus ups - Small Combatant Craft (+$8.400M), Sealion Tech Demo (+$1.000M), Metallic Materials Adv Dev (+$3.400M), Document Automation Of ICAS (+2.60
and
Planning & Design LHD-Type Ship (+$3.500M) and minor adjustments (-$.184).
FY 2003: FY 2003 realign shipbuilding R&D funds for future force formulation (+$4.000M)and minor adjustment (-$.157M).

(U) Schedule: None

(U) Technical: The advanced concept studies efforts have been expanded to include alternative surface ship force studies.

ıtion Program.

sment System (ICAS) Maintenance and other Navy prcedures in XML format.

pr-27-01 (-$.131M) .
ın Tech Demo (+$1.000M), Metallic Materials Adv Dev (+$3.400M), Document Automation Of ICAS (+2.600M),

ş (-$.184).
$4.000M)and minor adjustment (-$.157M).

surface ship force studies.

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CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification						DATE: **February 2002**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E,N/4**				PROJECT NAME AND NUMBER DESIGN TOOLS, PLANS & CONCEPTS / S2196					
COST ($ in Millions)	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2005	FY 2006	Cost to Complete	Total Cost
Project Cost (S2196)	**0.208**	**1.932**	**5.820**	**8.054**	**7.909**	**2.036**	**2.029**	**Continuing**	**Continuing**
RDT&E Articles Qty	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**		

A. (U) Mission Description and Budget Item Justification: This project develops and explores alternative surface ship force structures, the advanced surface ship & unmanned surface vehicles concepts, and the potential technologies for these force structures and the advanced concepts in support pre-acquisition mission needs analysis, mission area analysis, SCN and R&D planning. The objective is more affordable mission capable surface ship force including ships with reduced manning, increased producibility, reduced operating and support costs, and greater utilization of the latest technology. The program directly supports the Navy Shipbuilding Plan with state-of-the-art design tools and methods for surface ship force structure alternative studies, ship & unmmanned vehicle concept studies, and the actual conduct of surface ship force structure alternative studies and advanced design concept studies for the ships that may become part of the SCN plan.

(U) This project provides the foundation for affordable and mission capable surface ship force. It also supports the next step in the development of a transformed naval force by accomplishing the pre-milestone A efforts for all potential surface ships. These efforts are the required first step in the integration of total ship systems, including combat systems and hull, mechanical and electrical (HM&E) systems. Inadequate early planning and ship concept formulation can result in down-stream design/construction and operational problems. A more subtle and severely negative impact of neglecting this early effort is that the "best" concepts and technologies may never even be considered and our greatest potential ship design advances never realized. Designs and technologies must meet the threat. This project supports this requirement.

(U) This project funds concept develop engineering, mission effectiveness analysis, and other analysis for formulation of future surface ship force structure along with development of the tools to accomplish these efforts. Advanced ship concept studies, ship and ship systems technology assessments, and the development and upgrade of ship concept design and engineering tools, methods, and criteria are also funded in this project.

(U) This project accomplishes the following: (1) Develops alternative surface ship force structure concepts including the ships and unmanned vehicles; (2) Evaluates the mission capability effectiveness and costs for these alternatives surface fleet architectures; (3) Performs fleet warfighting / mission effectivenes assessment studies; (4) identifies future surface ship requirements and characteristics necessary to meet future threats and support mission needs; (5) investigates new affordable ship concepts and evaluates technologies necessary to support these concepts; (6) provides design methods and automated design tools to develop and evaluate ship concepts; and (7) supports development of Mission Need Statements (MNS) for future ships. These efforts are done to support mission analysis, mission needs development and technology assessment in support of future fleet concepts and potential ship acquisition programs. These efforts are foundational to the Navy's formulation of the future fleet.

(U) Efforts under Project S2196 transition directly to early stage ship design in PE 0603564N, Ship Preliminary Design and Feasibility Studies. While these efforts support concept exploration and mission needs assessment for potential future ship acquisition programs, they are not direct efforts for specific authorized shipbuilding programs. This project is the only R&D effort (Government or commercial) that supports and maintains this country's naval ship design and engineering capabilities in the area of very early stage (Concept Design) design tools, criteria, and methods.

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2002
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E,N/4	SHIP CONCEPT ADVANCED DESIGN, PE 0603563N	DESIGN TOOLS, PLANS & CONCEPTS / S2196

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2001 ACCOMPLISHMENTS:

(U) ($0.208) Ship Concept Design and Engineering Tools, Methods, and Criteria. Improved capability for rapid and accurate ship tradeoff studies using surface ship synthesis/assessment moc Developed plan for enhancements to Advanced Surface Ship Evaluation Tool (ASSET). Supported NAVSEA Professor of Ship Production research grant.

2. (U) FY 2002 PLAN:

(U) ($0.454) Ship Concepts and Mission Need Analysis: Develop ship concepts and perform mission area analysis (MAA) for potential ships 5-10 years out in the SCN plan, including ship s configuration, capabilities and rough order of magnitude (ROM) ship costs. Conduct pre-Milestone A ship concept studies for potential ship concepts / configurations in support of SCN planning. Ass the future ship concepts as part of potential future fleet architecture concepts.

(U) ($0.195) Total Ship Technology Assessment: Analyze the benefits and impacts of new ship and hull, mechanical & electrical (HM&E) concepts and technologies. Identify, characterize and ass new and emergent technologies. Develop methodologies for assessment of benefits and imapcts of technologies in total ship concepts. Support development of total ship and HM&E technol roadmaps.

(U) ($1.283) Ship Concept Design and Engineering Tools, Methods, and Criteria. Improve capability for rapid and accurate ship performance/cost/risk assessments and tradeoff studies. Improve the Navy's Advanced Surface Ship Evaluation Tool (ASSET) surface ship synthesis/assessment models in the following areas: improve performance assessment capabilities, update and enhance capabili to handle new ship configurations, hull form alternatives, signature reduction features, characterize advanced machinery technologies, address optimal required shipboard manning, reduced t ownership cost , and increased capabilities to determine ship size impacts of new technologies. Improve interoperability of Navy and shipbuilder design systems. Continue development of interoperab standards and capability between and among: synthesis/assessment models, cost estimation models, operational effectiveness models, shipbuilder computer aided design (CAD) models, and Na developed analysis tools by participation in collaborative efforts such as the Navy Industry Digital Data Exchange Standards Committee (NIDDESC) and other shipbuilding technology efforts. Supp NAVSEA Professor of Ship Production research grant.

capability for rapid and accurate ship tradeoff studies using surface ship synthesis/assessment models. ted NAVSEA Professor of Ship Production research grant.

orm mission area analysis (MAA) for potential ships 5-10 years out in the SCN plan, including ship size, ıe A ship concept studies for potential ship concepts / configurations in support of SCN planning. Assess

hip and hull, mechanical & electrical (HM&E) concepts and technologies. Identify, characterize and assess napcts of technologies in total ship concepts. Support development of total ship and HM&E technology

ıbility for rapid and accurate ship performance/cost/risk assessments and tradeoff studies. Improve the US ɔdels in the following areas: improve performance assessment capabilities, update and enhance capabilities racterize advanced machinery technologies, address optimal required shipboard manning, reduced total Improve interoperability of Navy and shipbuilder design systems. Continue development of interoperability ı models, operational effectiveness models, shipbuilder computer aided design (CAD) models, and Navy- ɔigital Data Exchange Standards Committee (NIDDESC) and other shipbuilding technology efforts. Support

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2002
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E,N/4	SHIP CONCEPT ADVANCED DESIGN, PE 0603563N	DESIGN TOOLS, PLANS & CONCEPTS / S2196

(U) PROGRAM ACCOMPLISHMENTS AND PLANS (CONTINUED):

3. (U) FY 2003 PLAN:

(U) ($1.460) Future Force Structure Concepts and Mission Capabilities Effectiveness: In support of Navy force transformtation develop alternative surface ship force structure concepts including ships and unmanned vehicles. Evaluate the mission capability effectiveness and costs for these alternatives surface fleet architectures. Perform fleet warfighting / mission effectivenes assessm studies.

(U) ($0.979) Ship Concepts and Mission Need Analysis: Develop ship concepts and perform mission area analysis (MAA) for potential ships 5-10 years out in the SCN plan, including ship s configuration, capabilities and rough order of magnitude (ROM) ship costs. Conduct pre-Milestone A ship concept studies for potential ship concepts / configurations in support of SCN planning. Ass the future ship concepts as part of potential future fleet architecture concepts.

(U) ($0.490) Total Ship Technology Assessment: Analyze the benefits and impacts of new ship and hull, mechanical & electrical (HM&E) concepts and technologies. Identify, characterize and ass new and emergent technologies. Develop techniques to improve the integration and transition of new technologies in total ship concepts. Update and revise total ship and HM&E technology roadmaps.

(U) ($1.460) Future Force Formulation Concept and Evaluation Tools, Methods, and Criteia: Develop Force Architecture & Force Concept Synthesis Models, Fleet Architecture Assessmer Performance Analysis Tools, update the Naval Fleet Affordability Model (NFAM) & link in with other Cost Models and cost databases to support force level cost studies. Develop links to War Gam Models / Warfighting & Mission Effectiveness Assessment Models.

(U) ($1.431) Ship Concept Design and Engineering Tools, Methods, and Criteria. Improve capability for rapid and accurate ship performance/cost/risk assessments and tradeoff studies. Improve the Navy's Advanced Surface Ship Evaluation Tool (ASSET) surface ship synthesis/assessment models in the following areas: provide an integrated design environment that supports the multi-discip analysis of design and technology alternatives; expand the existing monohull design capabilities to support the projected trend in future naval vessels to higher speed, smaller, and potentially multi- platforms; use of component architecture for software development and ship design; more effective use of object-based ship product models; improve integration with other naval ship analysis tools a commercial design and analysis software; provide more effective visualization and access to the virtual ship and its related product model data; and allow for the exploitation of software technolog developed for the Web-based applications. Improve interoperability of Navy and shipbuilder design systems. Continue development of interoperability standards and capability between and amo synthesis/assessment models, cost estimation models, operational effectiveness models, shipbuilder computer aided design (CAD) models, and Navy-developed analysis tools by participatio collaborative efforts such as the Navy Industry Digital Data Exchange Standards Committee (NIDDESC) and other shipbuilding technology efforts. Support NAVSEA Professor of Ship Production resea grant.

B. Other Program Funding Summary: Not applicable.
(U) Related RDT&E

(U) PE 0603513N (Shipboard Systems Component Development)
(U) PE 0603564N (Ship Preliminary Design and Feasibility Studies)
(U) PE 0603512N (Carrier Systems Development)
(U) PE 0604300N (SC21 Total Ship Systems Engineering)
(U) PE 0604567N (Ship Contract Design/Live Fire T&E)

pport of Navy force transformtation develop alternative surface ship force structure concepts including the ese alternatives surface fleet architectures. Perform fleet warfighting / mission effectivenes assessment

orm mission area analysis (MAA) for potential ships 5-10 years out in the SCN plan, including ship size, ne A ship concept studies for potential ship concepts / configurations in support of SCN planning. Assess

ship and hull, mechanical & electrical (HM&E) concepts and technologies. Identify, characterize and assess f new technologies in total ship concepts. Update and revise total ship and HM&E technology roadmaps.

ia: Develop Force Architecture & Force Concept Synthesis Models, Fleet Architecture Assessment & other Cost Models and cost databases to support force level cost studies. Develop links to War Gamimg

bility for rapid and accurate ship performance/cost/risk assessments and tradeoff studies. Improve the US models in the following areas: provide an integrated design environment that supports the multi-discipline ies to support the projected trend in future naval vessels to higher speed, smaller, and potentially multi-hull ctive use of object-based ship product models; improve integration with other naval ship analysis tools and the virtual ship and its related product model data; and allow for the exploitation of software technologies design systems. Continue development of interoperability standards and capability between and among: hipbuilder computer aided design (CAD) models, and Navy-developed analysis tools by participation in DESC) and other shipbuilding technology efforts. Support NAVSEA Professor of Ship Production research

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2002**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E,N/4	SHIP CONCEPT ADVANCED DESIGN, PE 0603563N	DESIGN TOOLS, PLANS & CONCEPTS / S2196

C. Acquisition Strategy:

This is a non acquisition program that develops, evaluates, and validates early stage total ship concepts and technologies in support of SCN planning and potential future ship acquisition programs. This program also supports development, demonstration, evaluation, and validation of engineering tools, methods, and criteria for these concept designs and assessments.

D. Schedule Profile

	FY 2001	FY 2002	FY 2003
Program Milestones	(Not applicable - Non-Acquisition Program)		
Engineering Milestones (All are 4th Quarter unless otherwise indicated)	ASSET ship synthesis model tool user interface upgrade	Pre-MS A Ship Concept Studies for FY 2002	Pre-MS A Ship Concept Studies for FY 2003
	Publish Load Factor Resistance Design Method Application and Basis	Ship synthesis model tool interface to major operational assessment tool	Ship synthesis model tool interface to performance assessment tools
	Plan for Enhancements to ASSET Ship Synthesis Model	Merge modeling & analysis capabilities for of alternative ship synthesis model tools	Initial capability to assess alternative & advanced hull forms in ASSET ship synthesis model
		Enhanced ship auxiliary systems & machinery modules for ASSET ship synthesis model	Enhanced ship weight, area & volume capabilities by using surface modeling in ASSET ship synthesis model
		Initial method for assessment of technology benefits - impacts	Link of ASSET & cost models to support assessment of technology benefits - Impacts
			Surface Ship Force Structure Alternatives and Architecture Study
			Prototype Force Architecture Concept Development Model
			Prototype Force Mission Effectiveness Tool
Testing Milestones	(Not applicable - Non-Acquisition Program)		
Contract Milestones	(Not applicable - Non-Acquisition Program)		

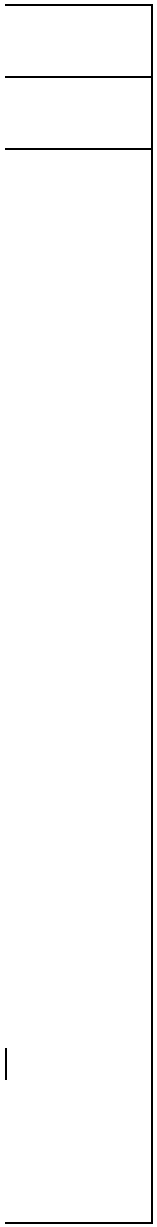

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Exhibit R-3 Cost Analysis (page 1)									DATE: February 2002			
APPROPRIATION/BUDGET ACTIVITY **RDT&E,N/4**		PROGRAM ELEMENT SHIP CONCEPT ADVANCED DESIGN, PE 0603563N			PROJECT NAME AND NUMBER DESIGN TOOLS, PLANS, AND CONCEPTS, S2196							
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	FY 03 Cost	FY 03 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development											0.000	
Ancillary Hardware Development											0.000	
Systems Engineering, Concept Development,	various	Other Various Contractors	53.855	0.000	various	0.000	various	0.975	various	N/A	Cont.	N/A
Engineering Development, Demonstration & Evaluation	WR	NAVSEA, Dahlgren Div, Dahlgren, VA		0.000	N/A	0.000	N/A	1.559	N/A	N/A	N/A	N/A
	WR	NAVSEA, Carderock Div, West Bethesda, MD	27.348	0.148	N/A	1.780	N/A	2.436	N/A	N/A	N/A	N/A
	WR & RC	Other Govt. Activities	8.422	0.060	N/A	0.143	N/A	0.834	N/A	N/A	N/A	N/A
Licenses											0.000	
Tooling											0.000	
GFE											0.000	
Award Fees											0.000	
Subtotal Product Development			89.625	0.208		1.923		5.804		Cont.	Cont.	
Remarks:												
Development Support Equipment											0.000	
Software Development											0.000	
Training Development											0.000	
Integrated Logistics Support											0.000	
Configuration Management											0.000	
Technical Data											0.000	
GFE											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		N/A	N/A	
Remarks:												

Exhibit R-3 Cost Analysis (page 2)								DATE: **February 2002**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E,N/4**		PROGRAM ELEMENT SHIP CONCEPT ADVANCED DESIGN, PE 0603563N			PROJECT NAME AND NUMBER DESIGN TOOLS, PLANS, AND CONCEPTS, S2196							
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY01 Cost	FY 01 Award Date	FY 02 Cost	FY 02 Award Date	FY 03 Cost	FY 03 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation											0.000	
Operational Test & Evaluation											0.000	
Tooling											0.000	
GFE											0.000	
Subtotal T&E			0.000	0.000	N/A	0.000	N/A	0.000	N/A	N/A	N/A	
Remarks:												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support											0.000	
Travel				0.000		0.009		0.016			N/A	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.000	0.000	N/A	0.009	N/A	0.016	N/A	N/A	N/A	
Remarks:												
Total Cost			89.625	0.208		1.932		5.820		Cont.	Cont.	
Remarks:												