

# UNCLASSIFIED

CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification						DATE:		February 2005	
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-04				R-1 ITEM NOMENCLATURE 0603512N - Carrier Systems Development					
COST (\$ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	
Total PE Cost	150.169	162.007	167.823	198.395	160.688	155.120	146.126	85.451	
9181 - Advanced Battlestation/Decision Support System	3.458	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
9349 - Aviation Ship Integration Center	9.425	3.665	0.000	0.000	0.000	0.000	0.000	0.000	
9515 - Sentinel Net	0.000	1.091	0.000	0.000	0.000	0.000	0.000	0.000	
9516 - Surface Ship Composite Moisture Separators	0.000	2.377	0.000	0.000	0.000	0.000	0.000	0.000	
2208 - CVN 21	93.598	102.372	109.362	59.090	49.698	56.873	58.736	42.821	
4004 - EMALS	37.173	50.600	56.630	58.538	26.312	13.455	0.000	0.000	
4005 - Smart Carrier	1.836	1.825	1.831	1.820	1.828	1.823	1.863	1.903	
4006 - CVN 21 Follow Ship	0.000	0.000	0.000	78.947	82.850	82.969	85.527	40.727	
1723 - CV Launch & Recovery Systems	4.679	0.077	0.000	0.000	0.000	0.000	0.000	0.000	
<p><b>A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:</b> This Navy unique program addresses all technology areas associated with Navy/Marine Corps aircraft operations aboard ships. The program includes:</p> <p>- (U) (9181) - The Advanced Battlestation/Decision Support System (ABS/DSS) provides a low-risk decision support capability that has great potential for multiple Navy platforms and possible application for other services. Expected benefits include: improved situational awareness, reduced response time in a multiple threat environment, manpower reductions, and reductions in Total Ownership Costs (TOC).</p> <p>- (U) (9349) - The Aviation Ship Integration Center provides an environment that supports the development and conceptualization of fully integrated future aircraft carrier advanced technology design. The Center will be used to identify, test, and integrate potential design approaches and products for the CVN 21 Warfare System that are focused on reducing costs by increasing efficiencies in air capable shipbuilding programs. The Center will mitigate CVN 21 advanced technology design risk by enabling detection and resolution of potential problems early in the development cycle, thereby maximizing the Navy's return on its non-recurring design investment and enhancing transformational initiatives necessary to support the CVN 21 Warfare System.</p> <p>- (U) (9515) - Sentinel Net provides a low-risk sensor processing method that builds on the Aircraft Carrier's Tactical Support Center's (CV-TSC) Command and Control (C2) Suite to yield a harbor defense or force protection C2 capability aboard the Carriers.</p>									

R-1 SHOPPING LIST - Item No.

38

UNCLASSIFIED

Exhibit R-2, RDTE Budget Item Justification  
(Exhibit R-2, page 1 of 72)

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification		DATE:	February 2005
APPROPRIATION/BUDGET ACTIVITY		R-1 ITEM NOMENCLATURE	
RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-04		0603512N - Carrier Systems Development	
<p>- (U) (9516) -Development of Composite Moisture Separators and a related manufacturing process for the CVN 21 Class Aircraft Carrier to replace the stainless steel moisture separators currently in use in NIMITZ Class Aircraft Carrier ventilation systems. The ventilation system has intake air inlets on the shell of the ship. At these inlets there currently are baffled stainless steel moisture separators that reduce the amount of entrained moisture in the air before it gets into the ventilation ducts, thus reducing the amount of corrosion of the ventilation ducts. These stainless steel moisture separators are heavy, and by converting them to a composite moisture separator, topside weight will be reduced. Reducing topside weight supports the CVN 21 Class Key Performance Parameters for Weight and Stability.</p> <p>- (U) (2208) - Development of ship hull, mechanical, propulsion, electrical, aviation, and combat support systems, subsystems and components to significantly improve aircraft carrier affordability, manpower requirements, 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.</p> <p>- (U) (4004) - Development of an advanced technology aircraft launch system in support of the CVN 21 Class design and construction schedule. The Electro Magnetic Aircraft Launch System (EMALS) will replace the current steam catapult on CVN 21 Class ships and could also be retrofit on existing CVNs. EMALS provides better control of applied forces, both peak and transient dynamic, improved reliability and maintainability, increased operational availability and reduced operator and maintainer workload.</p> <p>- (U) (4005) - The Smart Carrier Demonstration and Validation program exploits available technologies to deliver an affordable, robust, operator-friendly automation control environment for Navy Aircraft Carrier shipboard equipment. The program provides the system architecture, requirements/specification development, technology selection, software development (including software baseline), as well as land-based and shipboard testing of new technologies to improve shipboard operations and to reduce workload, manpower requirements, and Total Ownership Costs (TOC).</p> <p>- (U) (4006) - Development of aircraft carrier specific technologies, the infusion of the ship technology base into existing and future aircraft carriers and the potential realization of subsystem design capabilities not currently feasible. This project also funds the Contract Design efforts for the CVN 79.</p> <p>- (U) (1723) -- 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.</p>			

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED

Exhibit R-2, RDTE Budget Item Justification  
(Exhibit R-2, page 2 of 72)

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification							DATE: <b>February 2005</b>	
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-04</b>		PE 0603512N - Carrier Systems Development			PROJECT NUMBER AND NAME <b>PU 9181 - Advanced Battlestation/Decision Support System</b>			
COST (\$ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project Cost	<b>3.458</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
RDT&E Articles Qty								
<p><b>A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:</b></p> <p>The Advanced Battlestation/Decision Support System (ABS/DSS) provides a low-risk decision support capability that has great potential for multiple Navy platforms, and possible application for other services. Expected benefits include: improved situational awareness, reduced response time in a multiple threat environment, manpower reductions, and reductions in Total Ownership Costs (TOC).</p>								

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: <b>February 2005</b>																
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-04</b>	PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>	PROJECT NUMBER AND NAME <b>PU 9181 - Advanced Battlestation/Decision Support System</b>																	
<b>B. Accomplishments/Planned Program (Cont.)</b> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <th style="width: 40%;"></th> <th style="width: 10%;">FY 04</th> <th style="width: 10%;">FY 05</th> <th style="width: 10%;">FY 06</th> <th style="width: 10%;">FY 07</th> </tr> <tr> <td>Advanced Battlestation/Decision Support System (ABS/DSS)</td> <td style="text-align: center;">3.458</td> <td style="text-align: center;">0.000</td> <td style="text-align: center;">0.000</td> <td style="text-align: center;">0.000</td> </tr> <tr> <td>RDT&amp;E Articles Quantity</td> <td></td> <td></td> <td></td> <td></td> </tr> </table> <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"> <p>- <b>(U) Advanced Battlestation/Decision Support System (ABS/DSS)</b> FY04 technical accomplishments include Combat System test and certification at the Integrated Combat System Test Facility (ICSTF), San Diego, CA. ABS/DSS will be fully integrated into the Aircraft Carrier Tactical Support Center (CV-TSC) and Integrated Warfare Commander Cell (IWCC) initially as a passive display technology, then augmented as a fully integrated element of the Combat System. Fleet demonstrations/requirements working groups are planned for USS KITTY HAWK (CV-63), USS ENTERPRISE (CVN-65), USS EISENHOWER (CVN-69), and USS RONALD REAGAN (CVN-76), depending on field change installation approval cycles.</p> </div>						FY 04	FY 05	FY 06	FY 07	Advanced Battlestation/Decision Support System (ABS/DSS)	3.458	0.000	0.000	0.000	RDT&E Articles Quantity				
	FY 04	FY 05	FY 06	FY 07															
Advanced Battlestation/Decision Support System (ABS/DSS)	3.458	0.000	0.000	0.000															
RDT&E Articles Quantity																			

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: <b>February 2005</b>																																														
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA 04</b>	PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>	PROJECT NUMBER AND NAME <b>PU 9181 - Advanced Battlestation/Decision Support System</b>																																															
<p><b>C. PROGRAM CHANGE SUMMARY:</b></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 40%;"></th> <th style="text-align: right; width: 15%;">FY 2004</th> <th style="text-align: right; width: 15%;">FY 2005</th> <th style="text-align: right; width: 15%;">FY 2006</th> <th style="text-align: right; width: 15%;">FY 2007</th> </tr> </thead> <tbody> <tr> <td>Funding:</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>FY2005 President's Budget</td> <td style="text-align: right;">3.560</td> <td style="text-align: right;">0.000</td> <td style="text-align: right;">0.000</td> <td style="text-align: right;">0.000</td> </tr> <tr> <td>FY2006 President's Budget</td> <td style="text-align: right;">3.458</td> <td style="text-align: right;">0.000</td> <td style="text-align: right;">0.000</td> <td style="text-align: right;">0.000</td> </tr> <tr> <td>Total Adjustments</td> <td style="text-align: right; border-top: 1px solid black;">-0.102</td> <td style="text-align: right; border-top: 1px solid black;">0.000</td> <td style="text-align: right; border-top: 1px solid black;">0.000</td> <td style="text-align: right; border-top: 1px solid black;">0.000</td> </tr> <tr> <td colspan="5" style="padding-top: 10px;">Summary of Adjustments</td> </tr> <tr> <td style="padding-left: 20px;">Inflation Savings</td> <td style="text-align: right;">-0.003</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="padding-left: 20px;">SBIR Tax Assessment</td> <td style="text-align: right;">-0.099</td> <td></td> <td></td> <td></td> </tr> <tr> <td style="padding-left: 20px;">Total Adjustments</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 3px double black;">-0.102</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 3px double black;">0.000</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 3px double black;">0.000</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 3px double black;">0.000</td> </tr> </tbody> </table> <p style="margin-top: 20px;">Schedule:</p> <p style="margin-left: 20px;">Contract Award Q2FY05.</p> <p style="margin-top: 20px;">Technical:</p> <p style="margin-left: 20px;">Not Applicable.</p>						FY 2004	FY 2005	FY 2006	FY 2007	Funding:					FY2005 President's Budget	3.560	0.000	0.000	0.000	FY2006 President's Budget	3.458	0.000	0.000	0.000	Total Adjustments	-0.102	0.000	0.000	0.000	Summary of Adjustments					Inflation Savings	-0.003				SBIR Tax Assessment	-0.099				Total Adjustments	-0.102	0.000	0.000	0.000
	FY 2004	FY 2005	FY 2006	FY 2007																																													
Funding:																																																	
FY2005 President's Budget	3.560	0.000	0.000	0.000																																													
FY2006 President's Budget	3.458	0.000	0.000	0.000																																													
Total Adjustments	-0.102	0.000	0.000	0.000																																													
Summary of Adjustments																																																	
Inflation Savings	-0.003																																																
SBIR Tax Assessment	-0.099																																																
Total Adjustments	-0.102	0.000	0.000	0.000																																													

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED

**UNCLASSIFIED**

**Exhibit R-2, RDTEN Budget Item Justification**  
(Exhibit R-2, page 6 of 72)

R-1 SHOPPING LIST - Item No. 38

**UNCLASSIFIED**

**Exhibit R-2, RDTEN Budget Item Justification**  
(Exhibit R-2, page 7 of 72)

Exhibit R-3 Cost Analysis (page 1)

February 2005

Remarks: Contract Award 4th Quarter FY03

## UNCLASSIFIED

## CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)										DATE: <b>February 2005</b>				
APPROPRIATION/BUDGET ACTIVITY <b>RDTE, N / BA-04</b>			PROGRAM ELEMENT <b>PE 0603512N - Carrier Systems Development</b>			PROJECT NUMBER AND NAME <b>PU 9181 - Advanced Battlestation/Decision Support System</b>								
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	FY 06 Cost	FY 06 Award Date	FY 07 Cost	FY 07 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation														
Operational Test & Evaluation														
Live Fire Test & Evaluation														
Test Assets														
Tooling														
GFE														
Award Fees														
Subtotal T&E			0.000	0.000		0.000		0.000		0.000		0.000	0.000	
Remarks:														
Contractor Engineering Support														
Government Engineering Support														
Program Management Support														
Travel														
Transportation														
SBIR Assessment														
Subtotal Management			0.000	0.000		0.000		0.000				0.000	0.000	
Remarks:														
Total Cost			3.428	3.458		0.000		0.000				0.000	6.886	
Remarks:														

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED



UNCLASSIFIED

CLASSIFICATION:

EXHIBIT R4, Schedule Profile																								DATE:											
APPROPRIATION/BUDGET ACTIVITY												PROGRAM ELEMENT NUMBER AND NAME												PROJECT NUMBER AND NAME											
RDT&E, N / BA-04												PE 0603512N - Carrier Systems Development												PU 9181 - Advanced Battlestation/Decision Support System											
Fiscal Year	2004				2005				2006				2007				2008				2009				2010				2011						
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4							
Acquisition Milestones																																			
ABS/DSS Development			PDR					IOC																											
ABS/DSS Fleet Demo									CVN-76 CV-63				CVN-65				CVN-69																		
Follow-on Development/ Spiral I																																			
Test & Evaluation Milestones																																			
Development Test	DT C1								DT C2																										
Contract Milestones																																			
Development Contract	Contract Award							Contract Award																											

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED

**UNCLASSIFIED**

**CLASSIFICATION:**

[illegible]

R-1 SHOPPING LIST - Item No. 38

**UNCLASSIFIED**

**Exhibit R-2, RD TEN Budget Item Justification**  
(Exhibit R-2, page 10 of 72)

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification							DATE: <b>February 2005</b>	
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-04</b>		PE 0603512N - Carrier Systems Development			PROJECT NUMBER AND NAME <b>PU 9515 - Sentinel Net for Anti-Terrorism and Force Protection</b>			
COST (\$ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project Cost	<b>0.000</b>	<b>1.091</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
RDT&E Articles Qty								
<p><b>A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:</b></p> <p>Sentinel Net provides a low-risk sensor processing method that builds on the Aircraft Carrier's Tactical Support Center's (CV-TSC) Command and Control (C2) Suite to yield a harbor defense or force protection C2 capability aboard the Carriers.</p>								

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: <b>February 2005</b>															
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-04</b>	PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>	PROJECT NUMBER AND NAME <b>PU 9515 - Sentinel Net for Anti-Terrorism and Force Protection</b>															
<b>B. Accomplishments/Planned Program (Cont.)</b>																	
<table border="1" style="width: 100%; border-collapse: collapse;"><thead><tr><th style="width: 40%;"></th><th style="width: 15%;">FY 04</th><th style="width: 15%;">FY 05</th><th style="width: 15%;">FY 06</th><th style="width: 15%;">FY 07</th></tr></thead><tbody><tr><td>Advanced Battlestation/Decision Support System (ABS/DSS)</td><td style="text-align: center;">0.000</td><td style="text-align: center;">1.091</td><td style="text-align: center;">0.000</td><td style="text-align: center;">0.000</td></tr><tr><td>RDT&amp;E Articles Quantity</td><td></td><td></td><td></td><td></td></tr></tbody></table>				FY 04	FY 05	FY 06	FY 07	Advanced Battlestation/Decision Support System (ABS/DSS)	0.000	1.091	0.000	0.000	RDT&E Articles Quantity				
	FY 04	FY 05	FY 06	FY 07													
Advanced Battlestation/Decision Support System (ABS/DSS)	0.000	1.091	0.000	0.000													
RDT&E Articles Quantity																	
<div style="border: 1px solid black; min-height: 100px; margin-top: 10px;"></div>																	

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: <b>February 2005</b>																																														
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA 04</b>	PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>	PROJECT NUMBER AND NAME <b>PU 9515 - Sentinel Net for Anti-Terrorism and Force Protection</b>																																															
<p><b>C. PROGRAM CHANGE SUMMARY:</b></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 40%;"></th> <th style="text-align: right; width: 15%;">FY 2004</th> <th style="text-align: right; width: 15%;">FY 2005</th> <th style="text-align: right; width: 15%;">FY 2006</th> <th style="text-align: right; width: 15%;">FY 2007</th> </tr> </thead> <tbody> <tr> <td>Funding:</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>FY2005 President's Budget</td> <td style="text-align: right;">0.000</td> <td style="text-align: right;">0.000</td> <td style="text-align: right;">0.000</td> <td style="text-align: right;">0.000</td> </tr> <tr> <td>FY2006 President's Budget</td> <td style="text-align: right;">0.000</td> <td style="text-align: right;">1.091</td> <td style="text-align: right;">0.000</td> <td style="text-align: right;">0.000</td> </tr> <tr> <td>Total Adjustments</td> <td style="text-align: right; border-top: 1px solid black;">0.000</td> <td style="text-align: right; border-top: 1px solid black;">1.091</td> <td style="text-align: right; border-top: 1px solid black;">0.000</td> <td style="text-align: right; border-top: 1px solid black;">0.000</td> </tr> <tr> <td colspan="5" style="padding-top: 10px;">Summary of Adjustments</td> </tr> <tr> <td style="padding-left: 20px;">Congressional Add</td> <td></td> <td style="text-align: right;">1.100</td> <td></td> <td></td> </tr> <tr> <td style="padding-left: 40px;">Recission</td> <td></td> <td style="text-align: right;">-0.009</td> <td></td> <td></td> </tr> <tr> <td style="padding-left: 20px;">Total Adjustments</td> <td style="text-align: right; border-top: 1px solid black;">0.000</td> <td style="text-align: right; border-top: 1px solid black;">1.091</td> <td style="text-align: right; border-top: 1px solid black;">0.000</td> <td style="text-align: right; border-top: 1px solid black;">0.000</td> </tr> </tbody> </table> <p style="margin-top: 20px;">Schedule:</p> <p style="margin-left: 20px;">FY05 Contract Award Q2FY05.</p> <p style="margin-top: 20px;">Technical:</p> <p style="margin-left: 20px;">Not Applicable.</p>						FY 2004	FY 2005	FY 2006	FY 2007	Funding:					FY2005 President's Budget	0.000	0.000	0.000	0.000	FY2006 President's Budget	0.000	1.091	0.000	0.000	Total Adjustments	0.000	1.091	0.000	0.000	Summary of Adjustments					Congressional Add		1.100			Recission		-0.009			Total Adjustments	0.000	1.091	0.000	0.000
	FY 2004	FY 2005	FY 2006	FY 2007																																													
Funding:																																																	
FY2005 President's Budget	0.000	0.000	0.000	0.000																																													
FY2006 President's Budget	0.000	1.091	0.000	0.000																																													
Total Adjustments	0.000	1.091	0.000	0.000																																													
Summary of Adjustments																																																	
Congressional Add		1.100																																															
Recission		-0.009																																															
Total Adjustments	0.000	1.091	0.000	0.000																																													

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED

**UNCLASSIFIED**

**CLASSIFICATION:**

EXHIBIT R-2a, RDT&E Project Justification		DATE: <b>February 2005</b>
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-04</b>	PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>	PROJECT NUMBER AND NAME <b>PU 9515 - Sentinel Net for Anti-Terrorism and Force Protection</b>
<b>D. OTHER PROGRAM FUNDING SUMMARY:</b>		
<b>E. ACQUISITION STRATEGY:</b> This procurement is an SBIR transition and will be awarded on a sole source basis to 21st Century Systems, Inc., Omaha, Nebraska.		
<b>F. MAJOR PERFORMERS:</b> Johns Hopkins University Applied Physics Laboratory (JHU/APL), MD. 21st Century Systems, Inc., Omaha, NE, Development		

R-1 SHOPPING LIST - Item No. 38

**UNCLASSIFIED**

**Exhibit R-2, RD TEN Budget Item Justification**  
(Exhibit R-2, page 15 of 72)

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED

## CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)										DATE: <b>February 2005</b>				
APPROPRIATION/BUDGET ACTIVITY <b>RDTE, N / BA-04</b>			PROGRAM ELEMENT <b>PE 0603512N - Carrier Systems Development</b>			PROJECT NUMBER AND NAME <b>PU 9515 - Sentinel Net for Anti-Terrorism and Force Protection</b>								
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	FY 06 Cost	FY 06 Award Date	FY 07 Cost	FY 07 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation														
Operational Test & Evaluation														
Live Fire Test & Evaluation														
Test Assets														
Tooling														
GFE														
Award Fees														
Subtotal T&E			0.000	0.000		0.000		0.000		0.000		0.000	0.000	
Remarks:														
Contractor Engineering Support														
Government Engineering Support														
Program Management Support														
Travel														
Transportation														
SBIR Assessment														
Subtotal Management			0.000	0.000		0.000		0.000				0.000	0.000	
Remarks:														
Total Cost			0.000	0.000		1.091		0.000				0.000	1.091	
Remarks:														

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED



UNCLASSIFIED

CLASSIFICATION:

EXHIBIT R4, Schedule Profile																								DATE:								
APPROPRIATION/BUDGET ACTIVITY										PROGRAM ELEMENT NUMBER AND NAME										PROJECT NUMBER AND NAME												
RDT&E, N / BA-04										PE 0603512N - Carrier Systems Development										PU 9515 - Sentinel Net for Anti-Terrorism and Force Protection												
Fiscal Year	2004				2005				2006				2007				2008				2009				2010				2011			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Acquisition Milestones																																
Sentinel Net Devel. Spiral 1																																
Sentinel Net Fleet Demo																																
Follow-on Development/ Spiral 2																																
Test & Evaluation Milestones																																
Development Test																																
Contract Milestones																																
Development Contract																																

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED

**UNCLASSIFIED**

**Exhibit R-2, RD TEN Budget Item Justification**  
(Exhibit R-2, page 18 of 72)

R-1 SHOPPING LIST - Item No. 38

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE:
								<b>February 2005</b>
APPROPRIATION/BUDGET ACTIVITY	PROJECT NUMBER AND NAME							
RDT&E, N / BA-04	PE 0603512N - Carrier Systems Development				PU 9349 Aviation Ship Integration Center			
COST (\$ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY2010	FY2011
Project Cost	9.425	3.665	0.000	0.000	0.000	0.000	0.000	0.000
RDT&E Articles Qty								

### A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Northrop Grumman Newport News (NGNN) Virginia Aviation Ship Integration Center (VASCIC) provides an environment that supports the development and conceptualization of a fully integrated future aircraft carrier advanced technology design. The Center will be used to identify, test, and integrate potential design approaches and products for the CVN 21 Combat/Warfare System that are focused on reducing costs by increasing efficiencies in air capable shipbuilding programs. The Center will mitigate CVN 21 advanced technology design risk by enabling detection and resolution of potential problems early in the development cycle, thereby maximizing the Navy's return on its non-recurring design investment and enhancing transformational initiatives necessary to support the CVN 21 Warfare System.

UNCLASSIFIED

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: <b>February 2005</b>	
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-04</b>	PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>	PROJECT NUMBER AND NAME <b>PU 9349 Aviation Ship Integration Center</b>		
<b>B. Accomplishments/Planned Program (Cont.)</b>				
	FY 04	FY 05	FY 06	FY 07
Accomplishments/Effort/Subtotal Cost	9.425	3.665	0.000	0.000
RDT&E Articles Quantity				
<p><b>- (U) Aviation Ship Integration Center</b> - Develop modeling and simulation capability through integration of existing M&amp;S assets with new M&amp;S Systems. Investigate and develop connectivity to various government and industry M&amp;S activities. Relocate the existing M&amp;S facility to the VASCIC Research Center. Build a support structure in the Center, procure hardware and software, and integrate various commercial and government M&amp;S software programs. Develop and implement an Aircraft Carrier Compartment Flexibility/Modularity Program and laboratory to provide an evaluation environment for investigating, prototyping, testing and qualifying new compartment outfitting techniques and products focusing on reducing the construction cost and schedule impacts associated with the installation of electronic systems during new construction and improving fleet maintenance and modernization after delivery. Investigate existing commercial and military technologies that have the potential to simplify and accelerate the equipment installation process during ship construction and technology refresh/reconfiguration updates. Develop a prototype test bed to: examine the use of advanced materials to improve cost/performance of existing modular deck tile and reduce weight; examine the adaptation of aircraft technology clamping devices to reduce outfitting durations; examine alternative methods of modular deck installation to decrease installation times; and aid in the development of simulations and models to analyze the shock and vibration characteristics of modular decking. Continue the application of Modeling and Simulation to aid in the CVN 21 ship design. Develop a facility in the VASCIC to investigate and develop connectivity to various government and industry M&amp;S activities, and develop a M&amp;S laboratory within the VASCIC to support the ship design and sortie generation rate analysis and to facilitate CVN 21 participation in future battle-space experiments.</p>				

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: <b>February 2005</b>	
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA 04</b>	PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>	PROJECT NUMBER AND NAME <b>PU 9349 Aviation Ship Integration Center</b>		

**C. PROGRAM CHANGE SUMMARY:**

	FY 2004	FY 2005	FY 2006	FY 2007
Funding:				
FY05 President's Budget	9.691	0.000	0.000	0.000
FY06 President's Budget	9.425	3.665	0.000	0.000
Total Adjustments	-0.266	3.665	0.000	0.000
Summary of Adjustments				
Inflation Savings	-0.009			
SBIR	-0.257			
Congressional Add		3.700		
Recissions		-0.034		
Other Adjustments		-0.001		
Total Adjustments	-0.266	3.665	0	0

Schedule:

The CVN 78 Basic Construction contract will be awarded in FY08 with delivery in FY15.

Technical:

Not Applicable.

UNCLASSIFIED

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE: <b>February 2005</b>		
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-04</b>			PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>			PROJECT NUMBER AND NAME <b>PU 9349 Aviation Ship Integration Center</b>				
<b>D. OTHER PROGRAM FUNDING SUMMARY:</b>										
<u>Line Item No. &amp; Name</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>Complete</u>	<u>Total Cost</u>
SCN: 200100 - Carrier Replacement Program	1,162.905	623.551	564.913	795.994	3,689.413	3,730.407	1,657.362	539.680	Cont.	Cont.
RDT&E:										
0604567N - Ship Contract Design, Live Fire T&E	112.730	136.516	55.672	86.506	83.826	59.393	40.082	87.499	Cont.	Cont.
0603570N - Advanced Nuclear Power Systems	198.814	168.080	168.373	170.980	160.992	152.814	133.951	105.975	Cont.	Cont.
<b>E. ACQUISITION STRATEGY:</b>										
The CVN 78 will be the first ship of the CVN 21 class of aircraft carriers consisting of 12 ships. Due to the length and cost of construction, each carrier will be contracted for separately. The CVN 78 will feature a new nuclear propulsion and electrical generation/distribution system, new electromagnetic aircraft launching system, advanced arresting gear system, all electric auxiliaries, warfare system improvements, survivability enhancements, improved weapons handling, and improved aircraft servicing. These design features will result in lower manpower and total ownership costs as compared to the Nimitz Class. Additionally, the following warfighting benefits will be realized: increased sortie generation rate, improved ship self defense capability, increased launch and recovery capability/flexibility, increased operational availability, and increased flexibility to support future upgrades.										
<b>F. MAJOR PERFORMERS:</b>										
Northrop Grumman Newport News, Newport News, VA, Design/Component Development/Construction										

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED

**UNCLASSIFIED**

**Exhibit R-2, RD TEN Budget Item Justification**  
(Exhibit R-2, page 23 of 72)

R-1 SHOPPING LIST - Item No. 38

# UNCLASSIFIED

## CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)												DATE: <b>February 2005</b>		
APPROPRIATION/BUDGET ACTIVITY <b>RD&amp;E, N / BA-04</b>			PROGRAM ELEMENT <b>PE 0603512N - Carrier Systems Development</b>							PROJECT NUMBER AND NAME <b>PU 9349 Aviation Ship Integration Center</b>				
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	FY 06 Cost	FY 06 Award Date	FY 07 Cost	FY 07 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation													0.000	
Operational Test & Evaluation														
Live Fire Test & Evaluation														
Test Assets														
Tooling														
GFE														
Award Fees														
Subtotal T&E			0.000	0.000		0.000		0.000		0.000		0.000	0.000	
Remarks:														
Contractor Engineering Support													0.000	
Government Engineering Support														
Program Management Support														
Travel														
Transportation														
SBIR Assessment														
Subtotal Management			0.000	0.000		0.000		0.000		0.000		0.000	0.000	
Remarks:														
Total Cost			0.000	9.425		3.665		0.000		0.000		0.000	13.090	
Remarks:														

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED



# UNCLASSIFIED

CLASSIFICATION:

EXHIBIT R4, Schedule Profile																								DATE:										
APPROPRIATION/BUDGET ACTIVITY												PROGRAM ELEMENT NUMBER AND NAME												PROJECT NUMBER AND NAME										
RDT&E, N / BA-04												PE 0603512N - Carrier Systems Development												PU 9349 Aviation Ship Integration Center										
Fiscal Year	2004				2005				2006				2007				2008				2009				2010				2011					
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4						
Acquisition Milestones		MS B △	SRR △				SFR △		PDR △				CDR △	DAB △	PR																			
Propulsion Plant																																		
EMALS		SDD AWARD △			SRR △	SFR △	PDR △	CDR 1 △		CDR 2 △		TRR 1 △		TRR 2 △						LRIP △														
DBR Radar Suite		PDR △			CDR △																													
Advanced Arresting Gear	SRR △			PDR △	MS B △			CDR-1-2 △					TRR 1 △							TRR 2 △				MSC △										
Test & Evaluation Milestones																																		
Development Test	◇	DT A2							◇	◇	DT B1							◇	◇	DT B2							◇	◇	DT B3					
Operational Test						◇	OT B1		◇				◇	OT B2			◇	◇	OT B3			◇	◇	OT B4			◇			◇	OT B5			◇
Contract Milestones																																		
IPPD Contract																																		
CP Contract		Contract Award △																																
Construction Contract																	Contract Award △																	
Full Funding (SCN)																		X																

R-1 SHOPPING LIST - Item No. 38

\* Not required for Budget Activities 1, 2, 3, and 6

UNCLASSIFIED

Exhibit R-2, RD TEN Budget Item Justification  
(Exhibit R-2, page 25 of 72)

# UNCLASSIFIED

CLASSIFICATION:

Exhibit R-4a, Schedule Detail							DATE: February 2005		
APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT				PROJECT NUMBER AND NAME			
RDT&E, N / BA-04		PE 0603512N - Carrier Systems Development				PU 9349 Aviation Ship Integration Center			
Schedule Profile	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	
Developmental Tests DT A-2	1-4Q								
Advanced Arresting Gear SRR	1Q								
EMALS SDD Phase Initiate	2Q								
Dual Band Radar PDR	2Q								
CVN 21 Milestone B	3Q								
CVN 21 SRR	3Q								
Construction Preparation Contract Award	3Q								
Advanced Arresting Gear PDR	4Q								
EMALS SRR		1Q							
Developmental Tests DT A-2		1-4Q							
Dual Band Radar CDR		1Q							
Advanced Arresting Gear Milestone B		1Q							
Operational Tests OT-B1		2-3Q							
EMALS SFR		2Q							
CVN 21 SFR		3Q							
EMALSP PDR		3Q							
EMALS CDR 1		4Q							
Advanced Arresting Gear CDR 1		4Q							
CVN 21 PDR			1Q						
Developmental Tests DT A-2			1-4Q						
AAG CDR 2			1Q						
EMALS CDR 2			2Q						
EMALS TRR 1(HALT/HCT)			4Q						
CVN 21 CDR				1Q					
Developmental Tests DT-B1				1-4Q					
Operational Tests OT-B2				1-4Q					
CVN 21 DAB PR				2Q					
AAG TRR 1 (DT/OA)				2Q					
EMALS TRR 2 (DT/OA)				4Q					
CVN 21 Construction Contract Award					1Q				
CVN 21 SCN Full Funding					1Q				
Developmental Tests DT-B1					1-4Q				
Operational Tests OT-B3					1-4Q				
EMALS LRIP					4Q				
AAG TRR 2 (DT/OA)						1Q			
Developmental Tests DT-B1						1Q			
Operational Tests OT-B4						1-4Q			
Developmental Tests DT-B2						3-4Q			
Developmental Tests DT-B2							1-4Q		
AAG LRIP								1Q	
Operational Tests OT-B5								1-4Q	
Developmental Tests DT-B3								2-4Q	

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE: <b>February 2005</b>	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-04		PE 0603512N - Carrier Systems Development			PROJECT NUMBER AND NAME PU 9516 Surface Ship Composite Moisture Separators				
COST (\$ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY2010	FY2011	
Project Cost	0.000	2.377	0.000	0.000	0.000	0.000	0.000	0.000	
RDT&E Articles Qty									

**A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:**

This item funds design and development of Composite Moisture Separators and a related manufacturing process for the CVN 21 Class Aircraft Carrier to replace the stainless steel moisture separators currently in use in NIMITZ Class Aircraft Carrier ventilation systems. The ventilation system has intake air inlets on the shell of the ship. At these inlets there currently are baffled stainless steel moisture separators that reduce the amount of entrained moisture in the air before it gets into the ventilation ducts, thus reducing the amount of corrosion of the ventilation ducts. These stainless steel moisture separators are heavy, and by converting them to a composite moisture separator, topside weight will be reduced. Reducing topside weight supports the CVN 21 Class Key Performance Parameters for Weight and Stability.

UNCLASSIFIED

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: <b>February 2005</b>	
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-04</b>	PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>	PROJECT NUMBER AND NAME <b>PU 9516 Surface Ship Composite Moisture Separators</b>		
<b>B. Accomplishments/Planned Program (Cont.)</b>				
	FY 04	FY 05	FY 06	FY 07
Accomplishments/Effort/Subtotal Cost	0.000	2.377	0.000	0.000
RDT&E Articles Quantity				
<p>- (U) Surface Ship Composite Moisture Separators - Perform a ship design analysis of moisture separator sizes, locations and quantities in the ship. Work with vendor to choose a representative size for which to develop a prototype. Select and prove out the manufacturing process, materials and the design for the vanes and frame system, ensuring quality and producibility. As part of the component design process, perform pressure drop analysis, as well as airflow and moisture separation analysis at both the sub-element and full scale level. Produce one prototype unit. Develop an acquisition and life cycle cost analysis and a plan of action and milestone for testing, qualifying and installation of the prototype unit on a ship for evaluation.</p>				

R-1 SHOPPING LIST - Item No.

38

UNCLASSIFIED

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: <b>February 2005</b>	
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA 04</b>	PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>	PROJECT NUMBER AND NAME <b>PU 9516 Surface Ship Composite Moisture Separators</b>		

**C. PROGRAM CHANGE SUMMARY:**

	FY 2004	FY 2005	FY 2006	FY 2007
Funding:				
FY05 President's Budget	0.000	0.000	0.000	0.000
FY06 President's Budget	0.000	2.377	0.000	0.000
Total Adjustments	0.000	2.377	0.000	0.000
Summary of Adjustments				
Congressional Add		2.400		
Recissions		-0.022		
Other adjustments		-0.001		
Total Adjustments	0	2.377	0.000	0.000

Schedule:

The CVN 78 Basic Construction contract will be awarded in FY08 with delivery in FY15.

Technical:

Not Applicable.

UNCLASSIFIED

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE: <b>February 2005</b>		
APPROPRIATION/BUDGET ACTIVITY <b>RDTE, N / BA-04</b>			PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>			PROJECT NUMBER AND NAME <b>PU 9516 Surface Ship Composite Moisture Separators</b>				

**D. OTHER PROGRAM FUNDING SUMMARY:**

Line Item No. & Name	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	Complete	Total Cost
SCN: 200100 - Carrier Replacement Program	1,162.905	623.551	564.913	795.994	3,689.413	3,730.407	1,657.362	539.680	Cont.	Cont.
RDT&E:										
0604567N - Ship Contract Design, Live Fire T&E	112.730	136.516	55.672	86.506	83.826	59.393	40.082	87.499	Cont.	Cont.
0603570N - Advanced Nuclear Power Systems	198.814	168.080	168.373	170.980	160.992	152.814	133.951	105.975	Cont.	Cont.
*Note: Only a portion of the funding in PE 0603570N is included in the CVN 21 Program										

**E. ACQUISITION STRATEGY:**

The CVN 78 will be the first ship of the CVN 21 class of aircraft carriers consisting of 12 ships. Due to the length and cost of construction, each carrier will be contracted for separately. The CVN 78 will feature a new nuclear propulsion and electrical generation/distribution system, new electromagnetic aircraft launching system, advanced arresting gear system, all electric auxiliaries, warfare system improvements, survivability enhancements, improved weapons handling, and improved aircraft servicing. These design features will result in lower manpower and total ownership costs as compared to the Nimitz Class. Additionally, the following warfighting benefits will be realized: increased sortie generation rate, improved ship self defense capability, increased launch and recovery capability/flexibility, increased operational availability, and increased flexibility to support future upgrades.

**F. MAJOR PERFORMERS:**

Northrop Grumman Newport News, Newport News, VA, Design/Component Development/Construction

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED

**UNCLASSIFIED**

**Exhibit R-2, RD TEN Budget Item Justification**  
(Exhibit R-2, page 31 of 72)

R-1 SHOPPING LIST - Item No. 38

# UNCLASSIFIED

## CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)												DATE: February 2005		
APPROPRIATION/BUDGET ACTIVITY <b>RD&amp;E, N / BA-04</b>			PROGRAM ELEMENT <b>PE 0603512N - Carrier Systems Development</b>							PROJECT NUMBER AND NAME <b>PU 9516 Surface Ship Composite Moisture Separators</b>				
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	FY 06 Cost	FY 06 Award Date	FY 07 Cost	FY 07 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation													0.000	
Operational Test & Evaluation														
Live Fire Test & Evaluation														
Test Assets														
Tooling														
GFE														
Award Fees														
Subtotal T&E			0.000	0.000		0.000		0.000		0.000		0.000	0.000	
Remarks:														
Contractor Engineering Support													0.000	
Government Engineering Support														
Program Management Support														
Travel														
Transportation														
SBIR Assessment														
Subtotal Management			0.000	0.000		0.000		0.000		0.000		0.000	0.000	
Remarks:														
Total Cost			0.000	0.000		2.377		0.000		0.000		0.000	2.377	
Remarks:														

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED

Exhibit R-2, RD&E Budget Item Justification  
(Exhibit R-2, page 32 of 72)



CLASSIFICATION:

EXHIBIT R4, Schedule Profile																								DATE:											
APPROPRIATION/BUDGET ACTIVITY												PROGRAM ELEMENT NUMBER AND NAME												PROJECT NUMBER AND NAME											
RDT&E, N / BA-04												PE 0603512N - Carrier Systems Development												PU 9516 Surface Ship Composite Moisture Separators											
Fiscal Year	2004				2005				2006				2007				2008				2009				2010				2011						
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4			
Acquisition Milestones		MS B △	SRR △				SFR △		PDR △				CDR △	DAB △	PR																				
Propulsion Plant																																			
EMALS		SDD AWARD △			SRR △	SFR △	PDR △	CDR 1 △	CDR 2 △	TRR 1 △			TRR 2 △				LRIP △																		
DBR Radar Suite		PDR △			CDR △																														
Advanced Arresting Gear	SRR △			PDR △	MS B △			CDR-1-2 △ △					TRR 1 △				TRR 2 △				MS C △														
Test & Evaluation Milestones																																			
Development Test	◆	DT A2							◆	DT B1							◆	DT B2							◆	DT B3									
Operational Test							OT B1	◆					◆	OT B2		◆	OT B3		◆	OT B4		◆							◆	OT B5		◆			
Contract Milestones																																			
IPPD Contract																																			
CP Contract		Contract Award △																																	
Construction Contract																																			
Full Funding (SCN)																																			

R-1 SHOPPING LIST - Item No. 38

\* Not required for Budget Activities 1, 2, 3, and 6

# UNCLASSIFIED

CLASSIFICATION:

Exhibit R-4a, Schedule Detail							DATE: February 2005		
APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT				PROJECT NUMBER AND NAME			
RDT&E, N / BA-04		PE 0603512N - Carrier Systems Development				PU 9516 Surface Ship Composite Moisture Separators			
Schedule Profile	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	
Developmental Tests DT A-2	1-4Q								
Advanced Arresting Gear SRR	1Q								
EMALS SDD Phase Initiate	2Q								
Dual Band Radar PDR	2Q								
CVN 21 Milestone B	3Q								
CVN 21 SRR	3Q								
Construction Preparation Contract Award	3Q								
Advanced Arresting Gear PDR	4Q								
EMALS SRR		1Q							
Developmental Tests DT A-2		1-4Q							
Dual Band Radar CDR		1Q							
Advanced Arresting Gear Milestone B		1Q							
Operational Tests OT-B1		2-3Q							
EMALS SFR		2Q							
CVN 21 SFR		3Q							
EMALSP PDR		3Q							
EMALS CDR 1		4Q							
Advanced Arresting Gear CDR 1		4Q							
CVN 21 PDR			1Q						
Developmental Tests DT A-2			1-4Q						
AAG CDR 2			1Q						
EMALS CDR 2			2Q						
EMALS TRR 1(HALT/HCT)			4Q						
CVN 21 CDR				1Q					
Developmental Tests DT-B1				1-4Q					
Operational Tests OT-B2				1-4Q					
CVN 21 DAB PR				2Q					
AAG TRR 1 (DT/OA)				2Q					
EMALS TRR 2 (DT/OA)				4Q					
CVN 21 Construction Contract Award					1Q				
CVN 21 SCN Full Funding					1Q				
Developmental Tests DT-B1					1-4Q				
Operational Tests OT-B3					1-4Q				
EMALS LRIP					4Q				
AAG TRR 2 (DT/OA)						1Q			
Developmental Tests DT-B1						1Q			
Operational Tests OT-B4						1-4Q			
Developmental Tests DT-B2						3-4Q			
Developmental Tests DT-B2							1-4Q		
AAG LRIP								1Q	
Operational Tests OT-B5								1-4Q	
Developmental Tests DT-B3								2-4Q	

UNCLASSIFIED

CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE:	February 2005
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-04		PROGRAM ELEMENT NUMBER AND NAME PE 0603512N - Carrier Systems Development			PROJECT NUMBER AND NAME PU 2208 - CVN 21				
COST (\$ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	
Project Cost	93.598	102.372	109.362	59.090	49.698	56.873	58.736	42.821	
RDT&E Articles Qty									

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

This project provides for the development of aircraft carrier specific technologies, the infusion of the 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, warfare systems, and combat support systems, sub-systems and components to significantly improve aircraft carrier affordability, manpower requirements, survivability, and operational capabilities and to meet the requirements of existing and pending regulations and statutes critical to the operation of future aircraft carriers. This project also encompasses those tasks required to develop the contract data package necessary to support CVN 78 procurement, including, but not limited to engineering support, programmatic and program support, logistics support, modeling and simulation, manpower and program related studies, and design support systems, such as the Integrated Digital Environment.

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: <b>February 2005</b>	
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-04</b>	PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>	PROJECT NUMBER AND NAME <b>PU 2208 - CVN 21</b>		
<b>B. Accomplishments/Planned Program</b>				
	FY 04	FY 05	FY 06	FY 07
Accomplishments/Effort/Subtotal Cost	21.089	13.400	3.600	0.000
RDT&E Articles Quantity				
<div style="border: 1px solid black; padding: 5px;"> <p><b>- (U) Non-Nuclear Propulsion Plant Development</b> - Complete fabrication of prototype Main Turbine Generator (MTG) and detailed design. Develop prototype qualification test plans. Initiate and complete MTG prototype qualification testing and shock test. Prepare for post-shock steam testing and prototype disassembly and inspection. Continue development of testing requirements and the identification and evaluation of testing capabilities. Continue development of inputs to the integrated product model. Continue prototyping and implementation of automated workflow for construction deliverables. Continue to integrate analysis and other required functions into product model design. Continue development of mechanical and electrical systems that interface with the propulsion plant.</p> </div>				
<div style="border: 1px solid black; padding: 5px; height: 150px; margin-top: 20px;"> </div>				
	FY 04	FY 05	FY 06	FY 07
Accomplishments/Effort/Subtotal Cost	66.153	78.582	99.595	54.930
RDT&E Articles Quantity				
<div style="border: 1px solid black; padding: 5px; margin-top: 20px;"> <p><b>- (U) CVN 21 Advanced Technology Design &amp; Development-</b> Commence and continue development and transition of technologies to support CVN 21 Key Performance Parameters (KPPs): increased sortie generation rate, further reductions in manpower, and further recovery of weight and stability service life margins. Continue design activities to integrate the new propulsion plant and Electromagnetic Aircraft Launch System, and expand the design build approach to include the whole ship, to optimize various systems and arrangements to meet KPPs, and to improve overall performance. Technologies and design efforts include, but are not limited to: Advanced Weapons Elevators technologies to increase throughput and improve survivability; Heavy Underway Replenishment technologies to increase individual payload limits and transfer rates per station per hour; Improved Material and Weapons Handling Arrangements and Equipment Modifications to improve the flow of material and weapons while simultaneously reducing required manpower; Improved Survivability technologies; Combat/Warfare Systems design/integration; and an Improved/Enlarged Flight Deck to improve aircraft spotting and movement and to incorporate the Advanced Arresting Gear.</p> </div>				

R-1 SHOPPING LIST - Item No.

38

UNCLASSIFIED

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification		DATE: <b>February 2005</b>		
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-04</b>	PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>	PROJECT NUMBER AND NAME <b>PU 2208 - CVN 21</b>		
<b>B. Accomplishments/Planned Program (Cont.)</b>				
	FY 04	FY 05	FY 06	FY 07
Accomplishments/Effort/Subtotal Cost	6.356	10.390	6.167	4.160
RDT&E Articles Quantity				
<p><b>- (U) CVN 21 - Test &amp; Evaluation</b> - Determine specific developmental test requirements (DT), related modeling and simulation and develop test plans. Conduct actual test events including tests on a Large Test Asset. DT-A2 events will be based on CVN 78 system requirements and capabilities. Items such as test articles, instrumentation, support equipment, threat representation, test targets and other expendables, operational force test support, models, simulations, test-beds, special requirements, and funding needs will be finalized and provided in TEMP 1610 Rev B (in support of the FY08 construction contract award). The NGNN T&amp;E IPT will continue planning and execution of DT-A2 events and will identify, plan and begin to execute DT-B events to demonstrate that CVN 78 concepts meet required capabilities.</p>				

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: <b>February 2005</b>																																																													
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA 04</b>	PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>	PROJECT NUMBER AND NAME <b>PU 2208 - CVN 21</b>																																																														
<p><b>C. PROGRAM CHANGE SUMMARY:</b></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 40%;"></th> <th style="text-align: right; width: 10%;">FY 2004</th> <th style="text-align: right; width: 10%;">FY 2005</th> <th style="text-align: right; width: 10%;">FY 2006</th> <th style="text-align: right; width: 10%;">FY 2007</th> </tr> </thead> <tbody> <tr> <td>Funding:</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>FY05 President's Budget</td> <td style="text-align: right;">102.806</td> <td style="text-align: right;">104.465</td> <td style="text-align: right;">95.297</td> <td style="text-align: right;">49.548</td> </tr> <tr> <td>FY06 President's Budget</td> <td style="text-align: right;">93.598</td> <td style="text-align: right;">102.372</td> <td style="text-align: right;">109.362</td> <td style="text-align: right;">59.090</td> </tr> <tr> <td>Total Adjustments</td> <td style="text-align: right; border-top: 1px solid black;">-9.208</td> <td style="text-align: right; border-top: 1px solid black;">-2.093</td> <td style="text-align: right; border-top: 1px solid black;">14.065</td> <td style="text-align: right; border-top: 1px solid black;">9.542</td> </tr> <tr> <td colspan="5" style="padding-top: 10px;">Summary of Adjustments</td> </tr> <tr> <td>    Congressional Recissions</td> <td style="text-align: right;">-1.144</td> <td style="text-align: right;">-1.072</td> <td></td> <td></td> </tr> <tr> <td>    SBIR</td> <td style="text-align: right;">-1.952</td> <td></td> <td></td> <td></td> </tr> <tr> <td>    Inflation Savings</td> <td style="text-align: right;">-0.094</td> <td></td> <td></td> <td></td> </tr> <tr> <td>    Technical &amp; Miscellaneous Adjustments</td> <td style="text-align: right;">-6.018</td> <td style="text-align: right;">-0.021</td> <td style="text-align: right;">14.065</td> <td style="text-align: right;">9.542</td> </tr> <tr> <td>    Reprogramming</td> <td></td> <td style="text-align: right;">-1.000</td> <td></td> <td></td> </tr> <tr> <td style="padding-top: 20px;">Subtotal</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 1px solid black;">-9.208</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 1px solid black;">-2.093</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 1px solid black;">14.065</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 1px solid black;">9.542</td> </tr> </tbody> </table> <p style="margin-top: 40px;">Schedule:</p> <p style="margin-left: 20px;">The CVN 78 Basic Construction contract will be awarded in FY08 with delivery in FY15.</p> <p style="margin-top: 40px;">Technical:</p> <p style="margin-left: 20px;">Not Applicable</p>						FY 2004	FY 2005	FY 2006	FY 2007	Funding:					FY05 President's Budget	102.806	104.465	95.297	49.548	FY06 President's Budget	93.598	102.372	109.362	59.090	Total Adjustments	-9.208	-2.093	14.065	9.542	Summary of Adjustments					Congressional Recissions	-1.144	-1.072			SBIR	-1.952				Inflation Savings	-0.094				Technical & Miscellaneous Adjustments	-6.018	-0.021	14.065	9.542	Reprogramming		-1.000			Subtotal	-9.208	-2.093	14.065	9.542
	FY 2004	FY 2005	FY 2006	FY 2007																																																												
Funding:																																																																
FY05 President's Budget	102.806	104.465	95.297	49.548																																																												
FY06 President's Budget	93.598	102.372	109.362	59.090																																																												
Total Adjustments	-9.208	-2.093	14.065	9.542																																																												
Summary of Adjustments																																																																
Congressional Recissions	-1.144	-1.072																																																														
SBIR	-1.952																																																															
Inflation Savings	-0.094																																																															
Technical & Miscellaneous Adjustments	-6.018	-0.021	14.065	9.542																																																												
Reprogramming		-1.000																																																														
Subtotal	-9.208	-2.093	14.065	9.542																																																												

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE: <b>February 2005</b>		
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-04</b>				PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>			PROJECT NUMBER AND NAME <b>PU 2208 - CVN 21</b>			

**D. OTHER PROGRAM FUNDING SUMMARY:**

Line Item No. & Name	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	Complete	Total Cost
SCN: 200100 - Carrier Replacement Program	1,162.905	623.551	564.913	795.994	3,689.413	3,730.407	1,657.362	539.680	Cont.	Cont.
RDT&E:										
0604567N - Ship Contract Design, Live Fire T&E	112.730	136.516	55.672	86.506	83.826	59.393	40.082	87.499	Cont.	Cont.
0603570N - Advanced Nuclear Power Systems	198.814	168.080	168.373	170.980	160.992	152.814	133.951	105.975	Cont.	Cont.
*Note: Only a portion of the funding in PE 0603570N is included in the CVN 21 Program										

**E. ACQUISITION STRATEGY:**

The CVN 78 will be the first ship of the CVN 21 class of aircraft carriers consisting of 12 ships. Due to the length and cost of construction, each carrier will be contracted for separately. The CVN 78 will feature a new nuclear propulsion and electrical generation/distribution system, new electromagnetic aircraft launching system, advanced arresting gear system, all electric auxiliaries, warfare system improvements, survivability enhancements, improved weapons handling, and improved aircraft servicing. These design features will result in lower manpower and total ownership costs as compared to the Nimitz Class. Additionally, the following warfighting benefits will be realized: increased sortie generation rate, improved ship self defense capability, increased launch and recovery capability/flexibility, increased operational availability, and increased flexibility to support future upgrades.

**F. MAJOR PERFORMERS:**

Northrop Grumman Newport News, Newport News, VA, Design/Component Development/Construction

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED

**UNCLASSIFIED**

**CLASSIFICATION:**

[illegible]



# UNCLASSIFIED

CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)										DATE: February 2005				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NUMBER AND NAME								
RDT&E, N / BA-04			PE 0603512N - Carrier Systems Development			PU 2208 - CVN 21								
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	FY 06 Cost	FY 06 Award Date	FY 07 Cost	FY 07 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation														
CVN 21 Class														
	CPAF	NGNN	0.000	1.233	01/04-03/04	0.500	11/04	0.942	11/05	0.925	11/06	Continuing	Continuing	
	WX	NAWC AD	0.000	2.301	11/03	6.995	11/04						9.296	
	WX	NSWC Dahlgren	0.000	0.874	11/03	0.322	11/04	0.525	11/05	0.675	11/06	Continuing	Continuing	
	Various	PARMS	0.000					1.000	11/05	0.725	11/06	Continuing	Continuing	
	Various	Miscellaneous	0.000	1.500	11/03-03/04	1.973	11/04	3.100	11/05	1.035	11/06	Continuing	Continuing	
Operational Test & Evaluation	WX	COMOPTEVFOR	0.000	0.448	01/04	0.600	11/04	0.600	11/05	0.800	11/06	Continuing	Continuing	
Live Fire Test & Evaluation														
Test Assets														
Tooling														
GFE														
Award Fees														
Subtotal T&E			0.000	6.356		10.390		6.167		4.160		Continuing	Continuing	
Remarks:														
Contractor Engineering Support														
Government Engineering Support														
Program Management Support														
Travel														
Transportation														
SBIR Assessment														
Subtotal Management			0.000	0.000		0.000		0.000		0.000		Continuing	Continuing	
Remarks:														
Total Cost			250.739	93.598		102.372		109.362		59.090		Continuing	Continuing	

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R4, Schedule Profile																								DATE: February 2005								
APPROPRIATION/BUDGET ACTIVITY								PROGRAM ELEMENT NUMBER AND NAME								PROJECT NUMBER AND NAME																
RDT&E, N / BA-04								PE 0603512N - Carrier Systems Development								PU 2208 - CVN 21																
Fiscal Year	2004				2005				2006				2007				2008				2009				2010				2011			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Acquisition Milestones		MS B	SRR				SFR		PDR				CDR	DAB	PR																	
Propulsion Plant																																
EMALS		SDD	AWARD		SRR	SFR	PDR	CDR 1	CDR 2	TRR 1		TRR 2				LRIP																
DBR Radar Suite		PDR			CDR																											
Advanced Arresting Gear	SRR			PDR	MS B			CDR-1-2				TRR 1				TRR 2				MS C												
Test & Evaluation Milestones																																
Development Test	◆	DT A2							◆	DT B1							◆	DT B2							◆	DT B3						
Operational Test					OT B1		◆					◆	OT B2		◆◆	OT B3		◆◆	OT B4		◆					OT B5		◆				
Contract Milestones																																
IPPD Contract		Contract Award																														
CP Contract																																
Construction Contract																																
Full Funding (SCN)																	X															

R-1 SHOPPING LIST - Item No. 38

\* Not required for Budget Activities 1, 2, 3, and 6

UNCLASSIFIED

Exhibit R-2, RD TEN Budget Item Justification  
(Exhibit R-2, page 42 of 72)

# UNCLASSIFIED

## CLASSIFICATION:

Exhibit R-4a, Schedule Detail							DATE: <b>February 2005</b>	
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-04</b>				PROGRAM ELEMENT <b>PE 0603512N - Carrier Systems Development</b>			PROJECT NUMBER AND NAME <b>PU 2208 - CVN 21</b>	
Schedule Profile	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11
Developmental Tests DT A-2	1-4Q							
Advanced Arresting Gear SRR	1Q							
EMALS SDD Phase Initiate	2Q							
Dual Band Radar PDR	2Q							
CVN 21 Milestone B	3Q							
CVN 21 SRR	3Q							
Construction Preparation Contract Award	3Q							
Advanced Arresting Gear PDR	4Q							
EMALS SRR		1Q						
Developmental Tests DT A-2		1-4Q						
Dual Band Radar CDR		1Q						
Advanced Arresting Gear Milestone B		1Q						
Operational Tests OT-B1		2-3Q						
EMALS SFR		2Q						
CVN 21 SFR		3Q						
EMALSP PDR		3Q						
EMALS CDR 1		4Q						
Advanced Arresting Gear CDR 1		4Q						
CVN 21 PDR			1Q					
Developmental Tests DT A-2			1-4Q					
AAG CDR 2			1Q					
EMALS CDR 2			2Q					
EMALS TRR 1(HALT/HCT)			4Q					
CVN 21 CDR				1Q				
Developmental Tests DT-B1				1-4Q				
Operational Tests OT-B2				1-4Q				
CVN 21 DAB PR				2Q				
AAG TRR 1 (DT/OA)				2Q				
EMALS TRR 2 (DT/OA)				4Q				
CVN 21 Construction Contract Award					1Q			
CVN 21 SCN Full Funding					1Q			
Developmental Tests DT-B1					1-4Q			
Operational Tests OT-B3					1-4Q			
EMALS LRIP					4Q			
AAG TRR 2 (DT/OA)						1Q		
Developmental Tests DT-B1						1Q		
Operational Tests OT-B4						1-4Q		
Developmental Tests DT-B2						3-4Q		
Developmental Tests DT-B2							1-4Q	
AAG LRIP								1Q
Operational Tests OT-B5								1-4Q
Developmental Tests DT-B3								2-4Q

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE: <b>February 2005</b>	
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-04</b>		PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>			PROJECT NUMBER AND NAME <b>PU 4004 - EMALS</b>				
COST (\$ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	
Project Cost	<b>37.173</b>	<b>50.600</b>	<b>56.630</b>	<b>58.538</b>	<b>26.312</b>	<b>13.455</b>	<b>0.000</b>	<b>0.000</b>	
RDT&E Articles Qty			<b>1</b>						
<p><b>A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:</b></p> <p>This project provides for the development of an advanced technology aircraft launch system in support of the CVN 78 design and construction schedule. The Electro Magnetic Aircraft Launch System (EMALS) will replace the current steam catapult on CVN 78 and follow-on ships of the CVN 21 Class. EMALS provides better control of applied forces, both peak and transient dynamic, improved reliability and maintainability, increased operational availability, and reduced operator and maintainer workload.</p>									

R-1 SHOPPING LIST - Item No.

38

UNCLASSIFIED

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: <b>February 2005</b>																
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-04</b>	PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>	PROJECT NUMBER AND NAME <b>PU 4004 - EMALS</b>																	
<b>B. Accomplishments/Planned Program</b> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <th style="width: 30%;"></th> <th style="width: 15%;">FY 04</th> <th style="width: 15%;">FY 05</th> <th style="width: 15%;">FY 06</th> <th style="width: 15%;">FY 07</th> </tr> <tr> <td>Accomplishments/Effort/Subtotal Cost</td> <td style="text-align: right;">37.173</td> <td style="text-align: right;">50.600</td> <td style="text-align: right;">56.630</td> <td style="text-align: right;">58.538</td> </tr> <tr> <td>RDT&amp;E Articles Quantity</td> <td></td> <td></td> <td style="text-align: center;">1</td> <td></td> </tr> </table> <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"> <p><b>-(U) EMALS -</b></p> <p>FY-04: Complete full scale, full power, half-length EMALS demonstration testing and technical evaluation using deadloads. Analyze test data, proposed contractor production system configurations, and program proposals. Select contractor for and begin System Development and Demonstration phase. Conduct comprehensive development risk assessments and develop detailed integrated program baseline. Initiate production design effort. Conduct follow on development testing. Continue CVN 78 integration development. Provide management, systems, engineering, test and ship integration support.</p> <p>FY-05: Continue System Development and Demonstration phase. Conduct Functional and Systems Requirements reviews. Conduct Preliminary Design and Critical Design Reviews and initiate manufacture of production representative system for Development Testing and Operational Assessment. Initiate procurement of dead load test articles and instrumentation in support of land based testing. Conduct follow on development testing on Program Definition and Risk Reduction phase system. Continue CVN 78 integration development. Provide management, systems engineering, test, and ship integration support.</p> <p>FY-06: Continue System Development and Demonstration phase. Continue production system development effort. Complete Critical design reviews. Continue manufacture of production representative system and procurement of dead load test articles and instrumentation. Initiate installation in the EMALS land based test facility. Continue CVN 78 integration development. Provide management, systems engineering, test, and ship integration support.</p> <p>FY-07: Continue System Development and Demonstration phase. Continue production system development effort. Conduct environmental, high cycle and highly accelerated life testing. Complete installation of the production representative EMALS system in the land based test facility. Initiate system integration and Integrated System Performance Development Testing and Operational Assessment. Continue CVN 78 integration development. Provide management, systems engineering, test, and ship integration support.</p> </div>						FY 04	FY 05	FY 06	FY 07	Accomplishments/Effort/Subtotal Cost	37.173	50.600	56.630	58.538	RDT&E Articles Quantity			1	
	FY 04	FY 05	FY 06	FY 07															
Accomplishments/Effort/Subtotal Cost	37.173	50.600	56.630	58.538															
RDT&E Articles Quantity			1																

R-1 SHOPPING LIST - Item No.

38

UNCLASSIFIED

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: <b>February 2005</b>																																																			
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-04</b>	PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>	PROJECT NUMBER AND NAME <b>PU 4004 - EMALS</b>																																																				
<p><b>C. PROGRAM CHANGE SUMMARY:</b></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 40%;">Funding:</th> <th style="text-align: right; width: 15%;">FY 2004</th> <th style="text-align: right; width: 15%;">FY 2005</th> <th style="text-align: right; width: 15%;">FY 2006</th> <th style="text-align: right; width: 15%;">FY 2007</th> </tr> </thead> <tbody> <tr> <td>FY05 President's Budget</td> <td style="text-align: right;">39.095</td> <td style="text-align: right;">51.094</td> <td style="text-align: right;">35.083</td> <td style="text-align: right;">28.634</td> </tr> <tr> <td>FY06 President's Budget</td> <td style="text-align: right;">37.173</td> <td style="text-align: right;">50.600</td> <td style="text-align: right;">56.630</td> <td style="text-align: right;">58.538</td> </tr> <tr> <td>Total Adjustments</td> <td style="text-align: right; border-top: 1px solid black;">-1.922</td> <td style="text-align: right; border-top: 1px solid black;">-0.494</td> <td style="text-align: right; border-top: 1px solid black;">21.547</td> <td style="text-align: right; border-top: 1px solid black;">29.904</td> </tr> <tr> <td colspan="5" style="padding-top: 10px;">Summary of Adjustments</td> </tr> <tr> <td>    Congressional Recissions</td> <td style="text-align: right;">-0.435</td> <td style="text-align: right;">-0.484</td> <td></td> <td></td> </tr> <tr> <td>    SBIR</td> <td style="text-align: right;">-0.977</td> <td></td> <td></td> <td></td> </tr> <tr> <td>    Inflation Savings</td> <td style="text-align: right;">-0.036</td> <td></td> <td></td> <td></td> </tr> <tr> <td>    Technical &amp; Miscellaneous Adjustments</td> <td style="text-align: right;">-0.474</td> <td style="text-align: right;">-0.010</td> <td style="text-align: right;">21.547</td> <td style="text-align: right;">29.904</td> </tr> <tr> <td>    Subtotal</td> <td style="text-align: right; border-top: 1px solid black;">-1.922</td> <td style="text-align: right; border-top: 1px solid black;">-0.494</td> <td style="text-align: right; border-top: 1px solid black;">21.547</td> <td style="text-align: right; border-top: 1px solid black;">29.904</td> </tr> </tbody> </table> <p style="margin-top: 20px;"><b>Remarks:</b></p> <p style="margin-top: 20px;">Schedule:</p> <p style="margin-left: 20px;">The CVN 78 Basic Construction contract will be awarded in FY08 with delivery in FY15.</p> <p style="margin-top: 20px;">Technical:</p> <p style="margin-left: 20px;">Not Applicable</p>					Funding:	FY 2004	FY 2005	FY 2006	FY 2007	FY05 President's Budget	39.095	51.094	35.083	28.634	FY06 President's Budget	37.173	50.600	56.630	58.538	Total Adjustments	-1.922	-0.494	21.547	29.904	Summary of Adjustments					Congressional Recissions	-0.435	-0.484			SBIR	-0.977				Inflation Savings	-0.036				Technical & Miscellaneous Adjustments	-0.474	-0.010	21.547	29.904	Subtotal	-1.922	-0.494	21.547	29.904
Funding:	FY 2004	FY 2005	FY 2006	FY 2007																																																		
FY05 President's Budget	39.095	51.094	35.083	28.634																																																		
FY06 President's Budget	37.173	50.600	56.630	58.538																																																		
Total Adjustments	-1.922	-0.494	21.547	29.904																																																		
Summary of Adjustments																																																						
Congressional Recissions	-0.435	-0.484																																																				
SBIR	-0.977																																																					
Inflation Savings	-0.036																																																					
Technical & Miscellaneous Adjustments	-0.474	-0.010	21.547	29.904																																																		
Subtotal	-1.922	-0.494	21.547	29.904																																																		

UNCLASSIFIED

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification									DATE: <b>February 2005</b>	
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-04</b>			PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>			PROJECT NUMBER AND NAME <b>PU 4004 - EMALS</b>				
<b>D. OTHER PROGRAM FUNDING SUMMARY:</b>										
<u>Line Item No. &amp; Name</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>Complete</u>	<u>Total Cost</u>
SCN: 200100 - Carrier Replacement Program	1,162.905	623.551	564.913	795.994	3,689.413	3,730.407	1,657.362	539.680	Cont.	Cont.
RDT&E:										
0604567N - Ship Contract Design, Live Fire T&E	112.730	136.516	55.672	86.506	83.826	59.393	40.082	87.499	Cont.	Cont.
0603570N - Advanced Nuclear Power Systems	198.814	168.080	168.373	170.980	160.992	152.814	133.951	105.975	Cont.	Cont.
*Note: Only a portion of the funding in PE 0603570N is included in the CVN 21 Program										
<b>E. ACQUISITION STRATEGY:</b>										
<p>The CVN 78 will be the first ship of the CVN 21 class of aircraft carriers consisting of 12 ships. Due to the length and cost of construction, each carrier will be contracted for separately. The CVN 78 will feature a new nuclear propulsion and electrical generation/distribution system, new electromagnetic aircraft launching system, advanced arresting gear system, all electric auxiliaries, warfare system improvements, survivability enhancements, improved weapons handling, and improved aircraft servicing. These design features will result in lower manpower and total ownership costs as compared to the Nimitz Class. Additionally, the following warfighting benefits will be realized: increased sortie generation rate, improved ship self defense capability, increased launch and recovery capability/flexibility, increased operational availability, and increased flexibility to support future upgrades.</p>										
<b>F. MAJOR PERFORMERS:</b>										
<p>General Atomics, San Diego, CA, EMALS Design and Development          Naval Air Warfare Center, Aircraft Division, Lakehurst, NJ: EMALS Development and Test.</p>										

R-1 SHOPPING LIST - Item No.

38

UNCLASSIFIED

## UNCLASSIFIED

## CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 1)								DATE: February 2005						
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NUMBER AND NAME								
RDT&E, N / BA-04			PE 0603512N - Carrier Systems Development			PU 4004 - EMALS								
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	FY 06 Cost	FY 06 Award Date	FY 07 Cost	FY 07 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Product Development														
Aircraft Launch, Recovery & Support	CPAF	Northrop Grumman	75.215	8.137	11/03	0.266	11/04					Continuing	Continuing	Continuing
	CPAF	General Atomics (PDRR)	76.028	6.691	11/03							Continuing	Continuing	Continuing
	CPIF	General Atomics (SDD)		16.924	04/04	41.234	11/04-8/05	39.178	11/05	36.340	11/06	Continuing	Continuing	Continuing
	WX	NAWC Lakehurst, NJ	10.884	4.028	11/03	5.207	11/04	5.521	11/05	5.631	11/06	Continuing	Continuing	Continuing
	CPAF	NGNN, VA	2.270									Continuing	Continuing	Continuing
	Various	Miscellaneous	0.000			1.614	11/04	3.952	11/05	4.098	11/06	Continuing	Continuing	Continuing
Subtotal Product Development			164.397	35.780		48.321		48.651		46.069		Continuing	Continuing	Continuing
Remarks: Prior Years were funded under PE 0603512N, PU 42208; however, prior year values have been shifted to PU 44004 in keeping with the CVN 21 Project realignment and in order to reflect program continuity on the PU 44004 Exhibit.														
Development Support														
Software Development														
Training Development														
Integrated Logistics Support														
Configuration Management														
Technical Data														
GFE														
Award Fees														
Subtotal Support			0.000	0.000		0.000		0.000		0.000		0.000	0.000	
Remarks: Prior Years were funded under PE 0603512N, PU 42208; however, prior year values have been shifted to PU 44004 in keeping with the CVN 21 Project realignment and in order to reflect program continuity on the PU 44004 Exhibit.														

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED



## UNCLASSIFIED

## CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)										DATE: <b>February 2005</b>				
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-04</b>			PROGRAM ELEMENT <b>PE 0603512N - Carrier Systems Development</b>			PROJECT NUMBER AND NAME <b>PU 4004 - EMALS</b>								
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	FY 06 Cost	FY 06 Award Date	FY 07 Cost	FY 07 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation														
Aircraft Launch, Recovery & Support	WX	Lakehurst NJ	5.038	1.393	11/03	2.279	11/04	7.979	11/05	12.469	11/06	Continuing	Continuing	
Subtotal T&E			5.038	1.393		2.279		7.979		12.469		Continuing	Continuing	
Remarks: Prior Years were funded under PE 0603512N, PU 42208; however, prior year values have been shifted to PU 44004 in keeping with the CVN 21 Project realignment and in order to reflect program continuity on the PU 44004 Exhibit.														
Contractor Engineering Support														
Government Engineering Support														
Program Management Support														
Travel														
Labor (Research Personnel)														
SBIR Assessment														
Subtotal Management			0.000	0.000		0.000		0.000		0.000		0.000	0.000	
Remarks: Prior Years were funded under PE 0603512N, PU 42208; however, prior year values have been shifted to PU 44004 in keeping with the CVN 21 Project realignment and in order to reflect program continuity on the PU 44004 Exhibit.														
Total Cost			169.435	37.173		50.600		56.630		58.538		Continuing	Continuing	
Remarks: FY02 and Prior Years were funded under PE 0603512N, PU 42208														

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED

CLASSIFICATION:

EXHIBIT R4, Schedule Profile																								DATE:												
APPROPRIATION/BUDGET ACTIVITY												PROGRAM ELEMENT NUMBER AND NAME												PROJECT NUMBER AND NAME												
RDT&E, N / BA-04												PE 0603512N - Carrier Systems Development												PU 4004 - EMALS												
Fiscal Year	2004				2005				2006				2007				2008				2009				2010				2011							
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4				
Acquisition Milestones		MS B ▲	SRR ▲				SFR ▲		PDR ▲				CDR ▲	DAB ▲	PR																					
Propulsion Plant																																				
EMALS		SDD AWARD ▲			SRR ▲	SFR ▲	PDR ▲	CDR 1 ▲	CDR 2 ▲	TRR 1 ▲			TRR 2 ▲				LRIP ▲																			
DBR Radar Suite		PDR ▲			CDR ▲																															
Advanced Arresting Gear	SRR ▲			PDR ▲	MS B ▲			CDR-1-2 ▲					TRR 1 ▲				TRR 2 ▲				MS C ▲															
Test & Evaluation Milestones																																				
Development Test	◆	DT A2								◆	DT B1								◆	DT B2								◆	DT B3							
Operational Test					OT B1			◆					◆	OT B2			◆	OT B3			◆	OT B4			◆					OT B5			◆			
Contract Milestones																																				
IPPD Contract																																				
CP Contract		Contract Award ▲																																		
Construction Contract																	Contract Award ▲																			
Full Funding (SCN)																	X																			

R-1 SHOPPING LIST - Item No. 38

\* Not required for Budget Activities 1, 2, 3, and 6

# UNCLASSIFIED

**CLASSIFICATION:**

Exhibit R-4a, Schedule Detail							DATE: <b>February 2005</b>	
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-04</b>				PROGRAM ELEMENT <b>PE 0603512N - Carrier Systems Development</b>			PROJECT NUMBER AND NAME <b>PU 4004 - EMALS</b>	
Schedule Profile	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11
Developmental Tests DT A-2	1-4Q							
Advanced Arresting Gear SRR	1Q							
EMALS SDD Phase Initiate	2Q							
Dual Band Radar PDR	2Q							
CVN 21 Milestone B	3Q							
CVN 21 SRR	3Q							
Construction Preparation Contract Award	3Q							
Advanced Arresting Gear PDR	4Q							
EMALS SRR		1Q						
Developmental Tests DT A-2		1-4Q						
Dual Band Radar CDR		1Q						
Advanced Arresting Gear Milestone B		1Q						
Operational Tests OT-B1		2-3Q						
EMALS SFR		2Q						
CVN 21 SFR		3Q						
EMALSP PDR		3Q						
EMALS CDR 1		4Q						
Advanced Arresting Gear CDR 1		4Q						
CVN 21 PDR			1Q					
Developmental Tests DT A-2			1-4Q					
AAG CDR 2			1Q					
EMALS CDR 2			2Q					
EMALS TRR 1(HALT/HCT)			4Q					
CVN 21 CDR				1Q				
Developmental Tests DT-B1				1-4Q				
Operational Tests OT-B2				1-4Q				
CVN 21 DAB PR				2Q				
AAG TRR 1 (DT/OA)				2Q				
EMALS TRR 2 (DT/OA)				4Q				
CVN 21 Construction Contract Award					1Q			
CVN 21 SCN Full Funding					1Q			
Developmental Tests DT-B1					1-4Q			
Operational Tests OT-B3					1-4Q			
EMALS LRIP					4Q			
AAG TRR 2 (DT/OA)						1Q		
Developmental Tests DT-B1						1Q		
Operational Tests OT-B4						1-4Q		
Developmental Tests DT-B2						3-4Q		
Developmental Tests DT-B2							1-4Q	
AAG LRIP								1Q
Operational Tests OT-B5								1-4Q
Developmental Tests DT-B3								2-4Q

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification							DATE: <b>February 2005</b>	
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-4</b>	PROGRAM ELEMENT NUMBER AND NAME <b>0603512N - Carrier Systems Development</b>				PROJECT NUMBER AND NAME <b>PU 4005 - Smart Carrier</b>			
COST (\$ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project Cost	1.836	1.825	1.831	1.820	1.828	1.823	1.863	1.903
RDT&E Articles Qty		2	1	1				

### A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

The Smart Carrier Demonstration and Validation program exploits available technologies to deliver an affordable, robust, operator-friendly automation control environment for Navy Aircraft Carrier shipboard equipment. The program provides the system architecture, requirements/specification development, technology selection, software development (including software baseline), as well as land-based and shipboard testing of new technologies to improve shipboard operations and to reduce workload, manpower requirements, and Total Ownership Costs. Initial technologies include Aviation Fuels (JP-5) Automation, the Advanced Damage Control System (ADCS), Automated Material Handling Systems, Damage Control Inventory Management and Stowage System (DCIMSS), List Control, Firemain Control, Integrated Condition Assessment System, Interior Communications/Systems Monitoring Alarm Upgrades, and the Digital Video Surveillance System. Demonstration technologies include Aviation Fuels On-Board Training (OBT) System, Smart Vent, Machinery Online Monitoring, Superior Sound Technology, Flat Plane Speakers, Smart Circuit Breakers, Distilling Unit Automation, Reboiler Automation, In-line Aviation Fuels Sampling, Advanced Oil Purification System, Oil Monitoring Sensors, and Voice Interactive Display. Wireless systems, smart sensors, knowledge-based systems, automated casualty control, automated technology for workload reduction, linked smart devices, common software tools for interoperability, and self-healing network are technologies being considered for future applications. This project was previously funded under Project 42208, Future Carrier R&D.

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: <b>February 2005</b>	
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N /BA-4</b>	PROGRAM ELEMENT NUMBER AND NAME <b>0603512N - Carrier Systems Development</b>	PROJECT NUMBER AND NAME <b>PU 4005 - Smart Carrier</b>		
<b>B. Accomplishments/Planned Program</b>				
	FY 04	FY 05	FY 06	FY 07
Accomplishments/Effort/Subtotal Cost	1.836	1.825	1.831	1.820
RDT&E Articles Quantity		2	1	1
<p><b>- (U) Smart Carrier</b> - Fiscal Year 2004 and 2005 efforts continue to develop, evaluate, demonstrate, install, test and measure the effectiveness of revised processes and selected technologies with the highest potential to meet Aircraft Carrier goals for manpower and Total Ownership Cost (TOC) reductions, such as HN&amp;E LAN survivability modifications, an On-Board Training capability for Aviation Fuels Operations, In-Line Fuel Monitoring, Condition-Based Maintenance, and Automated Systems Logs. Fiscal Year 2006 and 2007 efforts include software development, land-based testing, shipboard start-up and shipboard demonstration of ADCS software improvements and Electronic Valve Operator automation. Future efforts include Superior Sound Technology (5MC), vibration monitoring/rotating machinery diagnostic tools, and expanded condition-based maintenance using the existing Smart Carrier hardware and software suite.</p>				

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: <b>February 2005</b>																																														
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-4</b>	PROGRAM ELEMENT NUMBER AND NAME <b>0603512N - Carrier Systems Development</b>	PROJECT NUMBER AND NAME <b>PU 4005 - Smart Carrier</b>																																															
<p><b>C. PROGRAM CHANGE SUMMARY:</b></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 40%;"></th> <th style="text-align: right; width: 15%;">FY 2004</th> <th style="text-align: right; width: 15%;">FY 2005</th> <th style="text-align: right; width: 15%;">FY 2006</th> <th style="text-align: right; width: 15%;">FY 2007</th> </tr> </thead> <tbody> <tr> <td>Funding:</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>FY05 President's Budget:</td> <td style="text-align: right;">1.881</td> <td style="text-align: right;">1.843</td> <td style="text-align: right;">1.830</td> <td style="text-align: right;">1.817</td> </tr> <tr> <td>FY06 President's Budget</td> <td style="text-align: right;">1.836</td> <td style="text-align: right;">1.825</td> <td style="text-align: right;">1.831</td> <td style="text-align: right;">1.820</td> </tr> <tr> <td>Total Adjustments</td> <td style="text-align: right; border-top: 1px solid black;">-0.045</td> <td style="text-align: right; border-top: 1px solid black;">-0.018</td> <td style="text-align: right; border-top: 1px solid black;">0.001</td> <td style="text-align: right; border-top: 1px solid black;">0.003</td> </tr> <tr> <td colspan="5" style="padding-top: 20px;">Summary of Adjustments</td> </tr> <tr> <td>Congressional Recissions</td> <td style="text-align: right;">-0.021</td> <td style="text-align: right;">-0.018</td> <td></td> <td></td> </tr> <tr> <td>Technical &amp; Miscellaneous Adjustments</td> <td style="text-align: right;">-0.024</td> <td></td> <td style="text-align: right;">0.001</td> <td style="text-align: right;">0.003</td> </tr> <tr> <td>Subtotal</td> <td style="text-align: right; border-top: 1px solid black;">-0.045</td> <td style="text-align: right; border-top: 1px solid black;">-0.018</td> <td style="text-align: right; border-top: 1px solid black;">0.001</td> <td style="text-align: right; border-top: 1px solid black;">0.003</td> </tr> </tbody> </table> <p style="margin-top: 40px;">Schedule: Not Applicable</p> <p style="margin-top: 40px;">Technical: Not Applicable</p>						FY 2004	FY 2005	FY 2006	FY 2007	Funding:					FY05 President's Budget:	1.881	1.843	1.830	1.817	FY06 President's Budget	1.836	1.825	1.831	1.820	Total Adjustments	-0.045	-0.018	0.001	0.003	Summary of Adjustments					Congressional Recissions	-0.021	-0.018			Technical & Miscellaneous Adjustments	-0.024		0.001	0.003	Subtotal	-0.045	-0.018	0.001	0.003
	FY 2004	FY 2005	FY 2006	FY 2007																																													
Funding:																																																	
FY05 President's Budget:	1.881	1.843	1.830	1.817																																													
FY06 President's Budget	1.836	1.825	1.831	1.820																																													
Total Adjustments	-0.045	-0.018	0.001	0.003																																													
Summary of Adjustments																																																	
Congressional Recissions	-0.021	-0.018																																															
Technical & Miscellaneous Adjustments	-0.024		0.001	0.003																																													
Subtotal	-0.045	-0.018	0.001	0.003																																													

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE: <b>February 2005</b>																							
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-4</b>		PROGRAM ELEMENT NUMBER AND NAME <b>0603512N - Carrier Systems Development</b>			PROJECT NUMBER AND NAME <b>PU 4005 - Smart Carrier</b>																										
<p><b>D. OTHER PROGRAM FUNDING SUMMARY:</b></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;"><u>Line Item No. &amp; Name</u></th> <th style="text-align: center;"><u>FY 2004</u></th> <th style="text-align: center;"><u>FY 2005</u></th> <th style="text-align: center;"><u>FY 2006</u></th> <th style="text-align: center;"><u>FY 2007</u></th> <th style="text-align: center;"><u>FY 2008</u></th> <th style="text-align: center;"><u>FY 2009</u></th> <th style="text-align: center;"><u>FY 2010</u></th> <th style="text-align: center;"><u>FY 2011</u></th> <th style="text-align: center;"><u>To Complete</u></th> <th style="text-align: center;"><u>Total Cost</u></th> </tr> </thead> <tbody> <tr> <td>098100 Items Under \$5 million Smart Carrier (LT 140)</td> <td style="text-align: center;">6.988</td> <td style="text-align: center;">44.638</td> <td style="text-align: center;">20.923</td> <td style="text-align: center;">22.954</td> <td style="text-align: center;">9.133</td> <td style="text-align: center;">10.286</td> <td style="text-align: center;">8.056</td> <td style="text-align: center;">3.329</td> <td style="text-align: center;">Cont.</td> <td style="text-align: center;">126.307</td> </tr> </tbody> </table>										<u>Line Item No. &amp; Name</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>To Complete</u>	<u>Total Cost</u>	098100 Items Under \$5 million Smart Carrier (LT 140)	6.988	44.638	20.923	22.954	9.133	10.286	8.056	3.329	Cont.	126.307
<u>Line Item No. &amp; Name</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>	<u>FY 2010</u>	<u>FY 2011</u>	<u>To Complete</u>	<u>Total Cost</u>																					
098100 Items Under \$5 million Smart Carrier (LT 140)	6.988	44.638	20.923	22.954	9.133	10.286	8.056	3.329	Cont.	126.307																					
<p><b>E. ACQUISITION STRATEGY:</b></p> <p>Investigate, demonstrate, and implement available technologies to deliver a robust, operator-friendly automation control environment for Navy Aircraft Carrier shipboard equipment to reduce workload, manpower requirements, and Total Ownership Costs (TOC).</p>																															
<p><b>F. MAJOR PERFORMERS:</b></p> <p>Naval Sea Systems Command - Philadelphia (formerly Naval Surface Warfare Center, Carderock Division), Philadelphia, PA and Naval Air Systems Command - Lakehurst (formerly Naval Air Warfare Center, Lakehurst), Lakehurst NJ, perform software development, test and evaluation, integration and program management to include training development and integrated logistics support development.</p>																															

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED

**UNCLASSIFIED**

**CLASSIFICATION:**

Exhibit R-3 Cost Analysis (page 1)											DATE: February 2005			
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT					PROJECT NUMBER AND NAME						
RDT&E, N / BA-4			0603512N - Carrier Systems Development					PU 4005 - Smart Carrier						
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	FY 06 Cost	FY 06 Award Date	FY 07 Cost	FY 07 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Primary Hardware Development														
Ancillary Hardware Development														
Component Development														
Ship Integration	WX	NAVSEA, Phil./NAVAIR Lke	0.200	0.100	11/03	0.100	11/04	0.100	11/05	0.100	11/06	Continuing	Continuing	
Ship Suitability														
Systems Engineering	CPAF	NGNN, VA	0.205										0.205	
	Various	Miscellaneous	7.978										7.978	
Training Development														
Licenses														
Tooling														
GFE														
Award Fees														
Subtotal Product Development			8.383	0.100		0.100		0.100		0.100		0.000	8.783	
Development Support													0.000	
Software Development	WX	NAVSEA, Phil./NAVAIR Lke	1.042	0.886	11/03	0.825	11/04	0.881	11/05	0.820	11/06	Continuing	Continuing	
Training Development	WX	NAVSEA, Phil./NAVAIR Lke	0.050	0.050	11/03	0.080	11/04	0.050	11/05	0.080	11/06	Continuing	Continuing	
Integrated Logistics Support	WX	NAVSEA, Phil./NAVAIR Lke	0.100	0.150	11/03	0.120	11/04	0.150	11/05	0.120	11/06	Continuing	Continuing	
Configuration Management													0.000	
Technical Data													0.000	
GFE													0.000	
Award Fees													0.000	
Subtotal Support			1.192	1.086		1.025		1.081		1.020		0.000	5.404	

R-1 SHOPPING LIST - Item No.

38

**UNCLASSIFIED**

**Exhibit R-2, RDTEN Budget Item Justification**  
(Exhibit R-2, page 56 of 72)



## CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)									DATE:						February 2005		
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT					PROJECT NUMBER AND NAME									
RDT&E, N / BA-4			0603512N - Carrier Systems Development					PU 4005 - Smart Carrier									
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost *	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	FY 06 Cost	FY 06 Award Date	FY 07 Cost	FY 07 Award Date	Cost to Complete	Total Cost	Target Value of Contract			
Developmental Test & Evaluation	WX	NAVSEA, Phil./NAVAIR Lke	0.300	0.400	11/03	0.450	11/04	0.400	11/05	0.450	11/06	Continuing	Continuing				
Operational Test & Evaluation																	
Live Fire Test & Evaluation																	
Test Assets																	
Tooling																	
GFE																	
Award Fees																	
Subtotal T&E			0.300	0.400		0.450		0.400		0.450		0.000	2.000				
Contractor Engineering Support																	
Government Engineering Support																	
Program Management Support	WX	NAVSEA, Phil./NAVAIR Lke	0.250	0.250	11/03	0.250	11/04	0.250	11/05	0.250	11/06	Continuing	Continuing				
Travel																	
Labor (Research Personnel)																	
SBIR Assessment																	
Subtotal Management			0.250	0.250		0.250		0.250		0.250		0.000	1.250				
Total Cost			10.125	1.836		1.825		1.831		1.820		0.000	17.437				

UNCLASSIFIED

CLASSIFICATION:

UNCLASSIFIED

EXHIBIT R-4, Schedule Profile																	DATE:									
February 2005																										
APPROPRIATION/BUDGET ACTIVITY					PROGRAM ELEMENT NAME AND NUMBER								PROJECT NAME AND NUMBER													
RDT&E, N/BA-4					0603512N - Carrier Systems Development								PU 4005 - Smart Carrier													

R-1 SHOPPING LIST - Item No. 38

Exhibit R-4, Schedule Profile  
(Exhibit R-4, Page 38 of 46)

UNCLASSIFIED

UNCLASSIFIED

Exhibit R-2, RDTE Budget Item Justification  
(Exhibit R-2, page 58 of 72)

# UNCLASSIFIED

## CLASSIFICATION:

Exhibit R-4a, Schedule Detail							DATE: February 2005	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT				PROJECT NUMBER AND NAME			
RDT& BA-04	PE 0603512N - Carrier Systems Development				PU 4005 - Smart Carrier			
Schedule Profile	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
In-Line Fuel Sampling								
Mission Ready Sensor Development Testing	1Q							
Mission Ready Sensor Land-Based Testing	1-3Q							
Mission Ready Sensor Carrier Testing (single sensor, during deployment)	3-4Q	1Q						
System Development and Carrier Demonstration (Multi-Sensor System)		1-4Q						
Sensor Group Development - Six Sensors (HW & SW)		1-2Q						
Group Development Test		3-4Q						
Engineering Development Model			1-4Q	1Q				
Sensor System Development (HW & SW)			1-3Q					
System Development Test			4Q	1Q				
Carrier Machinery Control Systems								
HM&E Local Area Network Survivability Mods - Phase II Development and Test	1-3Q							
Aviation Fuels On-Board Training Software Development	1-3Q							
Aviation Fuels On-Board Training Software Development Test	4Q	1Q						
Condition-Based Maintenance Software Development	1-4Q							
Condition-Based Maintenance Software Development Test		1-3Q						
Automated System Logs Software Development		1-4Q						
Automated System Logs Software Development Test			1-3Q					
ADCS Software Improvements (AFSSS/FCCS) Software Development			2-4Q	1Q				
ADCS Software Improvements (AFSSS/FCCS) Software Development Test				2-4Q	1Q			
Electronic Valve Operator Automation Software Development				1-4Q	1Q			
Electronic Valve Operator Automation Software Development Test					2-4Q			
Superior Sound Technology (5MC) Development/Integration					2-4Q	1-3Q		
Vibration Monitoring/Rotating Machinery Diagnostic Tools SW Development						2-4Q	1-2Q	
Vibration Monitoring/Rotating Machinery Diagnostic Tools SW Dev. Test							3-4Q	1-3Q
Expanded Condition-Based Maintenance - Rotating Machinery						3-4Q	1-3Q	
Reboiler Automation SW/HW Development							2-4Q	
Reboiler Automation SW/HW Development Test								1Q
Liquid Load Management SW Development/Test							3-4Q	1-3Q
Advanced Fire and Smoke Sensor System Development								2-3Q
Advanced Fire and Smoke Sensor System Development Testing								4Q

R-1 SHOPPING LIST - Item No.

38

UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE: <b>February 2005</b>	
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-04</b>		PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>			PROJECT NUMBER AND NAME <b>PU 4006 - CVN 21 Follow Ship</b>				
COST (\$ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	
Project Cost	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>78.947</b>	<b>82.850</b>	<b>82.969</b>	<b>85.527</b>	<b>40.727</b>	
RDT&E Articles Qty									
<b>A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:</b>  Development and related testing of aircraft carrier specific technologies, the infusion of the ship technology base into existing and future aircraft carriers, and the potential realization of subsystem design capabilities not currently feasible. This project also funds the Contract Design efforts for the CVN 79. This project provides for the development of aircraft carrier specific technologies, the infusion of the 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, warfare systems, and combat support systems, sub-systems and components to significantly improve aircraft carrier affordability, manpower requirements, survivability, and operational capabilities and to meet the requirements of existing and pending regulations and statutes critical to the operation of future aircraft carriers. This project also encompasses those tasks required to develop the contract data package necessary to support CVN 79 procurement, including, but not limited to engineering support, programmatic and program support, logistics support, modeling and simulation, manpower and program related studies, and design support systems, such as the Integrated Digital Environment.									

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: <b>February 2005</b>	
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-04</b>	PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>	PROJECT NUMBER AND NAME <b>PU 4006 - CVN 21 Follow Ship</b>		
<b>B. Accomplishments/Planned Program</b>				
	FY 04	FY 05	FY 06	FY 07
Accomplishments/Effort/Subtotal Cost	0.000	0.000	0.000	43.060
RDT&E Articles Quantity				
<p><b>- (U) CVN 21 Follow Ship Advanced Technology Design &amp; Development:</b> Commence development and transition of technologies to support continued improvements in CVN 21 Key Performance Parameters (KPPs) and efforts supporting achievement of CVN 21 Class Operational Requirements Document (ORD) Objectives: increased sortie generation rate, manpower reduction, and recovery of weight and stability service life margins. Commence design activities to integrate and optimize systems and arrangements to improve KPPs and to improve overall performance towards ORD objectives. Technologies and design efforts include, but are not limited to: Enhanced Weapons / Material Movement to further reduce manpower and increase sortie generation rates; Advanced Materials development and integration to reduce total weight and improve stability while reducing shipboard maintenance; Consolidated Electrical Energy Storage and Advanced Electrical Load Management to improve power density, reduce weight, and support advanced electrical loads; Improved Survivability technologies; and Advanced Ship Self Defense technologies.</p>				
	FY 04	FY 05	FY 06	FY 07
Accomplishments/Effort/Subtotal Cost	0.000	0.000	0.000	3.850
RDT&E Articles Quantity				
<p><b>- (U) CVN 21 Follow Ship Testing:</b> Initiate efforts to determine specific developmental test and related modeling and simulation requirements. Assess the CVN 79 hull design survivability in terms of susceptibility, vulnerability and recoverability. Initiate planning of UNDEX, AIREX, Damage Control/Fire Fighting and Recoverability modeling and simulation and plan surrogate testing for model validation. Commence CVN 79 susceptibility assessment. Commence UNDEX, AIREX, Damage Control/Fire Fighting and Recoverability modeling and simulation. Commence surrogate testing of models. Continue CVN 79 susceptibility assessment and continue initiating and validating any additional modeling deemed necessary.</p>				

R-1 SHOPPING LIST - Item No.

38

UNCLASSIFIED

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: <b>February 2005</b>																
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-04</b>	PROGRAM ELEMENT NUMBER AND NAME <b>PE 0603512N - Carrier Systems Development</b>	PROJECT NUMBER AND NAME <b>PU 4006 - CVN 21 Follow Ship</b>																	
<b>B. Accomplishments/Planned Program</b> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <th style="width: 30%;"></th> <th style="width: 15%;">FY 04</th> <th style="width: 15%;">FY 05</th> <th style="width: 15%;">FY 06</th> <th style="width: 15%;">FY 07</th> </tr> <tr> <td>Accomplishments/Effort/Subtotal Cost</td> <td style="text-align: center;">0.000</td> <td style="text-align: center;">0.000</td> <td style="text-align: center;">0.000</td> <td style="text-align: center;">32.037</td> </tr> <tr> <td>RDT&amp;E Articles Quantity</td> <td></td> <td></td> <td></td> <td></td> </tr> </table> <div style="border: 1px solid black; padding: 10px; margin-top: 10px;"> <p><b>- (U) CVN 21 Follow Ship Total Ship Integration:</b> The CVN 79 will incorporate advanced technologies including, but not limited to: Enhanced Weapons / Material Movement to further reduce manpower and increase sortie generation rates; Advanced Materials development and integration to reduce total weight and improve stability while reducing shipboard maintenance; Consolidated Electrical Energy Storage and Advanced Electrical Load Management to improve power density, reduce weight, and support advanced electrical loads; Improved Survivability technologies; and Advanced Ship Self Defense technologies. These technologies support continued improvement in CVN 21 class Key Performance Parameters (KPPs) and efforts supporting achievement of CVN 21 class Operational Requirements Document (ORD) Objectives: increased sortie generation rate, manpower reduction, and recovery of weight and stability service life margins.</p> <p>CVN 79 Total Ship Integration (TSI) will be accomplished through an IPPD contract with Northrop Grumman Newport News to incorporate technology advancements into the CVN 21 baseline design. TSI efforts are focused on continued design activities that integrate and optimize systems arrangements to improve KPPs and overall performance towards ORD objectives. CVN 79 design efforts will resolve issues related to incorporation of new technologies, the development of the CVN 79 contract data package, including design drawings and specifications, and will provide required program management and logistics support.</p> </div>						FY 04	FY 05	FY 06	FY 07	Accomplishments/Effort/Subtotal Cost	0.000	0.000	0.000	32.037	RDT&E Articles Quantity				
	FY 04	FY 05	FY 06	FY 07															
Accomplishments/Effort/Subtotal Cost	0.000	0.000	0.000	32.037															
RDT&E Articles Quantity																			

R-1 SHOPPING LIST - Item No.

38

UNCLASSIFIED

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: <b>February 2005</b>																																														
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NUMBER AND NAME	PROJECT NUMBER AND NAME																																															
<b>RDT&amp;E, N / BA-04</b>	<b>PE 0603512N - Carrier Systems Development</b>	<b>PU 4006 - CVN 21 Follow Ship</b>																																															
<p><b>C. PROGRAM CHANGE SUMMARY:</b></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; width: 40%;"></th> <th style="text-align: right; width: 10%;">FY 2004</th> <th style="text-align: right; width: 10%;">FY 2005</th> <th style="text-align: right; width: 10%;">FY 2006</th> <th style="text-align: right; width: 10%;">FY 2007</th> </tr> </thead> <tbody> <tr> <td>Funding:</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>FY05 President's Budget</td> <td style="text-align: right;">0.000</td> <td style="text-align: right;">0.000</td> <td style="text-align: right;">0.000</td> <td style="text-align: right;">0.000</td> </tr> <tr> <td>FY06 President's Budget</td> <td style="text-align: right;">0.000</td> <td style="text-align: right;">0.000</td> <td style="text-align: right;">0.000</td> <td style="text-align: right;">78.947</td> </tr> <tr> <td>Total Adjustments</td> <td style="text-align: right; border-top: 1px solid black;">0.000</td> <td style="text-align: right; border-top: 1px solid black;">0.000</td> <td style="text-align: right; border-top: 1px solid black;">0.000</td> <td style="text-align: right; border-top: 1px solid black;">78.947</td> </tr> <tr> <td colspan="5" style="padding-top: 10px;">Summary of Adjustments</td> </tr> <tr> <td style="padding-left: 20px;">Programmatic Adjustment</td> <td></td> <td></td> <td></td> <td style="text-align: right;">79.601</td> </tr> <tr> <td style="padding-left: 20px;">Other Adjustments</td> <td></td> <td></td> <td></td> <td style="text-align: right;">-0.654</td> </tr> <tr> <td style="padding-top: 10px;">Subtotal</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 3px double black;">0.000</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 3px double black;">0.000</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 3px double black;">0.000</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 3px double black;">78.947</td> </tr> </tbody> </table>						FY 2004	FY 2005	FY 2006	FY 2007	Funding:					FY05 President's Budget	0.000	0.000	0.000	0.000	FY06 President's Budget	0.000	0.000	0.000	78.947	Total Adjustments	0.000	0.000	0.000	78.947	Summary of Adjustments					Programmatic Adjustment				79.601	Other Adjustments				-0.654	Subtotal	0.000	0.000	0.000	78.947
	FY 2004	FY 2005	FY 2006	FY 2007																																													
Funding:																																																	
FY05 President's Budget	0.000	0.000	0.000	0.000																																													
FY06 President's Budget	0.000	0.000	0.000	78.947																																													
Total Adjustments	0.000	0.000	0.000	78.947																																													
Summary of Adjustments																																																	
Programmatic Adjustment				79.601																																													
Other Adjustments				-0.654																																													
Subtotal	0.000	0.000	0.000	78.947																																													
<p><b>Remarks:</b></p> <p>Schedule:</p> <p style="margin-left: 20px;">The CVN 78 Basic Construction contract will be awarded in FY08 with delivery in FY15. The CVN 79 Basic Construction contract will be awarded in FY12.</p> <p>Technical:</p> <p style="margin-left: 20px;">Not Applicable</p>																																																	

UNCLASSIFIED

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification								DATE:		
								February 2005		
APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT NUMBER AND NAME			PROJECT NUMBER AND NAME					
RDT&E, N / BA-04		PE 0603512N - Carrier Systems Development			PU 4006 - CVN 21 Follow Ship					
D. OTHER PROGRAM FUNDING SUMMARY:										
Line Item No. & Name	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	Complete	Total Cost
SCN: 200100 - Carrier Replacement Program	1,162.905	623.551	564.913	795.994	3,689.413	3,730.407	1,657.362	539.680	Cont.	Cont.
RDT&E:										
0604567N - Ship Contract Design, Live Fire T&E	112.730	136.516	55.672	86.506	83.826	59.393	40.082	87.499	Cont.	Cont.
0603570N - Advanced Nuclear Power Systems	198.814	168.080	168.373	170.980	160.992	152.814	133.951	105.975	Cont.	Cont.
*Note: Only a portion of the funding in PE 0603570N is included in the CVN 21 Program										
E. ACQUISITION STRATEGY:										
The CVN 78 will be the first ship of the CVN 21 class of aircraft carriers consisting of 12 ships. Due to the length and cost of construction, each carrier will be contracted for separately. The CVN 78 will feature a new nuclear propulsion and electrical generation/distribution system, new electromagnetic aircraft launching system, advanced arresting gear system, all electric auxiliaries, warfare system improvements, survivability enhancements, improved weapons handling, and improved aircraft servicing. These design features will result in lower manpower and total ownership costs as compared to the Nimitz Class. Additionally, the following warfighting benefits will be realized: increased sortie generation rate, improved ship self defense capability, increased launch and recovery capability/flexibility, increased operational availability, and increased flexibility to support future upgrades.										
F. MAJOR PERFORMERS:										
Northrop Grumman Newport News, Newport News, VA, Design/Component Development/Construction										
Naval Surface Warfare Center, Carderock, MD, Technology Design & Development										
Naval Surface Warfare Center, Dahlgren, Virginia, Technology Design & Development										

R-1 SHOPPING LIST - Item No.

38

UNCLASSIFIED



**UNCLASSIFIED**

**Exhibit R-2, RD TEN Budget Item Justification**  
(Exhibit R-2, page 65 of 72)

R-1 SHOPPING LIST - Item No. 38

# UNCLASSIFIED

## CLASSIFICATION:

Exhibit R-3 Cost Analysis (page 2)										DATE: February 2005				
APPROPRIATION/BUDGET ACTIVITY			PROGRAM ELEMENT			PROJECT NUMBER AND NAME								
RDT&E, N / BA-04			PE 0603512N - Carrier Systems Development			PU 4006 - CVN 21 Follow Ship								
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 04 Cost	FY 04 Award Date	FY 05 Cost	FY 05 Award Date	FY 06 Cost	FY 06 Award Date	FY 07 Cost	FY 07 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation														
CVN 21 Follow Ship	CPAF	NGNN, VA	0.000							0.300	11/06	Continuing	Continuing	
	Various	Miscellaneous	0.000							0.299	11/06	Continuing	Continuing	
Operational Test & Evaluation														
CVN Follow Ship														
Live Fire Test & Evaluation														
CVN 21 Follow Ship	CPAF	NGNN, VA	0.000							0.486	11/06	Continuing	Continuing	
	WX	NSWC Carderock	0.000							1.026	11/06	Continuing	Continuing	
Test Assets	Various	Miscellaneous	0.000							1.739	11/06	Continuing	Continuing	
Tooling														
GFE														
Award Fees														
Subtotal T&E			0.000	0.000		0.000		0.000		3.850		Continuing	Continuing	
Remarks:														
Contractor Engineering Support														
Government Engineering Support														
Program Management Support														
Travel														
Transportation														
SBIR Assessment														
Subtotal Management			0.000	0.000		0.000		0.000		0.000		Continuing	Continuing	
Remarks:														
Total Cost			0.000	0.000		0.000		0.000		78.947		Continuing	Continuing	
Remarks:														

CLASSIFICATION:

EXHIBIT R4, Schedule Profile																								DATE:									
APPROPRIATION/BUDGET ACTIVITY												PROGRAM ELEMENT NUMBER AND NAME								PROJECT NUMBER AND NAME													
RDT&E, N / BA-04												PE 0603512N - Carrier Systems Development								PU 4006 - CVN 21 Follow Ship													
Fiscal Year	2004				2005				2006				2007				2008				2009				2010				2011				
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Acquisition Milestones		MS B ▲	SRR ▲				SFR ▲		PDR ▲				CDR ▲	DAB ▲	PR																		
Propulsion Plant																																	
EMALS		SDD AWARD ▲			SRR ▲	SFR ▲	PDR ▲	CDR 1 ▲	CDR 2 ▲	TRR 1 ▲			TRR 2 ▲						LRIP ▲														
DBR Radar Suite		PDR ▲			CDR ▲																												
Advanced Arresting Gear	SRR ▲			PDR ▲	MS B ▲			CDR-1-2 ▲					TRR 1 ▲						TRR 2 ▲					MS C ▲									
Test & Evaluation Milestones																																	
Development Test	◆						DT A2					◆	◆		DT B1					◆	◆		DT B2				◆	◆		DT B3			
Operational Test							OT B1	◆					◆		OT B2	◆	◆	OT B3	◆	◆		OT B4	◆				◆			◆	OT B5	◆	
Contract Milestones																																	
IPPD Contract																																	
CP Contract																																	
Construction Contract																																	
Full Funding (SCN)																																	

R-1 SHOPPING LIST - Item No. 38

\* Not required for Budget Activities 1, 2, 3, and 6

# UNCLASSIFIED

CLASSIFICATION:

Exhibit R-4a, Schedule Detail							DATE:		
APPROPRIATION/BUDGET ACTIVITY		PROGRAM ELEMENT				PROJECT NUMBER AND NAME			
RDT&E, N / BA-04		PE 0603512N - Carrier Systems Development				PU 4006 - CVN 21 Follow Ship			
Schedule Profile	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	
Developmental Tests DT A-2	1-4Q								
Advanced Arresting Gear SRR	1Q								
EMALS SDD Phase Initiate	2Q								
Dual Band Radar PDR	2Q								
CVN 21 Milestone B	3Q								
CVN 21 SRR	3Q								
Construction Preparation Contract Award	3Q								
Advanced Arresting Gear PDR	4Q								
EMALS SRR		1Q							
Developmental Tests DT A-2		1-4Q							
Dual Band Radar CDR		1Q							
Advanced Arresting Gear Milestone B		1Q							
Operational Tests OT-B1		2-3Q							
EMALS SFR		2Q							
CVN 21 SFR		3Q							
EMALSP PDR		3Q							
EMALS CDR 1		4Q							
Advanced Arresting Gear CDR 1		4Q							
CVN 21 PDR			1Q						
Developmental Tests DT A-2			1-4Q						
AAG CDR 2			1Q						
EMALS CDR 2			2Q						
EMALS TRR 1(HALT/HCT)			4Q						
CVN 21 CDR				1Q					
Developmental Tests DT-B1				1-4Q					
Operational Tests OT-B2				1-4Q					
CVN 21 DAB PR				2Q					
AAG TRR 1 (DT/OA)				2Q					
EMALS TRR 2 (DT/OA)				4Q					
CVN 21 Construction Contract Award					1Q				
CVN 21 SCN Full Funding					1Q				
Developmental Tests DT-B1					1-4Q				
Operational Tests OT-B3					1-4Q				
EMALS LRIP					4Q				
AAG TRR 2 (DT/OA)						1Q			
Developmental Tests DT-B1						1Q			
Operational Tests OT-B4						1-4Q			
Developmental Tests DT-B2						3-4Q			
Developmental Tests DT-B2							1-4Q		
AAG LRIP								1Q	
Operational Tests OT-B5								1-4Q	
Developmental Tests DT-B3								2-4Q	

UNCLASSIFIED

R-1 SHOPPING LIST Item No. 38

Exhibit R-2, RD TEN Budget Item Justification  
(Exhibit R-2, page 68 of 72)

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification							DATE: <b>February 2005</b>	
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-4</b>		PROGRAM ELEMENT NUMBER AND NAME <b>0603512N Carrier Systems Development</b>			PROJECT NUMBER AND NAME <b>1723 CV Launch and Recovery Systems</b>			
COST (\$ in Millions)	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011
Project Cost	4.679	0.077	0.000	0.000	0.000	0.000	0.000	0.000
RDT&E Articles Qty	2							
<p><b>A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:</b></p> <p>This project addresses the development of systems providing approach and landing guidance, recovery, service, support, and launch of aircraft operating on or from ships. Payoffs include increased safety, greater sortie generation rates, enhanced aircraft boarding rates, reduced manning, and increased aircraft service life. Specific programs include:</p> <ul style="list-style-type: none"> <li>- (U) Advanced Recovery Control (ARC) System: The ARC system development effort will replace the existing control valve and valve actuation control system on the MK7 arresting gear, providing enhanced performance, improved reliability and maintainability, and restoring operational margins of safety.</li> <li>- (U) Cost Reduction Effective Improvement Initiative (CREI) Arresting Gear Fairlead Sheaves: This program seeks to replace the arresting gear fairlead drive system sheaves with a more durable product that will have a longer service life, thus decreasing system life cycle costs.</li> </ul>								

R-1 SHOPPING LIST - Item No.

38

UNCLASSIFIED

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: <b>February 2005</b>																															
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-4</b>	PROGRAM ELEMENT NUMBER AND NAME <b>0603512N Carrier Systems Development</b>	PROJECT NUMBER AND NAME <b>1723 CV Launch and Recovery Systems</b>																																
<p><b>(U) B. Accomplishments/Planned Program</b></p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 30%;"></th> <th style="width: 15%;">FY 04</th> <th style="width: 15%;">FY 05</th> <th style="width: 15%;">FY 06</th> <th style="width: 15%;">FY 07</th> </tr> </thead> <tbody> <tr> <td>Accomplishments/Effort/Subtotal Cost</td> <td style="text-align: center;">4.552</td> <td></td> <td></td> <td></td> </tr> <tr> <td>RDT&amp;E Articles Quantity</td> <td style="text-align: center;">2</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <div style="border: 1px solid black; padding: 10px; margin-bottom: 10px;"> <p><b>- (U) ARC -</b>            Developed ARC System Specification, contract Statement of Work, and Request for Proposal. Conducted source selection process, completed Milestone B review and awarded development contract. Conducted testing to characterize existing Constant Run Out Valve (CROV) performance in support of ARC control system development. Completed System Requirements Review, Preliminary Design Review, Critical Design Review and fabricated/delivered two (2) test articles. Conducted developmental testing of test articles on arresting gear. Conducted development testing using deadloads at the Jet Car Track Site (JCTS) and aircraft at the Runway Arrested Landing Site (RALS). Conducted rapid cycle reliability testing and environmental testing. Complete Tech Evaluation and achieve Milestone C. Provide engineering and management support to the program. Purchased two production representative ARC test articles to support developmental testing.</p> </div> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 30%;"></th> <th style="width: 15%;">FY 04</th> <th style="width: 15%;">FY 05</th> <th style="width: 15%;">FY 06</th> <th style="width: 15%;">FY 07</th> </tr> </thead> <tbody> <tr> <td>Accomplishments/Effort/Subtotal Cost</td> <td style="text-align: center;">0.127</td> <td style="text-align: center;">0.077</td> <td></td> <td></td> </tr> <tr> <td>RDT&amp;E Articles Quantity</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <div style="border: 1px solid black; padding: 10px;"> <p><b>- (U) CREI -</b>            (Arresting Gear Fairlead Sheaves) - Selected candidate materials and conducted laboratory testing on samples. Award contract, conduct design and manufacture prototype of CREI Sheaves. Conduct developmental and environmental testing of prototype sheaves. Provide engineering and management support to the program.</p> </div>						FY 04	FY 05	FY 06	FY 07	Accomplishments/Effort/Subtotal Cost	4.552				RDT&E Articles Quantity	2					FY 04	FY 05	FY 06	FY 07	Accomplishments/Effort/Subtotal Cost	0.127	0.077			RDT&E Articles Quantity				
	FY 04	FY 05	FY 06	FY 07																														
Accomplishments/Effort/Subtotal Cost	4.552																																	
RDT&E Articles Quantity	2																																	
	FY 04	FY 05	FY 06	FY 07																														
Accomplishments/Effort/Subtotal Cost	0.127	0.077																																
RDT&E Articles Quantity																																		

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: <b>February 2005</b>																																									
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-4</b>	PROGRAM ELEMENT NUMBER AND NAME <b>0603512N Carrier Systems Development</b>	PROJECT NUMBER AND NAME <b>PU 1723 CV Launch and Recovery Systems</b>																																										
<p><b>(U) C. PROGRAM CHANGE SUMMARY:</b></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;"></th> <th style="width: 10%; text-align: right;"><u>FY 2004</u></th> <th style="width: 10%; text-align: right;"><u>FY 2005</u></th> <th style="width: 10%; text-align: right;"><u>FY 2006</u></th> <th style="width: 10%; text-align: right;"><u>FY 2007</u></th> </tr> </thead> <tbody> <tr> <td>(U) Funding:</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>FY05 President's Budget</td> <td style="text-align: right;">1.170</td> <td style="text-align: right;">0.077</td> <td></td> <td></td> </tr> <tr> <td>FY06 President's Budget</td> <td style="text-align: right;">4.679</td> <td style="text-align: right;">0.077</td> <td></td> <td></td> </tr> <tr> <td>Total Adjustments</td> <td style="text-align: right; border-top: 1px solid black;">3.509</td> <td style="text-align: right; border-top: 1px solid black;">0.000</td> <td style="text-align: right; border-top: 1px solid black;">0.000</td> <td style="text-align: right; border-top: 1px solid black;">0.000</td> </tr> <tr> <td>Summary of Adjustments</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Reprogrammings</td> <td style="text-align: right;">3.509</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Subtotal</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 1px solid black;">3.509</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 1px solid black;">0.000</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 1px solid black;">0.000</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 1px solid black;">0.000</td> </tr> </tbody> </table> <p style="margin-top: 20px;">(U) Schedule:</p> <p style="margin-top: 20px;">(U) Technical: Not Applicable</p>						<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>	(U) Funding:					FY05 President's Budget	1.170	0.077			FY06 President's Budget	4.679	0.077			Total Adjustments	3.509	0.000	0.000	0.000	Summary of Adjustments					Reprogrammings	3.509				Subtotal	3.509	0.000	0.000	0.000
	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>																																								
(U) Funding:																																												
FY05 President's Budget	1.170	0.077																																										
FY06 President's Budget	4.679	0.077																																										
Total Adjustments	3.509	0.000	0.000	0.000																																								
Summary of Adjustments																																												
Reprogrammings	3.509																																											
Subtotal	3.509	0.000	0.000	0.000																																								

R-1 SHOPPING LIST - Item No. 38

UNCLASSIFIED

# UNCLASSIFIED

## CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification							DATE: <b>February 2005</b>																									
APPROPRIATION/BUDGET ACTIVITY <b>RDT&amp;E, N / BA-4</b>			PROGRAM ELEMENT NUMBER AND NAME <b>0603512N Carrier Systems Development</b>			PROJECT NUMBER AND NAME <b>PU 1723 CV Launch and Recovery Systems</b>																										
<p><b>(U) D. OTHER PROGRAM FUNDING SUMMARY:</b></p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; border-bottom: 1px solid black;">Line Item No. &amp; Name: 4216</th> <th style="text-align: right; border-bottom: 1px solid black;">FY 2004</th> <th style="text-align: right; border-bottom: 1px solid black;">FY 2005</th> <th style="text-align: right; border-bottom: 1px solid black;">FY 2006</th> <th style="text-align: right; border-bottom: 1px solid black;">FY 2007</th> <th style="text-align: right; border-bottom: 1px solid black;">FY 2008</th> <th style="text-align: right; border-bottom: 1px solid black;">FY 2009</th> <th style="text-align: right; border-bottom: 1px solid black;">FY 2010</th> <th style="text-align: right; border-bottom: 1px solid black;">FY 2011</th> <th style="text-align: right; border-bottom: 1px solid black;">To Complete</th> <th style="text-align: right; border-bottom: 1px solid black;">Total Cost Cont</th> </tr> </thead> <tbody> <tr> <td>OPN BLI: 421600- Aircraft Launch &amp; Recovery Equipment</td> <td style="text-align: right;">0.000</td> <td style="text-align: right;">4.295</td> <td style="text-align: right;">4.424</td> <td style="text-align: right;">7.489</td> <td style="text-align: right;">8.690</td> <td style="text-align: right;">9.093</td> <td style="text-align: right;">9.133</td> <td style="text-align: right;">9.253</td> <td style="text-align: right;">2.500</td> <td></td> </tr> </tbody> </table> <p><b>(U) E. ACQUISITION STRATEGY:</b></p> <p>The ARC acquisition strategy calls for full and open competition leading to a single contract award for the System Development and Demonstration Phase. Production quantities are included as options to the development contract.</p> <p>CREI A/G Fairlead Sheaves: The A/G Fairlead Sheave Development effort will be competitively awarded to industry to develop sample materials and perform laboratory testing for resistance.</p> <p>Based on the results of the testing, one material and heat treatment process will be selected and prototype sheaves manufactured and tested on two arresting gear engines at NAVAIR</p>											Line Item No. & Name: 4216	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	To Complete	Total Cost Cont	OPN BLI: 421600- Aircraft Launch & Recovery Equipment	0.000	4.295	4.424	7.489	8.690	9.093	9.133	9.253	2.500	
Line Item No. & Name: 4216	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	To Complete	Total Cost Cont																						
OPN BLI: 421600- Aircraft Launch & Recovery Equipment	0.000	4.295	4.424	7.489	8.690	9.093	9.133	9.253	2.500																							

R-1 SHOPPING LIST - Item I 38

UNCLASSIFIED