CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-2, RDT&E BUDGET ITEM JUSTIFICATION						DATE February 2008	
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**			R-1 ITEM NOMENCLATURE **0603512N/CARRIER SYSTEMS DEVELOPMENT**				
COST (In Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Total PE Cost	149.866	86.544	120.511	72.135	44.260	44.097	46.185
2208 / CVN 21	56.991	45.168	56.922	58.555	42.534	42.218	44.271
4004 / EMALS	71.265	36.055	61.997	11.761	0.000	0.000	0.000
4005 / SMART CARRIER	1.719	1.744	1.592	1.819	1.726	1.879	1.914
4006 / CVN 79	16.990	0.000	0.000	0.000	0.000	0.000	0.000
9999 / CONGRESSIONAL ADDS	2.901	3.577	0.000	0.000	0.000	0.000	0.000

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:

- (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.

- (U) (9515C) - Sentinel Net provides a low-risk sensor processing method that builds on the Carrier Tactical Support Center's (CV-TSC) Command and Control (C2) suite to

yield a harbor defense or force protection C2 capability on board Carriers. Funding provided for the development, implementation and integration of decision support and fused battle space awareness technologies for the Sea Combat Module (SCM). Benefits to the Navy include: implementing enabling technologies for fusing the tactical surface, air, and undersea warfare combat system data feeds used by the SCM; implementing state-of-the art, Fleet-championed detection, classification, and integrated display/visualization technologies; evaluating new and advanced concepts and technologies for SCM warfare integration for maturing; and transitioning promising fused battle space view and decision support technologies from the Office of Naval Research (ONR), Defense Advanced Research Planning Agency (DARPA), universities, and industry to SCM.

- (U) (9801N) - QuIPS provides an automated data fusion system to detect, track, classify, and neutralize threats in the near shore 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 normal plane wave beamformers. Funding provided for the integration of QuIPS with CV-TSC version 6.0 software architecture and development of a portable (2-man lift) hardware system to host the integrated software.

- (U) (9801C) - Funding provided to continue the integration of QuIPS with 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 sonar. 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 Anti-Terrorism, Force Protection and Expeditionary Naval Coastal Warfare.

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-2, RDT&E BUDGET ITEM JUSTIFICATION (CONTINUATION)		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	R-1 ITEM NOMENCLATURE **0603512N/CARRIER SYSTEMS DEVELOPMENT**	

B. PROGRAM CHANGE SUMMARY:

Funding:	FY 2007	FY 2008	FY 2009
Previous President's Budget: (FY 08 Pres Controls)	156.248	84.806	72.683
President's Budget (FY 09 Pres Controls)	149.866	86.544	120.511
Total Adjustments	-6.382	1.738	47.828
Summary of Adjustments			
Congressional Increases	0.000	3.600	
Misc. Changes	-0.193		-0.542
Congressional Rescissions	0.000	-0.565	
Programmatic Changes	-2.223	-1.272	48.580
SBIR	-3.966	0.000	0.000
Information Assurance	0.000	-0.025	0.000
NWCF	0.000	0.000	-0.210
Subtotal	-6.382	1.738	47.828

CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION					DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**				PROJECT NUMBER AND NAME **2208/CVN 21**		
COST (In Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	56.991	45.168	56.922	58.555	42.534	42.218	44.271
RDT&E Articles Qty	0	0	0	0	0	0	0

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).

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**	PROJECT NUMBER AND NAME **2208/CVN 21**

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	4.617	0.805	0.010
RDT&E Articles Quantity	0	0	0

- (U) Non-Nuclear Propulsion Plant Development -

(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 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	48.555	39.183	46.137
RDT&E Articles Quantity	0	0	0

- (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-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.

(FY- 08) - 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.

(FY-09) - 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.

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	3.819	5.180	10.775
RDT&E Articles Quantity	0	0	0

- (U) CVN 21 - Test & Evaluation -

(FY-07) - 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.

(FY-08) -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 an test report and Operational Assessment.

(FY-09) -Continue DT-B1 and commence DT-B2 T&E planning effort. Plan/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 an test report and Operational Assessment.

C. OTHER PROGRAM FUNDING SUMMARY:

* Note: Only a portion of the funding in PE 0603570N is included in the CVN78 Class Program.

Line Item No. and Name	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	To Complete	Total Cost
BLI 200100 Carrier Replacement Program	1,106.950	3,145.026	3,926.439	1,494.646	1,144.373	2,513.230	3,171.707	Cont.	Cont.
PE 0604567N Ship Contract Design, Live Fire T&E	50.947	62.068	72.932	63.830	89.862	77.365	80.838	Cont.	Cont.
PE 0603570N Adv. Nuclear Power Systems	173.988	165.140	158.270	137.843	123.475	123.265	121.179	Cont.	Cont.

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION (CONTINUATION)		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**	PROJECT NUMBER AND NAME **2208/CVN 21**

D. ACQUISITION STRATEGY:

The CVN 78 will be the first ship of the CVN 78 Class of aircraft carriers designed to replace USS Enterprise and the ships of the Nimitz Class. 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.

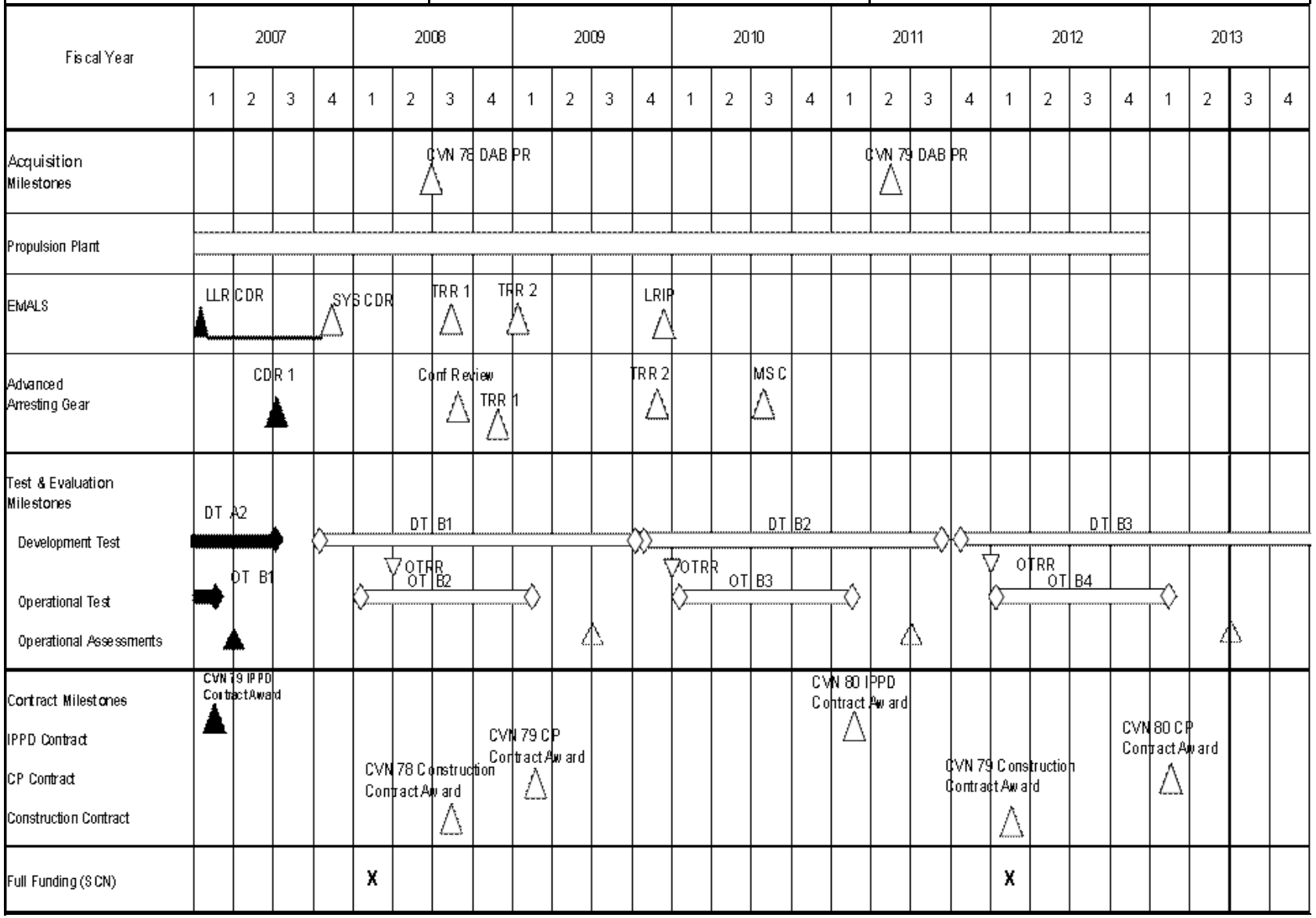
E. MAJOR PERFORMERS:

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

CLASSIFICATION:		UNCLASSIFIED										
EXHIBIT R-3, RDT&E PROJECT COST ANALYSIS									DATE February 2008			
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**		PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**					PROJECT NUMBER AND NAME **2208/CVN 21**					
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY Cost ($000)	FY 2007 Cost ($000)	FY 2007 Award Date	FY 2008 Cost ($000)	FY 2008 Award Date	FY 2009 Cost ($000)	FY 2009 Award Date	Cost to Complete ($000)	Total Cost ($000)	Target Value of Contract
Propulsion Plant Development	SS,CPFF	BETTIS, PA	71.627	0.000		0.000		0.000		CONT	CONT	0.000
	CPFF	NGNN, VA	160.050	4.359	JAN-07	0.800	APR-08	0.000		CONT	CONT	0.000
	Various	Miscellaneous	9.713	0.208	DEC-06	0.005	OCT-07	0.010	OCT-08	CONT	CONT	0.000
	WR	NSWC Carderock	0.000	0.050	APR-07	0.000		0.000		CONT	CONT	0.000
Advanced Design & Development	CPAF	NGNN	106.783	4.956	NOV-06	9.958	JAN-08	10.872	DEC-08	CONT	CONT	0.000
	WR	NSWC Carderock	59.956	6.686	OCT-06	3.193	DEC-07	1.582	OCT-08	CONT	CONT	0.000
	CPFF	SAIC	41.270	5.500	OCT-06	2.500	DEC-07	2.100	DEC-08	CONT	CONT	0.000
	WR	NAWCAD Pax River	13.851	9.658	OCT-06	6.662	JAN-08	11.535	OCT-08	CONT	CONT	0.000
	WR	NAWC Lakehurst	6.656	0.031	MAY-07	0.797	JAN-08	0.000		CONT	CONT	0.000
	WR	NSWC Dahlgren	7.637	3.710	OCT-06	2.972	JAN-08	1.821	OCT-08	CONT	CONT	0.000
	CPAF	Raytheon	4.364	4.828	NOV-06	5.635	JAN-08	11.553	DEC-08	CONT	CONT	0.000
	WR	NSWC P.H.	5.210	0.150	OCT-06	0.178	JAN-08	0.063	OCT-08	CONT	CONT	0.000
	WR	SPAWAR	5.016	2.199	OCT-06	0.643	JAN-08	0.609	OCT-08	CONT	CONT	0.000
	CPFF	NAVSEA Seaport	10.141	8.361	JAN-07	1.250	JAN-08	1.701	DEC-08	CONT	CONT	0.000
	Various	Miscellaneous	27.214	2.476	NOV-06	5.395	JAN-08	4.301	OCT-08	CONT	CONT	0.000
Subtotal Product Development			**529.488**	**53.172**		**39.988**		**46.147**		**CONT**	**CONT**	**0.000**
Remarks:												
Developmental Test & Evaluation	CPAF	NGNN	2.726	0.775	NOV-06	1.000	JAN-08	2.138	DEC-08	CONT	CONT	0.000
	WR	NAWCAD Pax River	8.648	0.019	NOV-06	0.709	DEC-07	1.242	OCT-08	CONT	CONT	0.000
	WR	NSWC Dahlgren	1.746	0.335	OCT-06	0.553	DEC-07	0.924	OCT-08	CONT	CONT	0.000
	WR	NSWC Carderock	2.971	0.058	JUL-07	0.573		0.000		CONT	CONT	0.000
	WR	SPAWAR	0.680	0.690	OCT-06	0.761	JAN-08	1.904	OCT-08	CONT	CONT	0.000
	CPFF	NAVSEA Seaport	0.075	0.000		0.000		0.000		CONT	CONT	0.000
	CPAF	Raytheon	0.214	0.471	NOV-06	0.050	JAN-08	1.438	DEC-08	CONT	CONT	0.000
	Various	Miscellaneous	3.044	0.924	NOV-06	0.840	DEC-07	2.529	OCT-08	CONT	CONT	0.000
Operational Test & Evaluation	WR	COMOPTEVFOR	1.555	0.547	NOV-06	0.694	JAN-08	0.600	OCT-08	CONT	CONT	0.000
Subtotal Test and Evaluation			**21.659**	**3.819**		**5.180**		**10.775**		**CONT**	**CONT**	**0.000**
Remarks:												

CLASSIFICATION:	UNCLASSIFIED											
EXHIBIT R-3, RDT&E PROJECT COST ANALYSIS									DATE February 2008			
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**		PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**					PROJECT NUMBER AND NAME **2208/CVN 21**					
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY Cost ($000)	FY 2007 Cost ($000)	FY 2007 Award Date	FY 2008 Cost ($000)	FY 2008 Award Date	FY 2009 Cost ($000)	FY 2009 Award Date	Cost to Complete ($000)	Total Cost ($000)	Target Value of Contract
Total Cost			**551.147**	**56.991**		**45.168**		**56.922**		**CONT**	**CONT**	**0.000**

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-4, SCHEDULE PROFILE		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**	PROJECT NUMBER AND NAME **2208/CVN 21**



CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-4a, SCHEDULE DETAIL					DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**			PROJECT NUMBER AND NAME **2208/CVN 21**			
Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Operational Tests OT-B1	1Q						
EMALS PDR							
Advanced Arresting Gear CDR 1	3Q						
Developmental Tests DT A-2	1-2Q						
AAG Configuration Review		3Q					
EMALS LLR CDR	1Q						
EMALS SYSTEM CDR	4Q						
Developmental Tests DT-B1	4Q	1-4Q	1-4Q				
Operational Tests OT-B2		1-4Q	1Q				
EMALS TRR 1(HALT/HCT)		3Q					
CVN 21 DAB PR		2-3Q			2Q		
AAG TRR 1 (IT)		4Q					
CVN 78 Construction Contract Award		3Q					
CVN 78 SCN Full Funding		1Q					
Developmental Tests DT-B2			4Q	1-4Q	1-3Q		
Operational Tests OT-B3				1-4Q	1Q		
EMALS TRR 2 (DT/OA)			1Q				
EMALS LRIP			4Q				
AAG TRR 2 (IT)			4Q				
Developmental Tests DT-B3					4Q	1-4Q	1-4Q
Operational Tests OT-B4						1-4Q	1Q
Operational Test Readiness Reviews		2Q		1Q		1Q	
Operational Assessments	1-2Q		2-3Q		2-3Q		
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 79 SCN Full Funding						1Q	
CVN 80 CP Contract Award							1Q

CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION					DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**				PROJECT NUMBER AND NAME **4004/EMALS**		
COST (In Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	71.265	36.055	61.997	11.761	0.000	0.000	0.000
RDT&E Articles Qty	0	0	0	0	0	0	0

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.

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**	PROJECT NUMBER AND NAME **4004/EMALS**

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	71.265	36.055	61.997
RDT&E Articles Quantity	0	0	0

-(U) EMALS -

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. 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.

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. Prepare and release the Low Rate Initial Production (LRIP) Request for Proposal (RFP) for four (4) EMALS launchers for CVN-78. Award the LRIP contract.

C. OTHER PROGRAM FUNDING SUMMARY:

*Note: Only a portion of the funding in PE 0603570N is included in the CVN 78 Class Program.

Line Item No. and Name	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	To Complete	Total Cost
BLI 200100 Carrier Replacement Program	1,106.950	3,145.026	3,926.439	1,494.646	1,144.373	2,513.230	3,171.707	Cont.	Cont.
PE 0604567N Ship Contract Design/Live Fire T&E	50.539	62.068	72.932	63.830	89.862	77.365	80.838	Cont.	Cont.
PE 0603570N Adv. Nuclear Power Systems	173.988	165.140	158.270	137.843	123.475	123.265	121.179	Cont.	Cont.

D. ACQUISITION STRATEGY:

The CVN 78 will be the first ship of the CVN 78 Class of aircraft carriers designed to replace USS Enterprise and the ships of the Nimitz Class. 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:

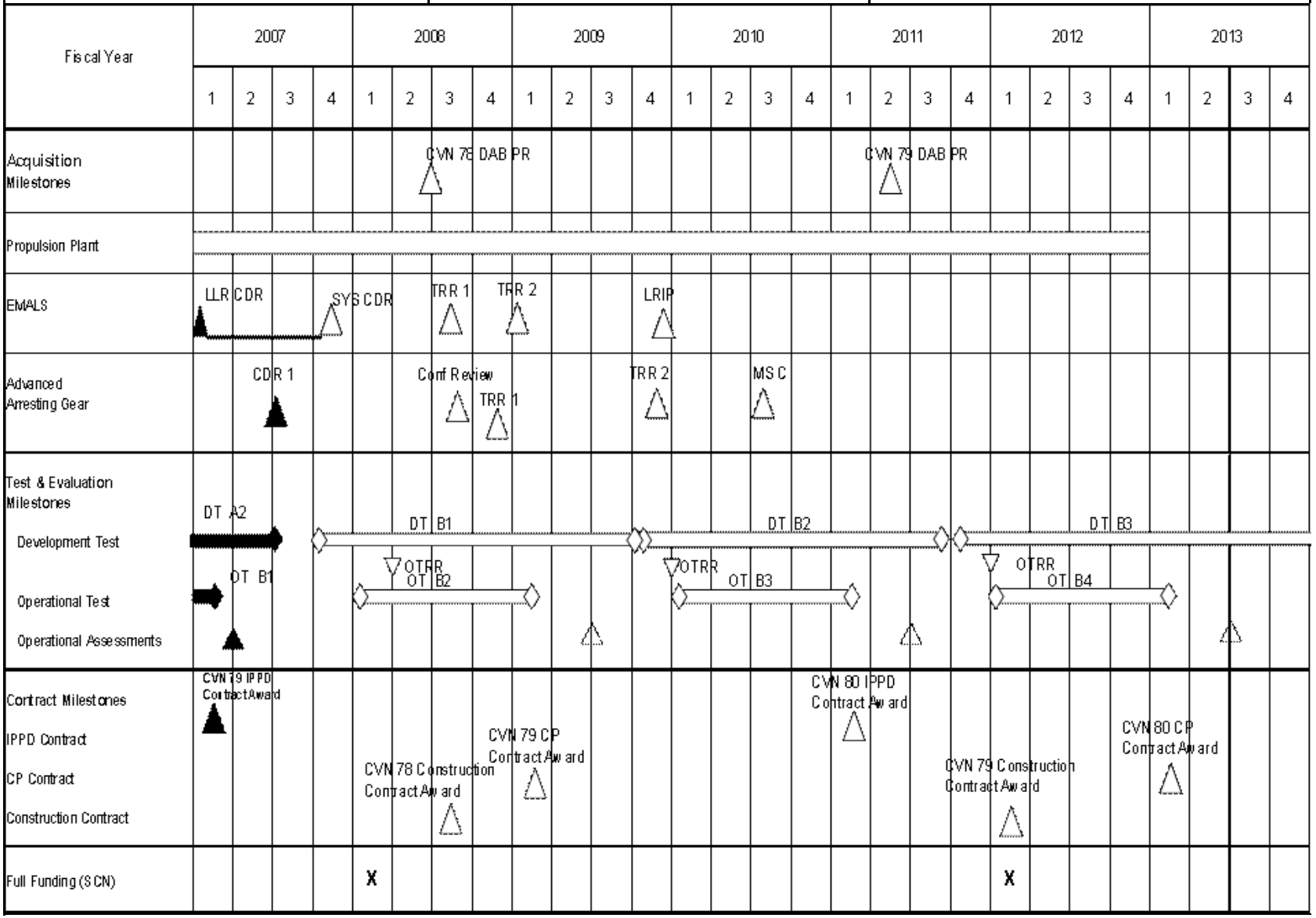
General Atomics, San Diego, CA, EMALS Design and Development

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION (CONTINUATION)		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**	PROJECT NUMBER AND NAME **4004/EMALS**

Naval Air Warfare Center, Aircraft Division, Lakehurst, NJ: EMALS Development and Test.

CLASSIFICATION:	UNCLASSIFIED											
EXHIBIT R-3, RDT&E PROJECT COST ANALYSIS									DATE February 2008			
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**		PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**					PROJECT NUMBER AND NAME **4004/EMALS**					
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY Cost ($000)	FY 2007 Cost ($000)	FY 2007 Award Date	FY 2008 Cost ($000)	FY 2008 Award Date	FY 2009 Cost ($000)	FY 2009 Award Date	Cost to Complete ($000)	Total Cost ($000)	Target Value of Contract
Aircraft Launch, Recovery & Support	CPAF	Northrop Grumman	83.352	0.000		0.000		0.000		0.000	83.352	0.000
	CPAF	General Atomics (PDRR)	82.719	0.000		0.000		0.000		0.000	82.719	0.000
	CPAF	General Atomics (SDD)	104.663	56.688	DEC-06	23.936	DEC-07	37.701	DEC-08	11.547	234.535	236.758
	WR	NAWC Lakehurst, NJ	24.659	4.866	NOV-06	4.932	DEC-07	7.546	DEC-08	0.000	42.003	0.000
	CPAF	NGNN, VA	2.536	0.000		0.000		0.000			2.536	0.000
	Various	Miscellaneous	0.577	0.691	NOV-06	0.478	DEC-07	1.859	DEC-08	0.357	3.962	0.000
Subtotal Product Development			**298.506**	**62.245**		**29.346**		**47.106**		**11.904**	**449.107**	**236.758**
Remarks:												
Aircraft Launch, Recovery & Support	WR	Lakehurst, NJ	12.225	9.020	NOV-06	6.709	DEC-07	14.891	DEC-08	0.000	42.845	0.000
Subtotal Test and Evaluation			**12.225**	**9.020**		**6.709**		**14.891**		**0.000**	**42.845**	**0.000**
Remarks: .												
Total Cost			**310.731**	**71.265**		**36.055**		**61.997**		**11.904**	**491.952**	**236.758**

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-4, SCHEDULE PROFILE		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**	PROJECT NUMBER AND NAME **4004/EMALS**



CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-4a, SCHEDULE DETAIL					DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**			PROJECT NUMBER AND NAME **4004/EMALS**			
Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Operational Tests OT-B1	1Q						
EMALS PDR							
Advanced Arresting Gear CDR 1	3Q						
Developmental Tests DT A-2	1-2Q						
AAG Configuration Review		3Q					
EMALS LLR CDR	1Q						
EMALS SYSTEM CDR	4Q						
Developmental Tests DT-B1	4Q	1-4Q	1-4Q				
Operational Tests OT-B2		1-4Q	1Q				
EMALS TRR 1(HALT/HCT)		3Q					
CVN 21 DAB PR		2-3Q			2Q		
AAG TRR 1 (IT)		4Q					
CVN 78 Construction Contract Award		3Q					
CVN 78 SCN Full Funding		1Q					
Developmental Tests DT-B2			4Q	1-4Q	1-3Q		
Operational Tests OT-B3				1-4Q	1Q		
EMALS TRR 2 (DT/OA)			1Q				
EMALS LRIP			4Q				
AAG TRR 2 (IT)			4Q				
Developmental Tests DT-B3					4Q	1-4Q	1-4Q
Operational Tests OT-B4						1-4Q	1Q
Operational Test Readiness Reviews		2Q		1Q		1Q	
Operational Assessments	1-2Q		2-3Q		2-3Q		2-3
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 79 SCN Full Funding						1Q	
CVN 80 CP Contract Award							1Q

CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION					DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**				PROJECT NUMBER AND NAME **4005/SMART CARRIER**		
COST (In Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	1.719	1.744	1.592	1.819	1.726	1.879	1.914
RDT&E Articles Qty	0	0	0	0	0	0	0

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.

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**	PROJECT NUMBER AND NAME **4005/SMART CARRIER**

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	1.719	1.744	1.592
RDT&E Articles Quantity	0	0	0

- (U) Smart Carrier - 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.

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.

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.

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.

C. OTHER PROGRAM FUNDING SUMMARY:

Line Item No. and Name	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	To Complete	Total Cost
098100 Items Under $5M Smart Carrier (LT 140)	22.221	13.612	16.336	17.501	15.808	0.000	0.000	0.000	85.478

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).

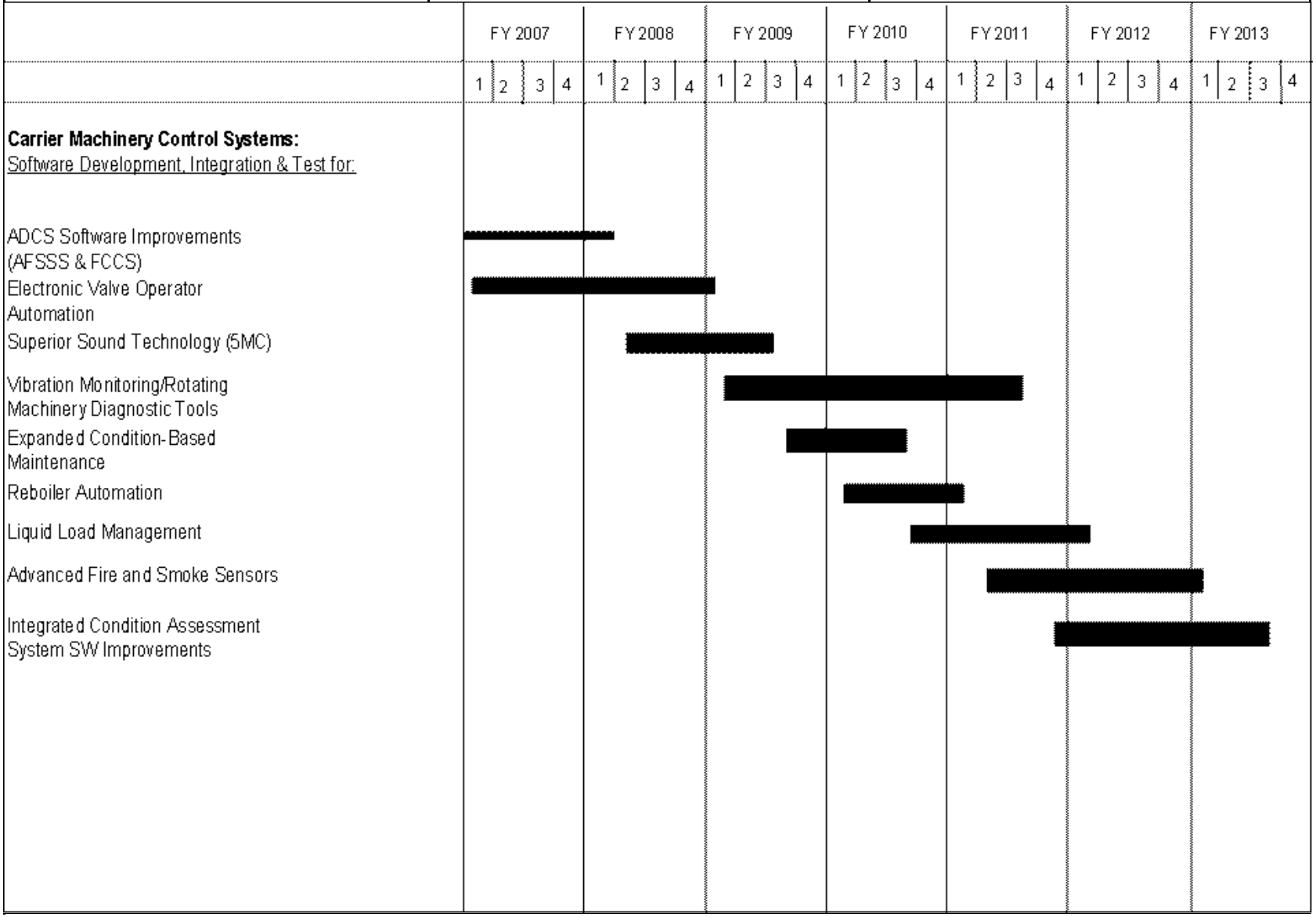
E. MAJOR PERFORMERS:

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

CLASSIFICATION:	UNCLASSIFIED											
EXHIBIT R-3, RDT&E PROJECT COST ANALYSIS									DATE February 2008			
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**		PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**					PROJECT NUMBER AND NAME **4005/SMART CARRIER**					
Cost Categories	Contract Method & Type	Performing Activity & Location	Total PY Cost ($000)	FY 2007 Cost ($000)	FY 2007 Award Date	FY 2008 Cost ($000)	FY 2008 Award Date	FY 2009 Cost ($000)	FY 2009 Award Date	Cost to Complete ($000)	Total Cost ($000)	Target Value of Contract
Ship Integration	WR	NAVSEA, Phil.	0.500	0.100	NOV-06	0.120	JAN-08	0.120	NOV-08	CONT	CONT	0.000
Systems Engineering	CPAF	NGNN, VA	0.205	0.000		0.000		0.000		0.000	0.205	0.000
	Various	Miscellaneous	7.978	0.000		0.000		0.000		0.000	7.978	0.000
Subtotal Product Development			**8.683**	**0.100**		**0.120**		**0.120**		**CONT**	**CONT**	**0.000**
Remarks:												
Software Development	WR	NAVSEA, Phil.	3.587	0.719	NOV-06	0.724	JAN-08	0.572	NOV-08	CONT	CONT	0.000
Training Development	WR	NAVSEA, Phil.	0.230	0.080	NOV-06	0.080	DEC-07	0.080	NOV-08	CONT	CONT	0.000
Integrated Logistics Support	WR	NAVSEA, Phil	0.520	0.120	NOV-06	0.120	JAN-08	0.120	NOV-08	CONT	CONT	0.000
Subtotal Development Support			**4.337**	**0.919**		**0.924**		**0.772**		**CONT**	**CONT**	**0.000**
Remarks:												
Developmental Test & Evaluation	WR	NAVSEA, Phil	1.550	0.450	NOV-06	0.450	JAN-08	0.450	NOV-08	CONT	CONT	0.000
Subtotal Test & Evaluation			**1.550**	**0.450**		**0.450**		**0.450**		**CONT**	**CONT**	**0.000**
Remarks:												
Program Management Support	WR	NAVSEA, Phil.	1.000	0.250	NOV-06	0.250	JAN-08	0.250	NOV-08	CONT	CONT	0.000
Subtotal Support Services			**1.000**	**0.250**		**0.250**		**0.250**		**CONT**	**CONT**	**0.000**
Remarks:												
Total Cost			**15.570**	**1.719**		**1.744**		**1.592**		**CONT**	**CONT**	**0.000**

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-4, SCHEDULE PROFILE		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**	PROJECT NUMBER AND NAME **4005/SMART CARRIER**



CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-4a, SCHEDULE DETAIL					DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**			PROJECT NUMBER AND NAME **4005/SMART CARRIER**			
Schedule Profile	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Automated System Logs Software Development Test							
ADCS Software Improvements (AFSSS/FCCS) Software Development	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	1Q				
Superior Sound Technology (5MC) Development/Integration		2-4Q	1-3Q				
Vibration Monitoring/Rotating Machinery Diagnostic Tools SW Development			1-4Q	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				1-4Q			
Reboiler Automation SW/HW Development Test					1Q		
Liquid Load Management SW Development/Test				3-4Q	1-4Q	1Q	
Advanced Fire and Smoke Sensor System Development					2-4Q	1Q	
Advanced Fire and Smoke Sensor System Development Testing						2-4Q	1Q
Integrated Condition Assessment System Software Development					4Q	1-3Q	
Integrated Condition Assessment System Software Development Testing						4Q	1-3Q

CLASSIFICATION:	UNCLASSIFIED						
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION					DATE February 2008		
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**				PROJECT NUMBER AND NAME **4006/CVN 79**		
COST (In Millions)	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013
Project Cost	16.990	0.000	0.000	0.000	0.000	0.000	0.000
RDT&E Articles Qty	0	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:

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 transitions the minimum sustaining technologies required to address obsolescence, critical survivability shortfalls as identified in CVN 78 testing, future requirements, and technologies which did not mature in time to support the CVN 78. 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 maintain 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.

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**	PROJECT NUMBER AND NAME **4006/CVN 79**

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2007	FY 2008	FY 2009
Accomplishments/Effort/Subtotal Cost	16.990	0.000	0.000
RDT&E Articles Quantity	0	0	0

CVN 79 efforts will continue to reduce the ship acquisition cost through the establishment of the CVN 79 initial cost estimate supported by process initiatives, material selections, and lessons learned from the CVN 78 activities will be studied and analyzed to support the development of the CVN 78 class planning yard and life cycle support plan.

The CVN 79 will incorporate technologies to address obsolescence, technology refresh, critical survival improvements, as well as manpower reduction and weight savings to maintain threshold levels of capability.

An IPPD contract with Northrop Grumman Newport News will incorporate necessary modifications into the CVN 78 class baseline design. Efforts are focused on maintaining the Key Performance Parameters (KPPs) for weight and kg/service life allowance at or above the ORD threshold values. CVN 79 contract planning efforts will provide required program management and logistics support.

C. OTHER PROGRAM FUNDING SUMMARY:

*Note: Only a portion of the funding in PE 0603570N is included in the CVN 78 Class Program.

Line Item No. and Name	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	To Complete	Total Cost
SCN: 200100 Carrier Replacement Program	1,106.950	3,145.026	3,926.439	1,494.646	1,144.373	2,513.230	3,171.707	Cont.	Cont.
PE 0604567N Ship Contract Design/Live Fire T&E	50.539	62.068	72.932	63.830	89.862	77.365	80.838	Cont.	Cont.
PE 0603570N Adv. Nuclear Power Systems	173.988	165.140	158.270	137.843	123.475	123.265	121.179	Cont.	Cont.

D. ACQUISITION STRATEGY:

The CVN 78 will be the first ship of the CVN 78 Class of aircraft carriers designed to replace USS Enterprise and the ships of the Nimitz Class.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:

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

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION (CONTINUATION)		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**	PROJECT NUMBER AND NAME **4006/CVN 79**

Naval Surface Warfare Center, Carderock, MD, Technology Design & Development

Naval Surface Warfare Center, Dahlgren, Virginia, Technology Design & Development

CLASSIFICATION:	UNCLASSIFIED	
EXHIBIT R-2a, RDT&E PROJECT JUSTIFICATION		DATE February 2008
APPROPRIATION/BUDGET ACTIVITY **RDTEN/BA 4**	PROGRAM ELEMENT NUMBER AND NAME **0603512N/CARRIER SYSTEMS DEVELOPMENT**	PROJECT NUMBER AND NAME **9999/CONGRESSIONAL ADDS**

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2007	FY 2008	FY 2009
9515C Sentinel Net for Ship Anti-Terrorism/Force Protection	1.606	0.000	0.000
RDT&E Articles Quantity	0	0	0

Sentinel Net provides a low-risk sensor processing method that builds on the Carrier Tactical Support Center's (CV-TSC) Command and Control (C2) suite to yield a harbor defense or force protection C2 capability on board Carriers. Funding provided for the development, implementation and integration of decision support and fused battle space awareness technologies for the Sea Combat Module (SCM). Benefits to the Navy include: implementing enabling technologies for fusing the tactical surface, air, and undersea warfare combat system data feeds used by the SCM; implementing state-of-the art, Fleet-championed detection, classification, and integrated display/visualization technologies; evaluating new and advanced concepts and technologies for SCM warfare integration for maturing; and transitioning promising fused battle space view and decision support technologies from the Office of Naval Research (ONR), Defense Advanced Research Planning Agency (DARPA), universities, and industry to SCM.

	FY 2007	FY 2008	FY 2009
9801C Quiet Interlude Processing System (QuIPS)	1.295	0.795	0.000
RDT&E Articles Quantity	0	0	0

Funding provided to continue the integration of QuIPS with 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 sonar. 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 Anti-Terrorism, Force Protection and Expeditionary Naval Coastal Warfare.

	FY 2007	FY 2008	FY 2009
Carrier Plant Automation and Manning Reduction Technology Insertion	0.000	0.795	0.000
RDT&E Articles Quantity	0	0	0

	FY 2007	FY 2008	FY 2009
Improved Corrosion Protection for Electromagnetic Aircraft Launch System	0.000	1.987	0.000
RDT&E Articles Quantity	0	0	0

Funding will be used to continue ongoing corrosion testing at Ocean City Research Testing facility in NJ. Various coupons and coating have been exposed up to 7 months now and will continue to be evaluated up to 3 years of exposure under simulated flight deck trough conditions. The funding will also be used to initiate a phase 2 study into the development of a corrosion inhibitor addition to the armature cooling to extent the armature's life. Phase one identified several candidates which look promising. The remainder of the funds will be utilized to interrogate and document the material properties of the alloys selected for use on EMALS. Fatigue and fracture data will be compiled under the unique conditions of the EMALS trough for in-service support of the EMALS system.