

UNCLASSIFIED

CLASSIFICATION:

EXHIBIT R-2, RDT&E Budget Item Justification						DATE: February 2007		
APPROPRIATION/BUDGET ACTIVITY RESEARCH DEVELOPMENT TEST & EVALUATION, NAVY / BA-04				R-1 ITEM NOMENCLATURE 0603512N - Carrier Systems Development				
COST (\$ in Millions)	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Total PE Cost	165.429	156.248	84.806	72.683	61.070	44.864	44.477	46.373
2208 - CVN 21	106.130	58.562	46.182	57.402	59.235	43.009	42.590	44.456
4004 - EMALS	54.624	58.153	36.842	13.484	0.000	0.000	0.000	0.000
4005 - Smart Carrier	1.791	1.766	1.782	1.797	1.835	1.855	1.887	1.917
4006 - CVN 79	0.000	34.828	0.000	0.000	0.000	0.000	0.000	0.000
9999/Congressional Adds	2.884	2.939	0.000	0.000	0.000	0.000	0.000	0.000
<p>A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This Navy unique program addresses all technology areas associated with Navy/Marine Corps aircraft operations aboard ships. The program includes:</p> <ul style="list-style-type: none"> - (U)(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. - (U) (4004) - Development of an advanced technology aircraft launch system in support of the CVN 78 Class design and construction schedule. The Electro Magnetic Aircraft Launch System (EMALS) will replace the current steam catapult on CVN 78 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. - (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). - (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. Funding realigned to PE 0604567N project 3179 starting in FY2008. 								

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- (U) (9515C) - Sentinel Net (Congressional Add) 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.
- (U) (9801C) - Continue the integration of the Quiet Interlude Processing System (QulPS) with the Carrier Tactical Support Center (CV-TSC) version 6.0 software architecture and develop a portable (2-man lift) hardware system to host the integrated software. Develop and integrate data fusion algorithms and software to fuse short range, relatively accurate, time dense tactical sensor ship track data with global, relatively inaccurate, time sparse national sensor ship track data. Develop and integrate data fusion algorithms and software to fuse non acoustic Latitude/Longitude vs. time tracks with acoustic sonar true bearing vs. time tracks output by most Navy sonars. There is a requirement for a portable tactical situational awareness system that can take inputs from multiple sensor types; fuse sensor detection reports, contact reports and tracks into composite tracks; display both independent contacts and composite tracks on a GIS display; and allow operator drill-down capability to underlying metadata. This portable system would support a number of mission scenarios including Antiterrorism, Force Protection and Expeditionary Naval Coastal Warfare. The Program of Record will benefit from the software and hardware developed in support of the repackaging of CV-TSC and additional sensor capability.
- (U) (9801N) -Quips Integration with CV Tactical Support (FY06 Congressional Add) - The Quiet Interlude Processing System (QUIPS) will provide an automated data fusion system to detect, track, classify, and neutralize threats in the nearshore environment. QulPS is state-of-the-art in algorithm development in non plane wave acoustic beamforming to detect and track surface ship and submerged contacts in very shallow water using matched phase matched field processing, as well as the normal plane wave beamformers.
- (U) (9802N)-Ship Security perimeter monitoring (FY06 Congressional Add) - The Perimeter Security Monitoring System will provide a solid state millimeter-wave radar uniquely designed to provide 360-degree Ship Perimeter Protection in Port and Littoral Waters. It will provide AT-FP/Harbor Defense Sensor for Networked Connection, be metadata enabled, man-portable and is meant to move the perimeter outward.

B. PROGRAM CHANGE SUMMARY:

Funding:	FY 2006	FY 2007	FY 2008	FY 2009
Previous President's Budget: (FY 07 Pres Controls)	168.283	153.894	117.125	106.872
Current BES/President's Budget (FY 08 Pres Controls)	165.429	156.248	84.806	72.683
Total Adjustments	-2.854	2.354	-32.319	-34.189
Summary of Adjustments				
Congressional Increases	0.081	2.950	0.000	0.000
Misc. Changes	-0.139	0.000	0.000	0.000
Congressional Rescissions	0.000	-0.596	0.000	0.000
Programmatic changes	0.000	0.000	-32.319	-34.189
SBIR	-2.796	0.000	0.000	0.000
Subtotal	-2.854	2.354	-32.319	-34.189

C. SCHEDULE: 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.

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EXHIBIT R-2a, RDT&E Project Justification								DATE: February 2007	
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 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	
Project Cost	106.130	58.562	46.182	57.402	59.235	43.009	42.590	44.456	
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 (IDE).

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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

B. Accomplishments/Planned Program

	FY 06	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost	6.471	4.720	0.810	0.010
RDT&E Articles Quantity				

- (U) Non-Nuclear Propulsion Plant Development -

(FY06) Completed CVN 21 Main Turbine Generator (MTG) VRS/EGS voltage/frequency variation testing; continued voltage regulator and electronic governor system schematic development; continued technical manual development; and definitized MTG shock qualification effort.

(FY07) Continue MTG shock qualification effort; continue technical manual development; and complete voltage regulator and electronic governor system schematics.

(FY08) Complete MTG shock qualification; transport/disposition MTG generator to designated storage; and transport/disposition MTG turbine.

	FY 06	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost	93.740	49.937	40.122	46.617
RDT&E Articles Quantity				

- (U) CVN 21 Advanced Technology Design & Development – Continue development and transition of technologies to support CVN 21 Key Performance Parameters (KPPs): maintain sortie generation rate, 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, and to improve overall performance. Technologies and design efforts include, but not limited to:

(FY 06) – Constructed prototypes, test and finalize integration and life cycle management for high design impact technologies. Developed prototypes and testing as necessary for other technologies. Continued to identify new technologies for later incorporation in the CVN 78 design. Continued system engineering process for the integration of the mission systems.

(FY 07) – Finalize integration for technologies developed and prototyped in previous years to support inclusion into the CVN 78 design. Continue to identify new technologies for later incorporation in the CVN 78 design. Continue system engineering process and high level integration of the mission systems.

(FY08) - Continue transition planning and execution, including finishing development work, certification/qualification testing, in-service testing, integrated logistics support and design integration tasks for all projects in the Critical and Non-Critical Technology portfolios. Continue identification of technology opportunities for incorporation into the CVN78.

(FY09) - Continue transition planning and execution, including finishing development work, certification/qualification testing, in-service testing, integrated logistics support and design integration tasks for all projects in the Critical and Non-Critical Technology portfolios. Continue identification of technology opportunities for incorporation into the CVN78.

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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
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B. Accomplishments/Planned Program (Cont.)

	FY 06	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost	5.919	3.905	5.250	10.775
RDT&E Articles Quantity				

- (U) CVN 21 - Test & Evaluation -

(FY06) - Continued DT-A2 events 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 have been finalized and provided in TEMP 1610 Rev B (in support of the FY08 construction contract award). DT-A2g (LTA) test report was approved and related models have been updated with plans to accredit in FY07.

(FY07) - The T&E IPT will finalize planning and execution of DT-A2 events and will begin to identify and plan to execute DT-B events to demonstrate that CVN 78 meets required capabilities. Assess CVN 21 Program T&E risks by reviewing various PARM test plans and reports, identify any gaps or differences in PARM testing and determine if PARMs are meeting CVN 21 Program ORD requirements.

(FY08) -Commence DT-B1 test events to include an assessment of DT-A2 data results, begin demonstrating the CVN 78 design will meet requirements, continue PARM interfacing, model and simulation testing, and manage T&E risks. DT-B1 concludes in late FY09 with a test report and Operational Assessment.

(FY09) -Continue DT-B1 and commence DT-B2 T&E planning effort. Execute Developmental Test B1g (LTA II); a full scale weapons effect test to further gain insight into ship responses to combat threats. Continue PARM interfacing, model and simulation testing, and manage T&E risks. DT-B1 concludes in late FY09 with a test report and Operational Assessment.

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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			
C. OTHER PROGRAM FUNDING SUMMARY:										
<u>Line Item No. & Name</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>FY 2012</u>	<u>FY 2013</u>	<u>Complete</u>	<u>Total Cost</u>
SCN: 200100 - Carrier Replacement Program	762.457	1,106.950	2,848.354	4,470.640	1,620.491	464.957	3,539.599	3,715.132	Cont.	Cont.
0604567N - Ship Contract Design, Live Fire T&E	56.415	51.729	62.404	73.698	69.270	101.536	91.287	90.106	Cont.	Cont.
0603570N - Advanced Nuclear Power Systems	165.971	173.988	166.196	158.276	138.891	124.417	124.051	121.840	Cont.	Cont.
*Note: Only a portion of the funding in PE 0603570N is included in the CVN 21 Program										
D. ACQUISITION STRATEGY:										
<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>										
E. MAJOR PERFORMERS:										
<p>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, VA, Technology Design & Development</p>										

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EXHIBIT R4, Schedule Profile																								DATE: February 2007										
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	2006				2007				2008				2009				2010				2011				2012				2013					
	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								DAB PR △																DAB PR △										
Propulsion Plant																																		
EMALS	PDR ▲				CDR 1 ▲		CDR 2 △		TRR 1 △		TRR 2 △		LRIP △																					
Advanced Arresting Gear					CDR 1 △		TRR 1 △						CDR 2 △	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									
Contract Milestones																																		
IPPD Contract					CVN 79 IPPD Contract Award △															CVN 80 IPPD Contract Award △														
CP Contract													CVN 79 CP Contract Award △													CVN 79 Construction Contract Award △					CVN 80 CP Contract Award △			
Construction Contract									CVN 78 Construction Contract Award △																									
Full Funding (SCN)									X																	X								

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

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Exhibit R-4a, Schedule Detail							DATE: February 2007	
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT				PROJECT NUMBER AND NAME			
RDT&E, N /	BA-04				PE 0603512N - Carrier Systems Development			
					PU 2208 - CVN 21			
Schedule Profile	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13
Operational Tests OT-B1	2-4Q	1Q						
EMALSP PDR	1Q							
Advanced Arresting Gear CDR 1		1Q						
Developmental Tests DT A-2	1-4Q	1-2Q						
AAG CDR 2			3Q					
EMALS CDR 1		1Q						
EMALS CDR 2		2Q						
Developmental Tests DT-B1		4Q	1-4Q	1-4Q				
Operational Tests OT-B2			1-4Q					
EMALS TRR 1(HALT/HCT)			2Q					
CVN 21 DAB PR		3Q				2Q		
AAG TRR 1 (IT)		3Q						
CVN 21 Construction Contract Award			1Q					
CVN 21 SCN Full Funding			1Q					
Developmental Tests DT-B2				4Q	1-4Q	1-3Q		
Operational Tests OT-B3				4Q	1-4Q	1Q		
EMALS TRR 2 (DT/OA)			4Q					
EMALS LRIP				4Q				
AAG TRR 2 (IT)				1Q				
Developmental Tests DT-B3						4Q	1-4Q	1-4Q
Operational Tests OT-B4						4Q	1-4Q	1Q
Developmental Tests DT-B4								
Operational Tests OT-B5					1-4Q			
Developmental Tests DT-B3						4Q	1-4Q	
CVN 79 IPPD Contract Award		1Q						
CVN 79 CP Contract Award				1Q				
AAG MS C / LRIP					3Q			
CVN 80 IPPD Contract Award						1Q		
CVN 79 Construction Contract Award							1Q	
CVN 80 CP Contract Award								1Q

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EXHIBIT R-2a, RDT&E Project Justification								DATE: February 2007	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-04		PROGRAM ELEMENT NUMBER AND NAME PE 0603512N - Carrier Systems Development				PROJECT NUMBER AND NAME PU 4004 - EMALS			
COST (\$ in Millions)	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	
Project Cost	54.624	58.153	36.842	13.484	0.000	0.000	0.000	0.000	
RDT&E Articles Qty	1								

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

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 ships of the CVN 78 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.

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B. Accomplishments/Planned Program

	FY 06	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost	54.624	58.153	36.842	13.484
RDT&E Articles Quantity	1			

-(U) EMALS -

FY-06: Continued System Development and Demonstration phase. Conducted Preliminary Design Review and initiated detailed design of shipboard representative system. Completed Critical design review for the Energy Storage Subsystem and Launch Motor Structure. Initiated manufacture of shipboard representative system and design of dead load test articles and instrumentation. Continued CVN 78 integration development. Provided management, systems engineering, test, and ship integration support.

FY-07: Continue System Development and Demonstration phase. Continue shipboard representative system development effort. Complete Critical Design Review for the remainder of the system. Continue manufacture of shipboard representative system and dead load test articles. Initiate installation in the EMALS land based test facility. Continue CVN 78 integration development. Provide management, systems engineering, test, and ship integration support. Continue CVN 78 integration development. Provide management, systems engineering, test, and ship integration support.

FY-08: Continue System Development and Demonstration phase. Continue shipboard representative system development effort. Complete manufacture and installation of a shipboard representative system into the land based test facility. Conduct environmental, high cycle and highly accelerated life testing. Initiate system integration testing. Continue CVN 78 integration development. Provide management, systems engineering, test, and ship integration support. Prepare and release the Low Rate Initial Production (LRIP) Request for Proposal (RFP) for four (4) EMALS launchers for CVN-78.

FY-09: Continue System Development and Demonstration phase. Continue shipboard representative system development effort. Complete contractor led system integration testing. Continue CVN 78 integration development. Provide management, systems engineering, test, and ship integration support. Award the LRIP contract.

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-04	PROGRAM ELEMENT NUMBER AND NAME PE 0603512N - Carrier Systems Development	PROJECT NUMBER AND NAME PU 4004 - EMALS
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C. OTHER PROGRAM FUNDING SUMMARY:

<u>Line Item No. & Name</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>FY 2012</u>	<u>FY 2013</u>	<u>Complete</u>	<u>Total Cost</u>
SCN: 200100 - Carrier Replacement Program	762.457	1,106.950	2,848.354	4,470.640	1,620.491	464.957	3,539.599	3,715.132	Cont.	Cont.
0604567N - Ship Contract Design, Live Fire T&E	56.415	51.729	62.404	73.698	69.270	101.536	91.287	90.106	Cont.	Cont.
0603570N - Advanced Nuclear Power Systems	165.971	173.988	166.196	158.276	138.891	124.417	124.051	121.840	Cont.	Cont.

*Note: Only a portion of the funding in PE 0603570N is included in the CVN 21 Program

D. 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.

E. MAJOR PERFORMERS:

General Atomics, San Diego, CA, EMALS Design and Development
 Naval Air Warfare Center, Aircraft Division, Lakehurst, NJ: EMALS Development and Test.

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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	2006				2007				2008				2009				2010				2011				2012				2013			
	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								DAB PR △																DAB PR △								
Propulsion Plant																																
EMALS		PDR ▲				CDR 1 ▲	CDR 2 △			TRR 1 △	TRR 2 △				LRIP △																	
Advanced Arresting Gear						CDR 1 △	TRR 1 △							CDR 2 △	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							
Contract Milestones																																
IPPD Contract						CVN 79 IPPD Contract Award △														CVN 80 IPPD Contract Award △												
CP Contract												CVN 79 CP Contract Award △																				CVN 80 CP Contract Award △
Construction Contract								CVN 78 Construction Contract Award △																				CVN 79 Construction Contract Award △				
Full Funding (SCN)										X																		X				

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

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Exhibit R-4a, Schedule Detail							DATE: February 2007		
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT				PROJECT NUMBER AND NAME				
RDT&E, N /	BA-04				PE 0603512N - Carrier Systems Development				PU 4004 - EMALS
Schedule Profile	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13	
Operational Tests OT-B1	2-4Q	1Q							
EMALSP PDR	1Q								
Advanced Arresting Gear CDR 1		1Q							
Developmental Tests DT A-2	1-4Q	1-2Q							
AAG CDR 2			3Q						
EMALS CDR 1		1Q							
EMALS CDR 2		2Q							
Developmental Tests DT-B1		4Q	1-4Q	1-4Q					
Operational Tests OT-B2			1-4Q						
EMALS TRR 1(HALT/HCT)			2Q						
CVN 21 DAB PR		3Q				2Q			
AAG TRR 1 (IT)		3Q							
CVN 21 Construction Contract Award			1Q						
CVN 21 SCN Full Funding			1Q						
Developmental Tests DT-B2				4Q	1-4Q	1-3Q			
Operational Tests OT-B3				4Q	1-4Q	1Q			
EMALS TRR 2 (DT/OA)			4Q						
EMALS LRIP				4Q					
AAG TRR 2 (IT)				1Q					
Developmental Tests DT-B3						4Q	1-4Q	1-4Q	
Operational Tests OT-B4						4Q	1-4Q	1Q	
Developmental Tests DT-B4									
Operational Tests OT-B5					1-4Q				
Developmental Tests DT-B3						4Q	1-4Q		
CVN 79 IPPD Contract Award		1Q							
CVN 79 CP Contract Award				1Q					
AAG MS C / LRIP					3Q				
CVN 80 IPPD Contract Award						1Q			
CVN 79 Construction Contract Award							1Q		
CVN 80 CP Contract Award								1Q	

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APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4		PROGRAM ELEMENT NUMBER AND NAME 0603512N - Carrier Systems Development			PROJECT NUMBER AND NAME PU 4005 - Smart Carrier			
COST (\$ in Millions)	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	1.791	1.766	1.782	1.797	1.835	1.855	1.887	1.917
RDT&E Articles Qty	1	1	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 Advanced Damage Control System (ADCS) software improvements, Electronic Valve Operator automation, Superior Sound Technology, Vibration Monitoring/Rotating Machinery Diagnostic Tools, 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.

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EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2007		
APPROPRIATION/BUDGET ACTIVITY RDT&E, N /BA-4	PROGRAM ELEMENT NUMBER AND NAME 0603512N - Carrier Systems Development	PROJECT NUMBER AND NAME PU 4005 - Smart Carrier		
B. Accomplishments/Planned Program				
	FY 06	FY 07	FY 08	FY 09
Accomplishments/Effort/Subtotal Cost	1.791	1.766	1.782	1.797
RDT&E Articles Quantity	1	1	1	1
<p>- (U) Smart Carrier - Fiscal Year 2006 efforts implemented hardware and software changes and completed final system developmental testing for Automated Systems Logs, completed software development and land-based test facility testing and subsequent shipboard testing in USS HARRY S. TRUMAN (CVN75); and began development of Advanced Damage Control System (ADCS) software improvements for the Advanced Fire and Smoke Sensor System (AFSSS) and the Flooding Casualty Control System (FCCS).</p> <p>Fiscal Year 2007 efforts continue software development, land-based testing, and shipboard testing of ADCS software improvements for the Advanced Fire and Smoke Sensor System (AFSSS) and the Flooding Casualty Control System (FCCS) in USS GEORGE WASHINGTON (CVN73); and initiate software development for Aviation Fuels System Electric Valve Operator (EVO) automation.</p> <p>Fiscal Year 2008 efforts will complete ADCS software improvements for installation in USS NIMITZ (CVN68) and continue Aviation Fuels Electric Valve Operator automation, as well as initiate the development and testing of Superior Sound Technologies for shipboard announcing systems.</p> <p>Fiscal Year 2009 efforts will complete Aviation Fuels Electric Valve Operator automation and the development/testing of Superior Sound Technologies for shipboard announcing systems for implementation in USS RONALD REAGAN (CVN76), and initiate software development of vibration monitoring/rotating machinery diagnostic tools and software development for expanded condition-based maintenance for rotating machinery.</p> <p>Future efforts include reboiler automation, liquid load management, advanced fire and smoke sensors, and Integrated Condition Assessment System software improvements, all via modifications and improvements to the existing Smart Carrier hardware and software suite.</p>				

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EXHIBIT R-2a, RDT&E Project Justification	DATE: February 2007
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C. OTHER PROGRAM FUNDING SUMMARY:

<u>Line Item No. & Name</u>	<u>FY2006</u>	<u>FY2007</u>	<u>FY2008</u>	<u>FY2009</u>	<u>FY2010</u>	<u>FY2011</u>	<u>FY2012*</u>	<u>FY2013</u>	<u>To Complete</u>	<u>Total Cost</u>
098100 Items Under \$5 million Smart Carrier (LT 140)	22.666	22.783	13.786	16.816	18.002	12.458	0.000	0.000	0.000	106.511

D. ACQUISITION STRATEGY:

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).

E. MAJOR PERFORMERS:

Naval Sea Systems Command - Philadelphia (formerly Naval Surface Warfare Center, Carderock Division), Philadelphia, PA performs software development, test and evaluation, integration and program management to include training development and integrated logistics support development. Funds are typically issued in the first fiscal quarter.

* Smart Carrier merges with the Aircraft Carrier Machinery Plant Upgrades procurement program beginning in FY12

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Exhibit R-3 Cost Analysis (page 1)											DATE: February 2007				
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 06 Cost	FY 06 Award Date	FY 07 Cost	FY 07 Award Date	FY 08 Cost	FY 08 Award Date	FY 09 Cost	FY 09 Award Date	Cost to Complete	Total Cost	Target Value of Contract	
Primary Hardware Development															
Ancillary Hardware Development															
Component Development															
Ship Integration	WX	NAVSEA, Phil.	0.400	0.100	11/05	0.100	11/06	0.120	11/07	0.120	11/08	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			8.583	0.100		0.100		0.120		0.120		0.000	9.023		
Development Support													0.000		
Software Development	WX	NAVSEA, Phil.	2.746	0.841	11/05	0.766	11/06	0.762	11/07	0.777	11/08	Continuing	Continuing		
Training Development	WX	NAVSEA, Phil.	0.180	0.050	11/05	0.080	11/06	0.080	11/07	0.080	11/08	Continuing	Continuing		
Integrated Logistics Support	WX	NAVSEA, Phil.	0.370	0.150	11/05	0.120	11/06	0.120	11/07	0.120	11/08	Continuing	Continuing		
Configuration Management													0.000		
Technical Data													0.000		
GFE													0.000		
Award Fees													0.000		
Subtotal Support			3.296	1.041		0.966		0.962		0.977		0.000	7.242		

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Exhibit R-3 Cost Analysis (page 2)											DATE: February 2007			
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 06 Cost	FY 06 Award Date	FY 07 Cost	FY 07 Award Date	FY 08 Cost	FY 08 Award Date	FY 09 Cost	FY 09 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WX	NAVSEA, Phil.	1.150	0.400	11/05	0.450	11/06	0.450	11/07	0.450	11/08	Continuing	Continuing	
Operational Test & Evaluation														
Live Fire Test & Evaluation														
Test Assets														
Tooling														
GFE														
Award Fees														
Subtotal T&E			1.150	0.400		0.450		0.450		0.450		0.000	2.500	
Contractor Engineering Support														
Government Engineering Support														
Program Management Support	WX	NAVSEA, Phil.	0.750	0.250	11/05	0.250	11/06	0.250	11/07	0.250	11/08	Continuing	Continuing	
Travel														
Labor (Research Personnel)														
SBIR Assessment														
Subtotal Management			0.750	0.250		0.250		0.250		0.250		0.000	1.500	
Total Cost			13.779	1.791		1.766		1.782		1.797		0.000	20.915	

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CLASSIFICATION:

EXHIBIT R-2a, RDT&E Project Justification			DATE: February 2007	
APPROPRIATION/BUDGET ACTIVITY RDT&E, N / BA-4	PROGRAM ELEMENT NUMBER AND NAME 0603512N Carrier Systems Development	PROJECT NUMBER AND NAME 9999 Congressional Plus-Ups : VARIOUS		
CONGRESSIONAL PLUS-UPS:				
	FY 06	FY 07	FY 08	FY 09
9515C				
Sentinel Net	0.962	1.644	0.000	0.000
Sentinel Net provides a low-risk sensor processing method that builds on CV-TSC's Command and Control Suite to yield a harbor defense or Force Protection C2 Capability on board Carriers.				
	FY 06	FY 07	FY 08	FY 09
9801C (CV-TSC) Quips Integration with CV Tactical Support Center				
Support Center	0.000	1.295	0.000	0.000
Continue the integration of the Quiet Interlude Processing System (QuiPS) with the Carrier Tactical Support Center (CV-TSC) version 6.0 software architecture and develop a portable (2-man lift) hardware system to host the integrated software. Develop and integrate data fusion algorithms and software to fuse short range, relatively accurate, time dense tactical sensor ship track data with global, relatively inaccurate, time sparse national sensor ship track data. Develop and integrate data fusion algorithms and software to fuse non acoustic Latitude/Longitude vs. time tracks with acoustic sonar true bearing vs. time tracks output by most Navy sonars. There is a requirement for a portable tactical situational awareness system that can take inputs from multiple sensor types; fuse sensor detection reports, contact reports and tracks into composite tracks; display both independent contacts and composite tracks on a GIS display; and allow operator drill-down capability to underlying metadata. This portable system would support a number of mission scenarios including Antiterrorism, Force Protection and Expeditionary Naval Coastal Warfare. The Program of Record will benefit from the software and hardware developed in support of the repackaging of CV-TSC and additional sensor capability.				
	FY 06	FY 07	FY 08	FY 09
9801N				
Quips Integration with CV Tactical Support Center	0.961	0.000	0.000	0.000
The Quiet Interlude Processing System (QUIPS) will provide an automated data fusion system to detect, track, classify, and neutralize threats in the nearshore environment. QuiPS is state-of-the-art in algorithm development in non plane wave acoustic beamforming to detect and track surface ship and submerged contacts in very shallow water using matched phase matched field processing, as well as the normal plane wave beamformers.				
	FY 06	FY 07	FY 08	FY 09
9802N				
Ship Security Perimeter Monitoring Using Millimeter	0.961	0.000	0.000	0.000
The Perimeter Security Monitoring System will provide a solid state millimeter-wave radar uniquely designed to provide 360-degree Ship Perimeter Protection in Port and Littoral Waters. It will provide AT-FP/Harbor Defense Sensor for Networked Connection, be metadata enabled, man-portable and is meant to move the perimeter outward.				