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EXHIBIT R-2, RDT&E Budget Item Justification							DATE: February 2000			
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA 4					R-1 ITEM NOMENCLATURE Carrier Systems Development - 0603512N					
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost		105.787	141.957	148.952	156.631	70.759	76.726	75.949	Cont.	Cont.
S1722 CV Weapons Elevator Improvements		0.750	1.020	1.052	1.067	1.064	1.082	1.114	Cont.	Cont.
42208 Future CV R & D		18.742	111.040	122.521	128.428	57.468	63.534	58.479	Cont.	Cont.
42678 CVN Technology Insertion		48.400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	48.400
42693 Carrier Systems Definition		34.243	24.529	14.362	13.088	0.000	0.000	0.000	Cont.	Cont.
W1723 CV Launch & Recovery Systems		1.600	1.829	6.805	13.177	12.227	12.110	16.356	Cont.	Cont.
W2269 EAF Matting		2.052	3.539	4.212	0.871	0.000	0.000	0.000	0.000	18.512
Quantity of RDT&E Articles										
<p>A. Mission Description and budget Item Justification : This Navy unique program addresses all technology areas associated with Navy/Marine Corps aircraft operations aboard ships. The program includes:</p> <ul style="list-style-type: none"> - (U) (S1722) -- Development of standardized, supportable and maintainable aircraft carrier weapons elevators components. - (U) (42208 formerly 22208) -- Development of ship hull, mechanical, propulsion, electrical, aviation and combat support systems, subsystems and components to significantly improve aircraft carrier affordability, survivability and operational capabilities and to meet the requirements of existing and pending regulations and statutes critical to the operation of existing and future aircraft carriers. - (U) (42678) -- Development of technologies for transition from CVN77 to CVNX, for demonstrating enhanced capabilities for CVNX, and for mitigating CVNX cost or technical risk. - (U) (42693 formerly S2693) - Supports post Milestone 0 ship system technical definition and initial cost estimates through studies for various ship alternatives being considered in the Analysis of Alternatives (AOA). The project supports interim Operational Requirements Document (ORD) preparation and develops the primary supporting documentation for Milestone I decision. 										

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R-1 ITEM NOMENCLATURE

RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA 4

Carrier Systems Development - 0603512N

- (U) (W1723) -- Development of all systems required to provide approach and landing guidance and control, recovery, service, support and launch aircraft operating onto or from ships. Payoffs include increased safety, greater sortie generation rates, enhanced aircraft boarding rates, reduced manning, increased aircraft service life and fleet modernization.

- (U) (W2269) -- Development of Lightweight Mat and Expeditionary Arresting Gear for use at Marine Corps Expeditionary Airfields (EAF).

- (U) NOTE: FY 2000 total PE amount contains (\$3,215) which is the portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

B. Program Change Summary:

	FY 1999	FY 2000	FY 2001
(U) FY 2000 President's Budget:	109.208	142.783	138.976
(U) Appropriated Value:	109.208	142.783	
(U) Adjustment to FY 99/00 Appropriated Value/FY 2000 PRESBUDG	-3.421	-0.826	9.976
(U) FY 2001 PRES Budget Submit:	105.787	141.957	148.952

Funding:

FY99 change (\$-3.421)

(\$-2.678) SBIR reductions, (\$-.590) Inflation savings and various adjustments, (\$-.153) (S1722) Recoupment of Future Carrier Below Threshold Reprogramming.

FY00 change (\$-.826)

(\$-.788) Across-the-board reductions, (\$-.038) (42208) Strategic Sourcing Redistribution.

FY01 change (+9.976)

(\$-3.197) Final Rebalancing and various adjustments

(\$-.789) Strategic Sourcing Redistribution.

(\$-.868) (42208) Offsets required to finance high priority O&M,N deficiencies.

(\$12.000) (42208) Rephase Smart Carrier

(\$2.830) (W1723) Reflects programmatic increase for CROV and AAGE.

Schedule: (U) W1723 -- The deferral of the VISUAL program Milestone II from 4th quarter FY99 to 2nd quarter FY00 are due to delays in developing, coordinating, and finalizing program documentation. Also, funding realignments driven by emergent, higher priority requirements retarded development efforts, deferring the EDM award by three months (1Q to 2Q FY00) and delaying RFP release by two quarters (2Q to 4Q FY99).

Technical: Not applicable.

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EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2000			
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER			PROJECT NAME AND NUMBER						
RDT&E, N / BA 4	Carrier Systems Development - 0603512N			CV Weapons Elevator Improvements S1722						
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost		0.750	1.020	1.052	1.067	1.064	1.082	1.114	Cont.	Cont.
RDT&E Articles Qty										
<p>A. Mission Description and Budget Item Justification This project provides for advanced development, fabrication, test, evaluation and documentation of standardized aircraft carrier weapons elevators components such as control systems, hoist machinery, doors and hatches. Emphasis is placed on the reduction of total ownership cost, improvement of safety, reliability, maintainability and watertight integrity and weight reduction.</p> <p>- (U) PROGRAM ACCOMPLISHMENTS AND PLANS:</p> <p>FY 1999 ACCOMPLISHMENTS: (U)(\$.240) – Conducted investigation and engineering analysis for integration of multiple controllers into Control Net. (U)(\$.200) -- Procured linear actuators. (U)(\$.210) – Completed development and test of embedded sensors in conjunction with Programmable Logic Controller (PLC). (U)(\$.100) – Installed linear actuators on Land Based Engineering Site (LBES) test site.</p> <p>FY 2000 PLAN: (U)(\$.150) – Complete linear actuator tests. (U)(\$.075) – Complete alternative governor research. (U)(\$.165) – Complete alternative governor testing. (U)(\$.330) – Develop intelligent controls for multiple car systems. (U)(\$.300) – Complete linear drive ropeless elevator research.</p> <p>FY 2001 PLAN: (U)(\$.387) – Complete design for model ropeless elevator. (U)(\$.300) – Develop simulation model for multiple cars in non-traditional trunk. (U)(\$.165) – Investigate reconfigurable power supplies. (U)(\$.200) – Develop design for non-traditional trunk installation at LBES.</p>										

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA 4	PROGRAM ELEMENT NAME AND NUMBER Carrier Systems Development - 0603512N	PROJECT NAME AND NUMBER CV Weapons Elevator Improvements S1722																					
<p>B. Other Program Funding Summary: Not applicable</p> <p>C. Acquisition Strategy: Not applicable</p> <p>D. Schedule Profile.</p> <table border="0"> <thead> <tr> <th></th> <th><u>FY 1999</u></th> <th><u>FY 2000</u></th> <th><u>FY 2001</u></th> </tr> </thead> <tbody> <tr> <td>Program Milestones</td> <td>3Q Completed Multiple PLC Investigations</td> <td>2Q Complete Alternative governor research 4Q Complete linear drive ropeless elevator research</td> <td>3Q Complete design for ropeless elevator</td> </tr> <tr> <td>Engineering Milestones</td> <td></td> <td>3Q Develop intelligent multiple car controls</td> <td>4Q Develop simulation model for multiple cars 2Q Investigate reconfigurable power supplies 4Q Develop design for non-traditional trunk at LBES</td> </tr> <tr> <td>T&E Milestones</td> <td>3Q Completed embedded sensor tests</td> <td>1Q Complete linear actuator test 4Q Complete alternative governor test</td> <td></td> </tr> <tr> <td>Contract Milestones</td> <td>3Q Procured linear actuator</td> <td></td> <td></td> </tr> </tbody> </table>					<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	Program Milestones	3Q Completed Multiple PLC Investigations	2Q Complete Alternative governor research 4Q Complete linear drive ropeless elevator research	3Q Complete design for ropeless elevator	Engineering Milestones		3Q Develop intelligent multiple car controls	4Q Develop simulation model for multiple cars 2Q Investigate reconfigurable power supplies 4Q Develop design for non-traditional trunk at LBES	T&E Milestones	3Q Completed embedded sensor tests	1Q Complete linear actuator test 4Q Complete alternative governor test		Contract Milestones	3Q Procured linear actuator		
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T&E Milestones	3Q Completed embedded sensor tests	1Q Complete linear actuator test 4Q Complete alternative governor test																					
Contract Milestones	3Q Procured linear actuator																						

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Exhibit R-3 Cost Analysis (page 1)										DATE: February 2000		
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N / BA 4			Carrier Systems Development - 0603512N			CV Weapons Elevator Improvements S1722						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WR	NSWC Philadelphia		0.540	12/98	1.020	12/99	1.052	12/00	Cont.	Cont.	Cont.
Ancillary Hardware Development		Misc	0.821									
Systems Engineering												
Licenses												
Tooling												
GFE												
Award Fees												
Subtotal Product Development			0.821	0.540		1.020		1.052		Cont.	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		0.000	0.000	
Remarks:												

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Exhibit R-3 Cost Analysis (page 2)							DATE: February 2000					
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N / BA 4			Carrier Systems Development - 0603512N			CV Weapons Elevator Improvements S1722						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	NSWC Philadelphia	0.000	0.210	12/98	0.000				Cont.	Cont.	Cont.
Operational Test & Evaluation											0.000	
Tooling											0.000	
GFE											0.000	
Subtotal T&E			0.000	0.210		0.000		0.000		Cont.	Cont.	Cont.
Remarks:												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support											0.000	
Travel											0.000	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Total Cost			0.821	0.750		1.020		1.052		Cont.	Cont.	
Remarks:												

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA 4		PROGRAM ELEMENT NAME AND NUMBER Carrier Systems Development - 0603512N			PROJECT NAME AND NUMBER Future Carrier R&D - 42208						
COST (\$ in Millions)			FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost			18.742	111.040	122.521	128.428	57.468	63.534	58.479	Cont.	Cont.
RDT&E Articles Qty											

A. (U) Mission Description and Budget Item Justification

This project provides for the development of aircraft carrier specific technologies, the infusion of the surface ship technology base into existing and future aircraft carriers and the potential realization of subsystem design capabilities not currently feasible. This project transitions the most promising technologies from the Navy technology base, other government laboratories, and the private sector into specific advanced development efforts. All systems developed in this project have the potential to support emerging requirements and other promising systems technologies for insertion into new aircraft carrier designs. The emphasis is directed toward developing ship hull, mechanical, propulsion, electrical, aviation and combat support systems, sub-systems and components to significantly improve aircraft carrier affordability, survivability, and operational capabilities and to meet the requirements of existing and pending regulations and statutes critical to the operation of future aircraft carriers.

- (U) PROGRAM ACCOMPLISHMENTS AND PLANS:

FY 1999 ACCOMPLISHMENTS:

- (U) (\$18.742) Propulsion Plant Development

- (U) (\$1.600) Developed preliminary propulsion plant functional requirements. Commenced development of plant component arrangements, including size and weight of structural members and required shielding. Initiated sizing of major plant component foundations.

- (U) (\$2.000) Initiated early stages of heat exchanger detailed design, including shock and sizing analyses, to reduce weight and cost while meeting power output requirements.

- (U) (\$1.500) Developed initial fluid system functional requirements. Began developing fluid system schematics, descriptions and diagrams. Undertook preliminary main coolant pump hydraulic motor design.

- (U) (\$1.600) Started description of functional requirements for instrumentation and control systems and equipment. Began developing advanced propulsion plant control and automation schemes with analysis of manpower cost.

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RDT&E, N / BA 4	Carrier Systems Development - 0603512N	Future Carrier R&D - 42208
<p>- (U) (\$4.130) Determined preliminary electric system functional requirements. Performed electrical plant computer modeling and analysis. Established turbine generator power rating and voltage, and did conceptual design. Initiated development of procurement specifications. Identified electric plant interface constraints and began refining layout concepts to ensure compatibility with NIMITZ hull form.</p> <p>- (U) (\$3.200) Developed preliminary steam plant performance and functional requirements. Established structural member sizes for major steam plant component foundations. Identified steam plant interface constraints and began refining layout concepts to ensure compatibility with the NIMITZ hull form.</p> <p>- (U) (\$4.712) Began identifying potential impacts of new propulsion plant systems on hull and watertight bulkhead penetrations. Began developing and integrating non-propulsion mechanical systems with the propulsion plant including water purification; potable water; fire main and other fire fighting systems; heating, ventilation, and air conditioning; and ship service air systems. Assessed preliminary sizing of emergency generator support systems.</p> <p>FY 2000 PLAN:</p> <p>- (U) (\$45.300)-Non-Nuclear Propulsion Plant Development</p> <p>- (U) (\$15.900) Begin preliminary turbine generator design, develop testing requirements and identify required testing capabilities for a prototype unit. Produce turbine generator schematic diagrams identifying all ship and system connections.</p> <p>- (U) (\$5.800) Integrate Non-Propulsion equipment into the Steam and Electric Equipment layouts. Determine major system requirements and performance criteria and provide information for the integrated product model. Establish non-propulsion systems interface requirements with propulsion plant and power distribution systems.</p> <p>- (U) (\$7.000) Continue developing enhancements to the product data management software and prototype automated workflow for construction deliverables. Develop design analysis features required for propulsion plan design development.</p> <p>- (U) (\$16.600) Begin developing conceptual designs for optimized mechanical and electrical systems that interface with the propulsion plant. Establish interface controls between propulsion and non-propulsion equipment. Develop optimal volume and weight requirements for these mechanical and electrical systems. Establish layout of doors, ladders, passageways, hatches, and escape trunks integrated with the optimal propulsion plant.</p>		

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA 4	PROGRAM ELEMENT NAME AND NUMBER Carrier Systems Development - 0603512N	PROJECT NAME AND NUMBER Future Carrier R&D - 42208
<p>- (U) (\$34.616) – Aircraft Launch, Recovery & Support – Advanced Technology Launcher (ATL) Program Definition and Risk Reduction (PDRR) phase. Develop two, prototype, full size, fully integrated, reduced length, launcher systems. Validate System Specification. Initiate system engineering, technology assessment, and risk mitigation efforts. Conduct candidate energy storage, power electronics, control system and launch engine technology testing. Complete System Design Review and allocate Configuration Item performance requirements. Develop Configuration Item performance specifications. Complete Preliminary Design Review, initiate detailed design and development of product specifications. Initiate development of ATL Test Facility. Conduct site surveys and environmental impact studies. Identify facility and utility requirements. Complete architectural and engineering design. Initiate site construction. Initiate ATL Ship Integration Effort. Identify space and service allocation requirements for integration in CVN-68 class baseline hull. Prepare preliminary arrangement drawings identifying structural and arrangements impacts. Develop other hull, mechanical, and electrical system requirements.</p> <p>- (U) (\$4.577) – Battle Damage Prevention & Recovery -- Initiate evaluation and development of Upgraded Armor Protection System – Littoral (UAPS - Littoral), Dynamic Armor Protection System (DAPS), Underwater Protection System (UWPS), and New Torpedo / Mine Side Protection System (New T/MSPS). Define threats and design goals. Develop preliminary system designs and determine installation feasibility within ship concept designs. Develop plans for procurement and development of scaled test components. Prepare test facilities for small scale testing. Commence refinement of analytical capabilities. Improve Hull Girder analytic capability as part of Weapons Damage & Residual Strength analysis. Define design, producibility and material property goals for General Protective Plate and Advanced Shock Isolation of Equipment. Develop performance requirements for Advanced Damage Control System (ADCS). Commence fire vulnerability study in support of initiatives targeted at reducing operation and support costs of related systems. Commence development of enhanced damage control and firefighting concepts. Characterize topside threats for Topside Survivability. Characterize threats and evaluate use of explosive load reduction and anti-fratricide shielding protection techniques in support of Sympathetic Detonation Suppression System (SDSS) development. Commence development of improved weapons effects codes for Advanced Survivability Assessment Model (ASAP) and the application of finite element and hydro codes to provide enhanced modeling and simulation support for development of advanced passive survivability features.</p> <p>- (U) (\$1.384) – Manpower and Material Support – Initiate development of manpower and material support alternatives to achieve manpower reductions and total ownership cost savings. Included will be the development of advanced robotics for ship systems and components operation, maintenance and material handling in the areas of combat and intelligence, logistics and Hull Mechanical & Electrical (HM&E). A standardized open system architecture approach will be incorporated into system and component development.</p> <p>- (U) (\$20.817) - Combat and Intelligence Systems – Complete Phase II competitive solicitation for Combat Systems Integration concepts and design process. Continue monitoring improvements targeted at reducing the operational and support costs of the ship's war fighting systems. Initiatives remain focused on reducing the number of systems through the use of "multi-function"/"volume search" radars and flat planar antenna arrays, data exchange across operational areas, data fusion, and integrated displays for operators. Complete trade studies, including those that result in cost reductions without degrading operational performance into the design development. Evaluate and complete competitive Combat Systems Integration design development and integrate into the ship contract data package. Commence Phase III Design Refinement. Refine Combat Systems Integration design and integrate into the ship design.</p> <p>- (U) (\$4.346) – Systems Development – Support CVNX Engineering Team for design, engineering and interoperability analysis to support Milestone I. Also support for Requirements and AOA Teams for TOC reductions/analysis, survivability analysis and CVNX Advanced Launch & Recovery, and trade studies and Lethality Studies (ORD Specific). Provide acquisition planning support.</p>		

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RDT&E, N / BA 4	Carrier Systems Development - 0603512N	Future Carrier R&D - 42208
FY 2001 PLAN:		
<ul style="list-style-type: none">- (U) (\$50.767) Non-Nuclear Propulsion Plant Development<ul style="list-style-type: none">- (U) (\$18.130) Continue preliminary turbine generator and main propulsion turbine design, development of testing requirements and identification of testing capabilities, and start prototype development.- (U) (\$6.270) Determine changes to and complete layout of major electric plant equipment such as load centers outside of propulsion plant spaces. Continue development of inputs to the integrated product model database. Refine interface requirements for the non-propulsion systems with the propulsion and power distribution systems.- (U) (\$7.840) Continue prototyping and implementation of automated workflow for construction deliverables. Continue developing specialized analysis software required for propulsion plant design development and continue adding design data to the database.- (U) (\$18.527) Complete preliminary designs and continue development of mechanical and electrical systems that interface with the propulsion plant. Finalize optimal layout of non-propulsion plant mechanical and electrical systems and assess preliminary volume and weight data .- (U) (\$46.745) – Aircraft Launch, Recovery & Support – Continue Advanced Technology Launcher (ATL) Program Definition and Risk Reduction (PDRR) phase. Complete prototype long lead configuration item product specifications. Complete prototype long lead configuration item product specifications. Conduct Critical Design Review on prototype long lead items and release for procurement/manufacture. Complete Critical Design review on remaining prototype configuration items and initiate procurement/manufacture of Advanced Technology Launcher Program Definition and Risk Reduction phase systems. Continue construction of Advanced Technology Launcher Land Based test Facility. Conduct ship integration trade studies. Identify impacts of candidate launcher configurations on CVN-68 class baseline hull. Recommend system changes to optimize launcher for ship installation and operation. Develop recommended configurations for auxiliary system enhancements required for launcher installation based on prototype design effort. Develop electrical power and distribution system requirements in support of CVNX-1 engineering plant development. Initiate detailed arrangement and system design proposals to support Advanced Technology Launcher integration.		

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<p>- (U) (\$7.300) – Battle Damage Prevention & Recovery – Commence procurement and development of scaled test components for UAPS – Littoral. Commence scaled testing of UAPS – Littoral concepts. Develop plan and commence procurement / construction of large scale test components. Commence small scale testing of DAPS concepts. Commence design of DAPS components. Continue refinement of analytical capability in conjunction with UWPS development. Commence small scale testing of candidate UWPS concepts. Continue assessment of ship design impacts due to these candidate concepts. Continue refinement of analytical capability in conjunction with New T/MSPS development. Commence small scale testing of candidate T/MSPS concepts. Develop plan to build and dynamically test hull girders / models as part of Weapons Damage & Residual Strength analysis. Develop plan and commence procurement of substructure test components for analyzing General Protective Plate concepts. Commence small scale testing of Advanced Shock Isolation of Equipment concepts. Assess ship design impacts of candidate shock isolation concepts. Determine installation feasibility of these candidate concepts. Continue development of enhanced damage control and firefighting concepts, including ADCS and portable sensors. Commence equipment identification (including COTS) for candidate DC / FF concepts. Complete fire vulnerability study in support of firefighting concept development. Conduct characterization tests and develop improvements to weapons effects codes in support of Topside Survivability protection concept development. Develop plans for scaled testing of staged ordnance concept. Continue development of improved weapons effects, finite element and hydro codes to provide enhanced modeling and simulation support for development of advanced passive survivability features.</p> <p>- (U) (\$2.000) – Manpower and Material Support – Continue development of manpower and material support alternatives which will achieve manpower reductions and total ownership cost savings. Develop advanced robotics for ship systems and components operation, maintenance and material handling in the areas of combat and intelligence, logistics and HM&E. Continue development of the standardized open systems architecture.</p> <p>- (U) (\$3.709) – Systems Development – Support CVNX Engineering Team for design, engineering and interoperability analysis to support overall CVNX Design Development. Also support for Requirements and an Analysis Teams for TOC reductions/analysis, survivability analysis and CVNX Advanced Launch & Recovery, and trade studies and Lethality Studies. Provide acquisition planning support.</p> <p>- (U) (\$12.000) - Smart Carrier - The Smart Carrier program is a PEO Carriers' initiative involving the introduction of information technology, automation and controls, and process improvements with the goal of reducing total workload, lowering total ownership cost (TOC), and enhancing quality of life. Evaluate New technologies for potential workload reductions, support advance planning and integrated work package development, and process reengineering efforts on prototype carrier.</p>		

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RDT&E, N / BA 4	Carrier Systems Development - 0603512N				Future Carrier R&D - 42208				
B. Other Program Funding Summary									
	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	To Complete	Total Cost
Related RDT&E:									
0604567N/42301 CV Contract Design	33.294	35.271	38.311	25.394	24.113	25.789	27.458	CONT	CONT
0603570N/S2692 Advance Nuclear Power System	0.000	68.687	99.212	104.800	142.352	132.321	119.880	688.000	1,355.252
Related SCN:									
200100 Carrier Replacement Program	122.897	749.601	4,075.522	146.826	428.159	1,323.287	128.834	CONT	CONT
C. Acquisition Strategy: The Carrier acquisition strategy for CVN77 and follow-on hulls is to utilize a phased design and technology insertion or "evolutionary" strategy. This strategy will focus on combat system redesign (topside) on CVN77, new propulsion plant and Advanced Technology Launcher on CVNX-1 and hull distributive systems and functional arrangements on the CVNX-2. On each hull, core capabilities will be maintained and Total Ownership Costs will be reduced in accordance with Carrier goals. As with past NIMITZ class carriers, the CVN77 will be awarded as a sole source Fixed Price Incentive Fee (FPIF) contract to Newport News Shipbuilding. For CVNX-1 and future hulls, various contracting methods are being considered.									
D. Schedule Profile:									
Program Milestones			<u>FY 1999</u>			<u>FY 2000</u>		<u>FY 2001</u>	
Engineering Milestones			CVNX: 4Q AoA PART III			CVNX: 2Q MS1			
T&E Milestones			CVNX: 1Q AoA PART II completed			ATL: 2Q SRR		ATL: 3Q CDR	
Contract Milestones						ATL: 4Q PDR			
						ATL: 1Q PDRR Phase			

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Exhibit R-3 Cost Analysis (page 1)								DATE: February 2000				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N / BA 4			Carrier Systems Development - 0603512N			Future Carrier R&D - 42208						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Product Development												
Aircraft Launch, Recovery & Support	CPAF	Northrop Gumman				14.000	11/99	17.365	N/A	Cont.	Cont.	Cont.
	CPAF	General Atomics				14.000	11/99	17.365	N/A	Cont.	Cont.	Cont.
	WR	NAWC Lakehurst, NJ	2.711			2.236	11/99	2.483	11/00	Cont.	Cont.	Cont.
	ACES	NNS, Va				0.450	11/99	5.000	11/00	Cont.	Cont.	Cont.
	Various	Miscellaneous				0.600	11/99	0.618	11/00	Cont.	Cont.	Cont.
Battle Damage & Recovery												
	WR	NSWC/CD, MD	1.000			2.987	11/99	3.200	11/00	Cont.	Cont.	Cont.
	WR	APG, MD				0.000	11/99	1.000	11/00	Cont.	Cont.	Cont.
	ACES	NNS, Va				1.590	11/99	1.000	11/00	Cont.	Cont.	Cont.
	C	Miscellaneous	1.511			0.000	11/99	2.100	11/00	Cont.	Cont.	Cont.
Propulsion Plant Development												
	SS,CPFP	BETTIS, PA	9.000	18.739	11/98	45.300	11/99	0.000	N/A	0.000	73.039	73.039
	C	NNS, Va						50.767	11/00	57.200	107.967	107.967
	Various	Miscellaneous	2.299			0.000	N/A	0.000	N/A	Cont.	Cont.	Cont.
Manpower & Material Support												
	WR	NSWC/CD, MD				0.284	11/99	1.200	11/00	Cont.	Cont.	Cont.
	Various	Miscellaneous	2.298			0.300	11/99	0.000	N/A	Cont.	Cont.	Cont.
	C	Boeing, CA				0.800	11/99	0.800	11/00	Cont.	Cont.	Cont.
Systems Development												
	Various	Miscellaneous				4.346	11/99	3.709	11/00	Cont.	Cont.	Cont.
Combat & Intelligence Systems												
	C	NNS, Va				10.400	11/99	0.000	N/A	Cont.	Cont.	Cont.
		TBD				10.417	01/00	0.000	N/A	Cont.	Cont.	Cont.
Smart Carrier												
	Various	TBD						12.000	11/00	Cont.	Cont.	Cont.
Subtotal Product Development			18.819	18.739		107.710		118.607		Cont.	Cont.	Cont.
Remarks:												
Development Support Equipment											0.000	
GFE											0.000	
Subtotal Support			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												

R-1 SHOPPING LIST - Item No. 38-13 of 38-33

Exhibit R-3, Project Cost Analysis
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Exhibit R-3 Cost Analysis (page 2)								DATE: February 2000				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N / BA 4			Carrier Systems Development - 0603512N			Future Carrier R&D - 42208						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation												
Aircraft Launch, Recovery & Support	CFAF	Miscellaneous				3.166	11/99	3.745	11/00	Cont.	Cont.	Cont.
Operational Test & Evaluation												
Aircraft Launch, Recovery & Support												
Subtotal T&E			0.000	0.000		3.166		3.745		Cont.	Cont.	Cont.
Remarks:												
Contractor Engineering Support												
Aircraft Launch, Recovery & Support												
Program Management Support	CSS	TBD				0.164	11/99	0.169	11/00	Cont.	Cont.	Cont.
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.000	0.000		0.164		0.169		Cont.	Cont.	Cont.
Remarks:												
Total Cost			18.819	18.739		111.040		122.521		Cont.	Cont.	Cont.
Remarks:												

R-1 SHOPPING LIST - Item No. 38-14 of 38-33

Exhibit R-3, Project Cost Analysis
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CLASSIFICATION:

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EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2000			
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER			PROJECT NAME AND NUMBER						
RDT&E, N / BA 4	Carrier Systems Development - 0603512N			CVN Technology Insertion - 42678						
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost		48.400	0.000	0.000	0.000	0.000	0.000	0.000	0.000	48.400
RDT&E Articles Qty										
<p>A. (U) <u>Mission Description and Budget Item Justification:</u> This one year project was established to fund the research, development, test, and evaluation, and for acquisition of technologies for use in the CVN77 aircraft carrier program. Specifically, the technologies funded are those which transition from the CVN77 aircraft carrier program to the CVNX aircraft carrier program, that demonstrate enhanced capabilities for the CVNX aircraft carrier program, and that mitigate the cost or technical risks of that program.</p> <p>FY 1999 ACCOMPLISHMENTS:</p> <ul style="list-style-type: none"> - (U) (\$14.517) Established contractor and management interface to the integrated product data environment to coordinate design development and manufacturing processes to achieve life cycle cost reductions. Established data transfer protocols for the exchange of design data between shipyards. Developed product data management software for propulsion plant design and analyzed data. Identified advanced analysis capabilities required for design development and began testing product modeling software. - (U) (\$18.099) Completed functional requirement documents for command and control, weapons and sensors, external communications, mission planning, computing architecture, ship interface boundaries, and test and evaluation. Identified and commenced trade studies intended to reduce cost without degrading operational performance. Commenced Phase II; completing competitive solicitation and evaluation of solicitations to determine final two proposed integrators. Continued Combat Systems Integration concepts and design process. Identified updates to CVN77 Contract Design ILS/Configuration Management Plan. - (U) (\$15.784) Supported CVNX Engineering Team for design, engineering and interoperability analysis to support Milestone I. Also supported Requirements and AOA Teams for TOC reductions/analysis, survivability analysis and CVNX Advanced Launch & Recovery, and trade studies and Lethality Studies (ORD Specific). Provided acquisition planning support. <p>FY 2000 PLAN: Not applicable.</p> <p>FY 2001 PLAN: Not applicable.</p>										

R-1 SHOPPING LIST - Item No. 38-15 of 38-33

Exhibit R-2a, RDT&E Project Justification
 (Exhibit R-2a, page 15 of 33)

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CLASSIFICATION:

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EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2000		
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER				PROJECT NAME AND NUMBER				
RDT&E, N / BA 4	Carrier Systems Development - 0603512N				CVN Technology Insertion -- 42678				
B. <u>Other Program Funding Summary</u>									
	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To Complete</u>	<u>Total Cost</u>
Related RDT&E:									
0604567N/42301 CV Contract Design	33.294	35.271	38.311	25.394	24.113	25.789	27.458	CONT	CONT
Related SCN:									
200100 Carrier Replacement Program	122.897	749.601	4,075.522	146.826	428.159	1,323.287	128.834	CONT	CONT
C. Acquisition Strategy: The Carrier acquisition strategy for CVN77 and follow hulls is to utilize a phased design and technology insertion or "evolutionary" strategy. This strategy will focus on combat system redesign (topside) on CVN77, new propulsion plant and Advanced Technology Launcher on CVNX-1, and hull, distributive systems and functional arrangements on the CVNX-2. On each hull, core capabilities will be maintained and Total Ownership Costs will be reduced in accordance with Carrier goals. As with past NIMITZ class carriers, the CVN77 will be awarded as a sole source FPIF contract to Newport News Shipbuilding. For CVNX-1 and future hulls, various contracting methods are being considered.									
D. Schedule Profile:									
Program Milestones		<u>FY 1999</u>			<u>FY 2000</u>		<u>FY 2001</u>		
Engineering Milestones		CVNX: 4Q AoA PART III			CVNX: 2Q MS1		ATL: 3Q CDR		
T&E Milestones		CVNX: 1Q AoA PART II completed			ATL: 2Q SRR		ATL: 4Q PDR		
Contract Milestones					ATL: 1Q PDRR Phase				

R-1 SHOPPING LIST - Item No. 38-16 of 38-33

Exhibit R-2a, RDT&E Project Justification
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Exhibit R-3 Cost Analysis (page 1)										DATE: February 2000		
APPROPRIATION/BUDGET ACTIVITY				PROGRAM ELEMENT			PROJECT NAME AND NUMBER					
RDT&E, N / BA 4				Carrier Systems Development - 0603512N			CVN Technology Insertion - 42678					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	C	AME Arlington, Va		2.000	01/99						2.000	
	C	JJMA, Arlington Va		2.000	01/99						2.000	
	C	NNS, Va		18.500	01/99						18.500	
	WR	NSWC CD Va		4.200	01/99						4.200	
	WR	NAWC Lake Va		2.500	01/99						2.500	
	SS,CPFP	BETTIS, Pa		14.517	01/99						14.517	
	C	Contractor, Various		2.576	01/99						2.576	
	WR	Navy Field, Various		2.107	01/99						2.107	
Subtotal Product Development			0.000	48.400		0.000		0.000		0.000	48.400	
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		0.000	0.000	
Remarks:												

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Exhibit R-3 Cost Analysis (page 2)										DATE: February 2000		
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N / BA 4			Carrier Systems Development - 0603512N			CVN Technology Insertion - 42678						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 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		0.000		0.000		0.000	0.000	
Remarks:												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support											0.000	
Travel											0.000	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Total Cost			0.000	48.400		0.000		0.000		0.000	48.400	
Remarks:												

R-1 SHOPPING LIST - Item No. 38-18 of 38-33

Exhibit R-3, Project Cost Analysis
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EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2000			
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER				PROJECT NAME AND NUMBER					
RDT&E, N / BA 4	Carrier Systems Development - 0603512N				Carrier Systems Definition - 42693					
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost		34.243	24.529	14.362	13.088	0.000	0.000	0.000	Cont.	Cont.
RDT&E Articles Qty										
<p>A. (U) <u>Mission Description and Budget Item Justification</u>: This project performs the Ship Feasibility Studies required after Milestone 0 (MS 0) to address a specific Mission Needs Statement (MNS) and support the Analysis of Alternatives (AOA) for the Future Carrier (CVNX) Program; performs impact studies of aircraft/air wing composition, propulsion, hull alternatives, combat systems, machinery and electrical subsystems, and cost on CVNX designs, supports the development of the Operational Requirements Document (ORD) and other documentation required at Milestone I. Completion of this phase allows review and approval, at Milestone I, to transfer a ship program to the Contract Design Program Element 0604567N. Ship Feasibility Study products include a description of the alternative ships' principal characteristics and mission critical subsystems, weight estimates, general arrangement sketches, technical risk assessments, and Class F cost estimates. The objective is to provide the decision-makers with feasible, affordable alternatives.</p> <p>- (U) PROGRAM ACCOMPLISHMENTS AND PLANS:</p> <p>FY 1999 ACCOMPLISHMENTS:</p> <p>- (U) (\$29.372) Identified and evaluated propulsion plant functional and manning requirements, performed conceptual studies and analyzed component arrangements. Evaluated possible turbine generator power ratings and voltages, identified performance requirements, and established conceptual designs. Developed electric and steam plant weight and volume estimates and determined impacts on stability and survivability. Assessed preliminary sizing of emergency generator support systems and major propulsion plant component foundations. Evaluated shock and sizing analyses of heat exchanger designs. Reviewed possible instrumentation and control systems and equipment. Identified interface constraints and began refining layout concepts to ensure compatibility with the NIMITZ hull form. Identified and assessed potential impacts of new propulsion plant systems on hull and watertight bulkhead penetrations. Identified non-propulsion mechanical system concepts to be developed and integrated with the propulsion plant.</p> <p>- (U) (\$4.871) Supported CVNX Engineering Team for design, engineering and interoperability analysis to support Milestone I. Also supported Requirements and AOA Teams for TOC reductions/analysis, survivability analysis and CVNX Advanced Launch & Recovery, and trade studies and Lethality Studies (ORD Specific). Provided acquisition planning support.</p>										

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Exhibit R-2a, RDT&E Project Justification
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EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2000
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA 4	PROGRAM ELEMENT NAME AND NUMBER Carrier Systems Development - 0603512N	PROJECT NAME AND NUMBER Carrier Systems Definition -- 42693
FY 2000 PLAN: - (U) (\$13.122) Conduct ORD level requirements definition, industrial capability assessments, risk assessment and management, schedule development and tracking, and threat assessments necessary to insure a coordinated acquisition effort. Develop an Integrated Master Plan. Develop the Test and Evaluation Master Plan. Develop logistics requirements including integrated logistics assessments, maintenance planning, supportability analysis, logistics process improvements, computer resource requirements analysis, and manpower/workload assessments. Develop cost model and baseline cost estimate. - (U) (\$11.407) Conduct engineering effort associated with the CVNX Ship Development phase to develop ship requirements and definition at the total system level. Conduct trade studies to support total ship definition including baseline design/build budget and baseline cost estimate. Further develop Integrated Product Process Development (IPPD). FY 2001 PLAN: - (U) (\$8.872) Continue to conduct ORD level requirements definition, industrial capability assessments, risk assessment and management, schedule development and tracking, and threat assessments necessary to insure a coordinated acquisition effort. Continue to develop an Integrated Master Plan and the Test and Evaluation Master Plan. Continue development of logistics requirements including integrated logistics assessments, maintenance planning, supportability analysis, logistics process improvements, computer resource requirements analysis, and manpower/workload assessments. Continue to develop cost model and baseline cost estimate. - (U) (\$5.490) Continue to conduct engineering effort associated with the CVNX Ship Development phase to develop ship requirements and definition at the total system level. Continue trade studies to support total ship definition including baseline design/build budget and baseline cost estimate. Further develop IPPD.		

R-1 SHOPPING LIST - Item No. 38-20 of 38-33

Exhibit R-2a, RDT&E Project Justification
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EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2000		
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER				PROJECT NAME AND NUMBER				
RDT&E, N / BA 4	Carrier Systems Development - 0603512N				Carrier Systems Definition - 42693				
B. Other Program Funding Summary									
	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	To Complete	Total Cost
Related RDT&E:									
0604567N/42301 CV Contract Design	33.294	35.271	38.311	25.394	24.113	25.789	27.458	CONT	CONT
0603570N/S2692 Advance Nuclear Power System	0.000	68.687	99.212	104.800	142.352	132.321	119.880	688.000	1,355.252
Related SCN:									
200100 Carrier Replacement Program	122.897	749.601	4,075.522	146.826	428.159	1,323.287	128.834	CONT	CONT
C. Acquisition Strategy: The Carrier acquisition strategy for CVN77 and follow hulls is to utilize a phased design and technology insertion or "evolutionary" strategy. This strategy will focus on combat system redesign (topside) on CVN77, new propulsion plant and Advanced Technology Launcher on CVNX-1, and hull, distributive systems and functional arrangements on the CVNX-2. On each hull, core capabilities will be maintained and Total Ownership Costs will be reduced in accordance with Carrier goals. As with past NIMITZ class carriers, the CVN77 will be awarded as a sole source FPIF contract to Newport News Shipbuilding. For CVNX-1 and future hulls, various contracting methods are being considered.									
D. Schedule Profile:									
Program Milestones		<u>FY 1999</u>			<u>FY 2000</u>		<u>FY 2001</u>		
		CVNX: 4Q AoA PART III			CVNX: 2Q MS1				
Engineering Milestones		CVNX: 1Q AoA PART II completed			ATL: 2Q SRR		ATL: 3Q CDR		
T&E Milestones					ATL: 4Q PDR				
Contract Milestones					ATL: 1Q PDRR Phase				

R-1 SHOPPING LIST - Item No. 38-21 of 38-33

Exhibit R-2a, RDT&E Project Justification
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Exhibit R-3 Cost Analysis (page 1)								DATE: February 2000				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N / BA 4			Carrier Systems Development - 0603512N			Carrier Systems Definition - 42693						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Product Development	SS, CPFF	BETTIS, PA	6.000	29.372	11/98	0.000	N/A	0.000	N/A	0.000	35.372	35.372
		AME, VA	4.800	2.051	02/99	2.000	11/99	2.000	11/00	Cont.	Cont.	Cont.
	C, CPFF	JJMA, VA	5.200	1.000	02/99	1.000	11/99	1.000	11/00	Cont.	Cont.	Cont.
	C, CPFF	NSWC/CD, MD	3.000			1.000	11/99					
	WR	NSWC/DD, VA	1.500			1.000	11/99					
	WR	Miscellaneous	10.624	0.503	02/99	2.000	11/99	2.000	11/00	Cont.	Cont.	Cont.
	Various	Miscellaneous		1.317	02/99	2.529	11/99	1.362	11/00	Cont.	Cont.	Cont.
	C	NNS				15.000	11/99	8.000	11/00	Cont.	Cont.	Cont.
Subtotal Product Development			31.124	34.243		24.529		14.362		Cont.	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		0.000	0.000	
Remarks:												

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Exhibit R-3 Cost Analysis (page 2)										DATE: February 2000		
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RD&E, N / BA 4			Carrier Systems Development - 0603512N			Carrier Systems Definition - 42693						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 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		0.000		0.000		0.000	0.000	
Remarks:												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support											0.000	
Travel											0.000	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks:												
Total Cost			31.124	34.243		24.529		14.362		Cont.	Cont.	N/A
Remarks:												

R-1 SHOPPING LIST - Item No. 38-23 of 38-33

Exhibit R-3, Project Cost Analysis
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CLASSIFICATION:

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EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2000			
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER			PROJECT NAME AND NUMBER						
RDT&E, N / BA 4	Carrier Systems Development - 0603512N			CV Launch & Recovery Systems - W1723						
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost		1.600	1.829	6.805	13.177	12.227	12.110	16.356	Cont.	Cont.
RDT&E Articles Qty				2						
<p>A. Mission Description and Budget Item Justification: This project addresses the development of systems providing approach and landing guidance and control; recovery; service; support; and launch for aircraft operating on or from ships. Payoffs include increased safety, greater sortie generation rates, enhanced aircraft boarding rates, reduced manning, increased aircraft service life, and fleet modernization. Specific programs include:</p> <p>The Virtual Imaging System for Approach and Landing (VISUAL): VISUAL will provide ship's force, the Landing Signal Officer (LSO), and pilots with enhanced images of the aircraft and ship in low visibility and night conditions during launch and recovery operations.</p> <p>The Constant Run-Out/Retract Valve (CROV): The CROV development effort will replace the existing control and retract valves on the MK7 arresting gear in order to enhance performance and restore margins of safety. This program addresses the CV(N) OAG's Number 10 priority item (arresting gear improvements).</p> <p>Advanced Arresting Gear Engine (AAGE): The AAGE replace the MK7 arresting gear engine - which has reached the limits of its operating capability. This program addresses the CV(N) OAG's Number 10 priority item (arresting gear improvements).</p> <p>(U) PROGRAM ACCOMPLISHMENTS AND PLANS:</p> <p>FY 1999 ACCOMPLISHMENTS:</p> <p>(U) (\$1,600) Completed design and integration of the VISUAL technology demonstration system and evaluation of critical technologies. Prepared documentation for Milestone II review in spring 2000. Prepared Engineering Development Model (EDM) RFP and planned for 2000 source selection. Provided continued engineering and management support to the program in anticipation of transition from Program Definition and Risk Reduction (PD&RR) to the Engineering and Manufacturing Development (E&MD) phase.</p>										

R-1 SHOPPING LIST - Item No. 38-24 of 38-33

Exhibit R-2a, RDT&E Project Justification
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EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2000
APPROPRIATION/BUDGET ACTIVITY RDT&E, N	PROGRAM ELEMENT NAME AND NUMBER Carrier Systems Development - 0603512N	PROJECT NAME AND NUMBER CV Launch & Recovery Systems - W1723
<p>FY 2000 PLAN:</p> <p>(U) (\$1.529) Release VISUAL EDM phase solicitation. Review responses and select VISUAL EDM contractor. Achieve Milestone II decision to proceed to the E&MD phase. Provide engineering and management support to the program, particularly for the transition from the PD&RR phase to the E&MD phase of the program.</p> <p>(U) (\$.300) Develop CROV acquisition strategy, performance specification, milestone and contracting documentation, and source selection criteria. Develop performance requirements and statement of objectives.</p> <p>FY 2001 PLAN:</p> <p>(U) (\$3.580) Release CROV RFP, conduct proposal review and select EDM contractor. Achieve Milestone I / II. Award contracts for design, analysis, computer simulation, and prototype manufacture of two (2) CROV and control systems test articles. Perform initial test planning and test facility modifications.</p> <p>(U) (\$3.225) Develop AAGE system specification solicitation documentation. Prepare program documentation and make all preparations for Milestone I. Provide engineering and management support to the program.</p>		

R-1 SHOPPING LIST - Item No. 38-25 of 38-33

Exhibit R-2a, RDT&E Project Justification
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EXHIBIT R-2a, RDT&E Project Justification						DATE: February 2000		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N		PROGRAM ELEMENT NAME AND NUMBER Carrier Systems Development - 0603512N			PROJECT NAME AND NUMBER CV Launch & Recovery Systems - W1723			
B. Other Program Funding Summary: N/A								
		<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u> To <u>Complete</u>
<u>Related RDT&E</u>								
P.E. 0602122N (Aircraft Technology)	30.251	20.545	21.057	21.675	22.031	22.067	21.835	
P.E. 0604512N (Shipboard Aviation Systems)		8.189	9.002	9.833	8.669	8.866	6.555	6.784
C. Acquisition Strategy:								
VISUAL: The Navy is conducting system integration and risk reduction efforts at NAWCADLKE, and is preparing a performance specification and will competitively award a cost plus award fee contract to deliver EDMs, with fixed price production options.								
CROV: The Navy is preparing a performance specification and will competitively award up to two cost plus award fee contracts to develop prototypes. The Navy will then conduct a down select for EDM and production systems.								
AAGE: The Navy will award a cost plus award fee contract to develop the AAGE prototype. EDM and production quantities will be awarded on a sole source basis to the PD&RR phase contractor.								
Schedule Profile:		<u>FY 1999</u>		<u>FY 2000</u>		<u>FY 2001</u>		
Program Milestones				VISUAL: 2Q 00 MS II		CROV: 2Q 01 MS I / II		
Engineering Milestones			VISUAL: 4Q 99 PDR			CROV: 3Q 01 PDR		AAGE: 3Q 01 System Spec
T&E Milestones								
Contract Milestones			VISUAL: 4Q 99 RFP	VISUAL: 2Q 00 EDM Awd		CROV: 1Q 01 EDM Award		AAGE: 3Q 01 RFP

R-1 SHOPPING LIST - Item No. 38-26 of 38-33

Exhibit R-2a, RDT&E Project Justification
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Exhibit R-3 Cost Analysis (page 1)	DATE: February 2000
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APPROPRIATION/BUDGET ACTIVITY RDT&E, N	PROGRAM ELEMENT Carrier Systems Development - 0603512N	PROJECT NAME AND NUMBER CV Launch & Recovery Systems - W1723
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Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	WX	NAWCAD, LKE	19.532	1.600	10/98	0.300	11/99	3.225	11/00	Cont.	Cont.	
Ancillary Hardware Dev-(CROV)	CPAF	TBD						3.580	12/00	Cont.	Cont.	
Ancillary Hardware Development	CPFF	Kaman,EM	4.900								4.900	
Licenses												
Design, Manufacturing (VISUAL)	CPAF	TBD				1.529	11/99				1.529	
Award Fees												
Subtotal Product Development			24.432	1.600		1.829		6.805		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		0.000	Cont.	

Remarks:

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Exhibit R-3 Cost Analysis (page 2)										DATE: February 2000		
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N			Carrier Systems Development - 0603512N			CV Launch & Recovery Systems - W1723						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 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		0.000		0.000		0.000	Cont.	
Remarks:												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support											0.000	
Travel											0.000	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	Cont.	
Remarks:												
Total Cost			24.432	1.600		1.829		6.805		Cont.	11.291	Cont.
Remarks:												

R-1 SHOPPING LIST - Item No. 38-28 of 38-33

Exhibit R-3, Project Cost Analysis
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EXHIBIT R-2a, RDT&E Project Justification							DATE: February 2000			
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER			PROJECT NAME AND NUMBER						
RDT&E, N / BA 4	Carrier Systems Development - 0603512N			EAF Matting W2269						
COST (\$ in Millions)		FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Project Cost		2.052	3.539	4.212	0.871	0.000	0.000	0.000	0.000	18.512
RDT&E Articles Qty			2							
<p>(U) A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This project addresses the Program Definition and Risk Reduction (PDRR) phase of the lightweight airfield mat and expeditionary arresting gear to meet naval aviation unique Expeditionary Airfield (EAF) operational requirements, including transportability requirements on Maritime Prepositioning Ships (MPS).</p> <p>(U) The currently deployed EAF mat (AM-2) was developed for heavy fighter (such as the F-4) operations and is cumbersome to deploy. Lightweight (1/2 the weight of AM-2), less voluminous (1/2 the volume of AM-2), and easier to install (five days vice fifteen days to install a complete airfield) mat material may be technically feasible and commercially available, but must be evaluated for use with current type/model/series naval and Air Mobility Command (AMC) aircraft at conventional and Vertical and Short Take-off and Landing (V/STOL) airfields ashore. Candidate mat materials under consideration include reinforced synthetic composite materials and polyvinyl fiberglass. These mat materials will be configured and evaluated under Marine Corps operational scenarios.</p> <p>(U) The expeditionary arresting gear program will provide the Marine Corps with the capability to conduct short span arrestments of designated Navy and Marine Corps tail hook equipped aircraft in the expeditionary environment. The current arresting gear (M-21) cannot be adapted to operate on short span (100 feet or less) surfaces and is incapable of arresting the current inventory under casualty (no flaps or half flap) conditions. The M-21 has inadequate reliability and several replacement components are no longer produced. The replacement gear, M-31, will provide air transportability, rapid setup, full inventory operational compatibility under all arrestment conditions, and adequate operational reliability. Two M-31 prototype systems will be built under this project.</p> <p>(U) PROGRAM ACCOMPLISHMENTS AND PLANS:</p> <p>FY 1999 ACCOMPLISHMENTS:</p> <p>(U) (\$2.028) Evaluated alternative anchoring systems. Designed and initiated fabrication of prototyped M-31 arresting gear.</p> <p>(U) (\$.024) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.</p>										

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Exhibit R-2a, RDT&E Project Justification
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EXHIBIT R-2a, RDT&E Project Justification						DATE:																			
						February 2000																			
APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT NAME AND NUMBER			PROJECT NAME AND NUMBER																				
RDT&E, N / BA 4		Carrier Systems Development - 0603512N			EAF Matting W2269																				
<p>FY 2000 PLAN:</p> <p>(U) (\$3.539) Complete fabrication of two prototype M-31 systems and initiate performance testing with deadloads.</p> <p>FY 2001 PLAN:</p> <p>(U) (\$4.212) Complete performance testing with deadloads. Conduct mobility, environmental, and operability testing. Demonstrate compatibility and performance thresholds with aircraft.</p> <p>B. Other Program Funding Summary</p> <p>EAF OPN (PE 0206139M)</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 15%;"></th> <th style="width: 10%; text-align: center;"><u>FY 1999</u></th> <th style="width: 10%; text-align: center;"><u>FY 2000</u></th> <th style="width: 10%; text-align: center;"><u>FY 2001</u></th> <th style="width: 10%; text-align: center;"><u>FY 2002</u></th> <th style="width: 10%; text-align: center;"><u>FY 2003</u></th> <th style="width: 10%; text-align: center;"><u>FY 2004</u></th> <th style="width: 10%; text-align: center;"><u>FY 2005</u></th> <th style="width: 10%; text-align: center;"><u>To Complete</u></th> </tr> </thead> <tbody> <tr> <td>Related RDT&E: N/A</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">5.435</td> <td style="text-align: center;">6.443</td> <td style="text-align: center;">6.532</td> <td style="text-align: center;">6.731</td> <td style="text-align: center;">0</td> </tr> </tbody> </table> <p>C. Acquisition Strategy: The advanced lightweight mat acquisition strategy envisions the solicitation of candidate material panels from commercial sources for evaluation in the laboratory and in the operational environment. Upon qualification of a viable material, limited production quantities will be procured for full scale environmental, performance, and operational testing. Production quantities will be procured from the commercial source in accordance with Marine Corps priorities.</p> <p>The arresting gear acquisition strategy is predicated on the creation of a fully integrated team consisting of Navy and contractor personnel. Initial technology development and system design effort will be shared between the partners. The commercial partner will take the lead in the prototype manufacturing effort; the Navy partner will lead the test effort; and the commercial partner will ultimately be tasked with system production.</p>									<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To Complete</u>	Related RDT&E: N/A	0	0	0	5.435	6.443	6.532	6.731	0
	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To Complete</u>																	
Related RDT&E: N/A	0	0	0	5.435	6.443	6.532	6.731	0																	

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Exhibit R-2a, RDT&E Project Justification
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EXHIBIT R-2a, RDT&E Project Justification		DATE:
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, N / BA 4	Carrier Systems Development - 0603512N	EAF Matting W2269
D. Schedule Profile	<u>FY 1999</u>	<u>FY 2000</u> <u>FY2001</u>
Program Milestones		
Engineering Milestones	A/G PDR 1Q 99 CDR 4Q 99	A/G 2 Proto 4Q 00
T&E Milestones		A/G DT 1Q-3Q 01
Contract Milestones		

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Exhibit R-2a, RDT&E Project Justification
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Exhibit R-3 Cost Analysis (page 1)								DATE: February 2000				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NAME AND NUMBER						
RDT&E, N / BA 4			Carrier Systems Development - 0603512N			EAF Matting W2269						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development	CPAF	ESCO	4.209	0.746	06/98	2.826	06/98	1.340	06/98	0.000	9.121	9.961
Ancillary Hardware Development	WX	NAWCAD LKE	3.629	1.306	10/98	0.713	10/99	2.872	10/00	0.307	8.827	N/A
Systems Engineering												
Licenses												
Tooling												
Award Fees	CPAF	ESCO								0.564	0.564	N/A
Non-Add BTR for M-31 A/G												
Subtotal Product Development			7.838	2.052		3.539		4.212		0.871	18.512	
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		0.000	0.000	
Remarks: None												

R-1 SHOPPING LIST - Item No. 38-32 of 38-33

Exhibit R-3, Project Cost Analysis
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Exhibit R-3 Cost Analysis (page 2)										DATE: February 2000		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA 4			PROGRAM ELEMENT Carrier Systems Development - 0603512N			PROJECT NAME AND NUMBER EAF Matting W2269						
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 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		0.000		0.000		0.000	0.000	
Remarks: N/A												
Contractor Engineering Support											0.000	
Government Engineering Support											0.000	
Program Management Support											0.000	
Travel											0.000	
Labor (Research Personnel)											0.000	
Overhead											0.000	
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks: N/A												
Total Cost			7.838	2.052		3.539		4.212		0.871	18.512	
Remarks: N/A												

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