EXHIBIT R-2, RDT&E Budget Item Justification Sheet					DATE: **February 2002**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, BA4**		PROGRAM ELEMENT NAME AND NUMBER **Facilities Improvement / PE0603725N**			PROJECT NAME AND NUMBER Navy Facilities System/Y0995				
COST ($ in Millions)		FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Total PE Cost		**1.807**	**1.713**	**2.124**	**1.819**	**1.856**	**1.843**	**1.865**		
Navy Facilities System/Y0995		**1.807**	**1.713**	**2.124**	**1.819**	**1.856**	**1.843**	**1.865**	**Cont.**	**Cont.**
RDT&E Articles Qty		**5**	**5**	**6**	**TBD**	**TBD**	**TBD**	**TBD**	**NA**	**NA**

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program provides the Navy with new civil engineering capabilities that are required to overcome specific performance limitations of Naval shore facilities while reducing the cost of sustaining the Naval shore infrastructure. The program focuses available resources on satisfying facility requirements where the Navy is a major stakeholder. There are no test validated Commercial off the Shelf (COTS) solutions available, and a timely solution will not emerge without a Navy sponsored demonstration and validation. The program completes the development and validation of facility technologies originating in Navy Science and Technology programs, plus a variety of other sources which includes the National Science Foundation (NSF) and the National Institute of Standards and Technology (NIST). Validated technologies are implemented in the Navy's Military Construction (MILCON) and Sustainment Restoration and Modernization Programs. Project Y0995 is addressing three Navy facility requirements during the fiscal years FY 2001 through FY2003: Waterfront Facilities Repair and Upgrade, Facilities Technologies to Reduce the Sustainment, Restoration and Modernization and Modular Hybrid Pier. The execution of this program is consistent with the findings and recommendation of two National Academy of Sciences Reports: "The Role of Federal Agencies in Fostering New Technology and Innovation in Building" and "Federal Policies to Foster Innovation and Improvement in Constructed Facilities."

B. (U) PROGRAM CHANGE SUMMARY:	FY 2001	FY 2002	FY 2003
(U) FY 2002 President's Budget:	1.807	1.728	
(U) Appropriated Value:	1.807	1.728	
(U) Adjustments to FY2002/2003 President's Budget:		-0.015	
(U) FY 2003 Pres Budget Submit:	1.807	1.713	2.124

CHANGE SUMMARY EXPLANATION

(U) FY01: N/A

(U) FY02: Management reduction of $15K.

(U) Schedule: N/A

(U) Technical: N/A

C. (U) OTHER PROGRAM FUNDING SUMMARY: Provided in Project Y0995 R-2a

D. (U) ACQUISITION STRATEGY: Provided in Project Y0995 R-2a

E. (U) SCHEDULE PROFILE: Provided in Project Y0995 R-2a

EXHIBIT R-2a, RDT&E Project Justification						DATE: **February 2002**				
APPROPRIATION/BUDGET ACTIVITY **RDT&E, BA4**		PROGRAM ELEMENT NAME AND NUMBER **Facilities Improvement / PE0603725N**				PROJECT NAME AND NUMBER Navy Facilities System/Y0995				
COST ($ in Millions)		FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	Cost to Complete	Total Cost
Navy Facilities System/Y0995		**1.807**	**1.713**	**2.124**	**1.819**	**1.856**	**1.843**	**1.865**	**Cont.**	**Cont.**
RDT&E Articles Qty		**5**	**5**	**6**	**TBD**	**TBD**	**TBD**	**TBD**	**NA**	**NA**

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program provides the Navy with new civil engineering capabilities that are required to overcome specific performance limitations of Naval shore facilities while reducing the cost of sustaining the Naval shore infrastructure. The program focuses available resources on satisfying facility requirements where the Navy is a major stakeholder. And where there are no test validated Commercial off the Shelf (COTS) solutions available, and a timely solution will not emerge without Navy sponsored demonstration and validation. The program completes the development through demonstration and test validation of facility technologies originating in Navy Science and Technology programs, plus a variety of other sources which include the National Science Foundation (NSF) and the National Institute of Standards and Technology (NIST) and industry. Validated technologies are implemented in the Navy's Military Construction (MILCON) and Sustainment, Restoration and Modernization Programs. This project is addressing three Navy facility requirements during the fiscal years FY 2001 through FY2003:

(U) WATERFRONT FACILITIES REPAIR AND UPGRADE

(U) Over 75% of the Navy's waterfront facilities are over 42 years old. They were designed for a service life of no more that 25 years and to satisfy the mission requirements existing at that time of construction. The reinforced concrete used to construct nearly all of them requires costly and repetitive repairs. In addition, to accomplish more pier side ship maintenance and thus reduce drydock costs, these piers must be strengthened to support concentrated crane loads up to 110 tons when they were originally designed for no concentrated loads. This effort addresses new materials and design methods to extend the service life of existing waterfront facilities by an additional 15 or more years, and a new method to cost effectively upgrade the pier load capacity without resorting to demolition and replacement. Specific benefits include increasing the durability of concrete pier repairs from 3 to 15 +years for conventional concrete patches and composite enhanced repairs respectively, new longer-lasting low-maintenance fendering systems that eliminate the need for the frequent replacement of timber piles, a new Impulse Load Method (ILM) for accurately and quickly determining the vertical load capacity of piers and wharves, a new Swinging Weight Deflectometer (SWD) technique to determine the lateral stability of piers for earthquake forces and docking ship's impact. In total, for $1-2M of repairs and upgrades per pier, using this new technology, $50M for demolition and replacement is avoided.

(U) FACILITY TECHNOLOGIES TO REDUCE THE COST OF SUSTAINMENT, RESTORATION AND MODERNIZATION (SRM)

(U) The costs to correct these critical facility backlog deficiencies are over $3.1B as reported in the FY 2000 Annual Inspection Summary (AIS). Current Navy SRM funding levels are insufficient to prevent the continued growth of the backlog of mission and safety critical maintenance and repairs. This effort will demonstrate and clearly validate the cost and reliability of advanced technologies in order to assure their acceptance and implementation in traditionally conservative public works and maintenance and construction industries. The effort will accelerate the validation, commercialization, and wide-spread implementation of the facility technologies urgently required to reduce the cost of correcting the deficiencies in the Navy's SRM backlog by technology to reduce the frequency of failures and repair costs. Estimated returns on these investments are better than 100 to 1.

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(U) MODULAR HYBRID PIER.

(U) Modular Hybrid Pier, originally programmed for FY 02 start, must now be started in FY03 to achieve completions required by construction acquisition schedules.

The Navy is faced with the necessity of recapitalizing a large portion of its waterfront infrastructure over the next several decades. The Modular Hybrid Pier initiative develops and validates innovative material and design technologies for a mission-flexible waterfront infrastructure characterized by significantly reduced life cycle costs and increasing mission flexibility. The concepts validated by this project's Waterfront Facilities Repair and Upgrade initiative will enable the Navy to build new piers and to economically extend the useful service life of many existing piers and wharves. While reducing the need for immediate replacement, eventual replacement will be required. Emerging innovative structural and materials technologies, particularly those that will transition from the Navy's applied research and advanced development program, will help provide enhanced capability replacement structures that have a comparable initial cost yet have far less maintenance and repair costs. Use of composite materials and high strength light-weight concrete will produce structures that have twice the structural service life of the structures that they will replace. Modular design will enable off-site fabrication that will shorten the duration and lower the cost of the on-site construction. Modular design will vastly improve the durability quality because of precasting and yard assembly practices; it will also facilitate change-out of components to repair damage or to modify structure geometry or capacity to adapt to future changes in ship designs. Mobility of barge size modules through flotation is a significant new capability option to save money and provide new military worth. An economic analysis has shown that a modular hybrid (deployable) pier will have a Net Present Value (NPV) cost that is $18M less over its service life than that for a conventional pier constructed of ordinary reinforced concrete.

1. (U) FY 2001 ACCOMPLISHMENTS:

(U) ($0.427M) Waterfront Repair and Upgrade- Initiated repair and strengthening validation tests at SUBASE Bangor Marginal Wharf using advanced composite material systems to validate performance in cold/wet environment. Work under contract awarded FY00 to Sergent Inc. delayed by inclement weather and local regulation mandated work "window" for salmon protection. On site work started June 01 with scheduled completion in October 2001. Conducted operational test and evaluation of "Universal" Submarine Camel with successful multiple dockings of Seawolf submarine at pier of SUBASE New London. Sub Camel constructed of non-corroding composites has potential return on investment of 32:1 ($33M life cycle savings) compared with current steel camels. Camel design prevents contact with and damage to wide aperture arrays of Seawolf, Virginia and 688 class subs during berthing operations. Camel design modified to reduce acquisition cost and to facilitate transportation. Initiated validation testing of "Swinging Weight" pendulum system to assess lateral load capacity of piers.

(U) ($1.380M) Sustainment, Restoration and Modernization Technology - Continued performance evaluation of F/A-18 jet-exhaust-resistant pavements at NAS Oceana. Demonstrated construction of thin film hangar floor coating systems at NAS Lemoore and NAS Misawa. Provided data for Unified Facilities Guide Specifications 09611 and 09612 for safe and durable hangar floor coatings. Initiated demonstration of Roofing Maintenance Management System at NAVSTA Bremerton and Puget Sound NSY. Demonstrated constructability of concrete (containing high percentage of fly ash that increases durability) in piling fabricated for new Pier D at NAVSTA Bremerton. Demonstrated at NSA Mid South an automated 4-fold procedure for collecting pavement condition data. This will enable more efficient management of street and road pavement maintenance. Initiated DEMVAL of airfield markings containing recycled (less expensive) glass beads that provide requisite reflectivity. Demonstrated highly durable moisture-cured urethane (MCU) coating on steel water tank at NWS Seal Beach. Initiated DEMVAL of rapid techniques to non-destructively determine in-situ length of concrete pier piling to provide information for load assessments and dredging plans. Initiated DEMVAL of methods for encasement of concrete pier piles in composite shells to remediate loss of structural capacity from alkali silica and ettringite reactions. Initiated DEMVAL of heat resistant joint sealants for airfield pavements. Initiated DEMVAL of durable coating for corrosion protection of steel structures in waterfront splash zones.

EXHIBIT R-2a, RDT&E Project Justification			DATE: February 2002
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2. (U) FY 2002 PLAN:

(U) ($0.480M) Waterfront Repair and Upgrade - Complete test and evaluation of pier repair and strengthening systems at SUBASE Bangor Marginal Wharf. Complete validation testing and evaluation of Swinging Weight Deflectometer method for determining the remaining strength of piers to resist lateral loads from berthing ships. Initiate testing of agents to reduce the penetration rates of the chloride ion that causes corrosion.

(U) ($1.233M) Sustainment, Restoration and Modernization Technology - Complete testing or roof inspection and assessment. Complete NDE for measuring depth of embedment of concrete foundation piles. Continue measuring stresses of decomposing concrete on pile encasement. Initiate accelerated testing of "hybrid metalic reinforcement of concrete. Initiate testing acrylic elastomeric coatings for steel. Initiate testing flexible (non-cracking) airfield pavement marking paints. Test promising methods to improve underwater and inspection accuracy and efficiency by 10%. Complete testing of high heat resistant A/C pavement joint sealants. Complete application of durable coatings for steel in the splash zone. Continue performance testing of concrete with high-fly-ash content.

3. (U) FY 2003 PLAN:

(U) ($0.300M) Waterfront Repair and Upgrade - Continue testing agents to reduce chloride ion penetration rates into concrete.

(U) ($0.724M) Sustainment, Restoration and Modernization (SRM) Technology Reduction - Complete testing of pile encasement to extend life of decomposing concrete. Continue testing (and interim validation) of hybrid metalic reinforcement of concrete. Continue testing (and interim validation) of acrylic elastomeric coating on steel. Continue testing (and interim validation) of flexible (non-cracking) airfield pavement paints. Continue testing of underwater inspection methods/concepts. Continue evaluation (and interim validation) of durable coatings for steel in the splash zone. Complete validation of high temperature pavement joint sealants. Complete validation of high-fly-ash-content concrete.

(U) ($1.100M) Modular Hybrid Pier - The development and validation of a double deck, floating relocatable pier with highly durable concrete, appropriate composite reinforcement and passivated (protected) high strength post tensioning and having maintainability and operability features for economy and efficiency. The DEMVAL will include the latest to emerge technologies that can be validated by FY2005. The objective is to enable the maximum reduction in the total ownership cost of piers/waterfronts.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2002**
APPROPRIATION/BUDGET ACTIVITY	PROGRAM ELEMENT NAME AND NUMBER	PROJECT NAME AND NUMBER
RDT&E, BA4	**Facilities Improvement / PE0603725N**	Navy Facilities System/Y0995

B. (U) OTHER PROGRAM FUNDING SUMMARY: This project transitions waterfront facilities technology from applied research and advanced development programs PE0602234N, Materials, Electronics and Computer Technology, PE 0602236N, Warfighter Sustainment Applied Research, and PE0603236N, Warfighter Sustainment Advanced Technology. It also transitions facility technologies developed at universities under the sponsorship of the National Science Foundation (NSF), by the Building and Fire Research Laboratory (BRL) of the National Institute of Standards and Technology (NIST), and by the Construction Engineering Research Laboratories (CERL) and Waterways Experiment Station (WES) of the U. S. Army Engineer Research and Development Center (USAERDC) when they can contribute to the solution of one of the Navy requirements being addressed by this project. The project pursues opportunities to leverage private sector investment through partnerships with private sector organizations, such as the Civil Engineering Research Foundation (CERF) and the Composites Institute (CI) of The Society of the Plastics Industry (SPI). The project pursues opportunities to leverage Navy Sustainment, Restoration and Modernization and Military Construction (MILCON) investment through partnerships with SRM and MILCON program and project managers .

C. (U) ACQUISITION STRATEGY: This project is categorized as Non-ACAT (Non Acquisition). The know-how produced from this project enables the safe and cost effective application of emerging/advanced technology concepts and products: 1) specifying or describing the performance, 2) enabling innovative design applications, 3) enabling quality control/quality assurance during constructions, 4) enabling reliability and maintainability during operations, and 5)developing lifecycle cost projections and environmental sustainability life cycle data for Navy policy guidance and criteria serving the Navy Sustainment, Restoration and Modernization and Military Construction (MILCON) programs. The data from this program enables earliest and safe utilization of advanced technology for cost avoidance in the facilities infrastructure. The technical know-how of this program is transferred to the construction industry in supporting Navy construction and maintenance through the inclusion of individual firms (using competitive selection processes) and industry organizations/associations in the development and testing activities.
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EXHIBIT R-2a, RDT&E Project Justification			DATE: **February 2002**
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D. (U) SCHEDULE PROFILE:

FY01	**FY02**	**FY03**
Waterfront Facilities Repair and Upgrade Initiated validation test of composite materials for repair and strengthening of piers at SUBASE bangor. Initiated testing of swinging weight deflectometer (SWD) for assessing pier load capacity.	**Waterfront Facilities Repair and Upgrade** Complete performance validation of composites in SUBASE. Complete Swinging Weight Deflectometer for assessing repairing pier load/strength capacity. Initiate testing of agents to reduce corrosion inducing chloride ion penetration rates.	**Waterfront Facilities Repair and Upgrade** Continue testing agents to reduce chloride penetration rates.
Sustainment, Restoration and Modernization Technology Completed validation of: moisture cured urethanes (MCU) safety coatings for hangar floors; auto pavement condition index. Initiated testing of roof inspection and assessment process. Initiate testing of NDE for determining concrete foundation pile embedment length and condition measuring. Initiated testing of concrete pile encasement to arrest/slowdown concrete decomposition due to alkali-silica reactions. Initiated search for better methods for underwater inspection by divers. Initiated testing of heat resistant aircraft pavement joint sealants. Initiated testing of durable coatings for steel in the splash zone. Continued testing of concrete with high-fly ash content in marine settings.	**Sustainment, Restoration and Modernization Technology** Complete testing of roof inspection and assessment. Complete NDE for measuring depth of embedment of concrete foundation piles. Continue measuring stresses of decomposing concrete on pile encasement. Initiate accelerated testing of "hybrid" metalic reinforcement of concrete. Initiate testing acrylic elastomeric coatings for steel. Initiate testing flexible (non-cracking) airfield pavement marking paints. Test promising methods to improve underwater and surface inspection accuracy and efficiency. Complete testing of high heat resistant A/C pavement joint sealants. Complete application of durable coatings for steel in the splash zone. Continue performance testing of concrete with high-fly-ash content.	**Sustainment, Restoration and Modernization Technology** Complete testing pile encasement to extend life of decomposing concrete. Continue testing (and interim validation) of hybrid metalic reinforcement concrete. Continue testing of (and interim validation) of acrylic elastomeric coating on steel. Continue testing (and interim validation) of flexible (non-cracking) airfield pavement paints. Continue testing of underwater and surface inspection methods/concepts. Continue evaluation (and interim validation) of durable coatings for steel in the splash zone. Complete validation of high temperature pavement joint sealants. Complete validation of high-fly-ash content concrete. **Modular Hybrid Pier** Initiate fabrication long lead test articles. Initiate simulation and physical testing.
All results transition to engineering criteria and performance specifications for competitive procurement of maintenance and construction projects.	All results transition to engineering criteria and performance specifications for competitive procurement of maintenance and construction projects.	All results transition to engineering criteria and performance specifications for competitive procurement of maintenance and construction projects.

Exhibit R-3 Cost Analysis (page 1) | DATE: **February 2002**

APPROPRIATION/BUDGET ACTIVITY: **RDT&E, BA4** | PROGRAM ELEMENT: **Facilities Improvement / PE0603725N** | PROJECT NAME AND NUMBER: Navy Facilities System/Y0995

Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY01 Cost	FY01 Award Date	FY 02 Cost	FY 02 Award Date	FY 03 Cost	FY 03 Award Date	Cost to Complete	Total Cost	Target Value of Contract
High Performance (HP) Magazine	WX	NFESC Pt. Hueneme, CA	4.090									
	WR	NSWC Indian Head, MD	0.045									
	RC	LANTDIV Norfolk, VA	0.349									
	WR	Navy PHS&T Earle, NJ	0.070									
	FP	Ricarl Design Camarillo, CA	0.019									
	FP	SVERDRUP St. Louis, MO	0.261									
Waterfront Facilities Repair and Upgrade	WX	NFESC Pt. Hueneme, CA	1.228	0.315	10/00	0.330	10/01	0.300	cont.	cont.	cont.	na
	WR	NUWC New London, CT	0.687									
	WR	EFANW Poulsbo, WA		0.012	05/01							
	FP	Contractors TBD Locations TBD	0.331	0.100	09/01	0.150	06/02					
Sustainment, Restoration and Moderization Technology	WX	NFESC Pt. Hueneme, CA	2.081	0.986	10/00	0.715	10/01	0.724	11/02	nominal varies	cont.	na
	FP	CERF,Wash, DC	0.045									
	RC	LANTDIV	0.027	0.013	05/01							
	RC	NAS Misawa		0.030	05/01							
	WR	SWDIV		0.002	03/01							
	RC	SOUTHDIV		0.021	05/01							
	FP	Han Padron Inc.		0.018	03/01							
	RC	FACCO Port Hueneme, CA		0.060	05/01							
	FP	N. State Univ. Aberdeen, SD	0.042									
	WR	PWD,NWS Charleston,SC	0.081									
	FP	Contractors TBD Locations TBD		0.250	09/01	0.518	03/02			cont.	cont.	na
Modular Hybrid Pier	WR	NFESC										
		Pt. Hueneme, CA						1.100	12/02	cont.	cont.	na
Subtotal Product Development			9.356	1.807		1.713		2.124				

Remarks:

Total Prior Years Cost: Summation starts with FY94. Subtotal does not include performing activities from prior years that are no longer performing activities.

Exhibit R-3 Cost Analysis (page 2)									DATE: **February 2002**			
APPROPRIATION/BUDGET ACTIVITY **RDT&E, N**			PROGRAM ELEMENT **Facilities Improvement / PE0603725N**				PROJECT NAME AND NUMBER Navy Facilities System/Y0995					
Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total PY s Cost	FY 01 Cost	FY01 Award Date	FY 02 Cost	FY 02 Award Date	FY 03 Cost	FY 03 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation												
Operational Test & Evaluation												
Subtotal T&E			0.000	0.000		0.000		0.000		0.000		
Remarks: Included in Product Development costs.												
Contractor Engineering Support												
Government Engineering Support												
Program Management Support												
Travel												
Labor (Research Personnel)												
Overhead												
Subtotal Management			0.000	0.000		0.000		0.000		0.000	0.000	
Remarks: Not applicable.												
Total Cost			9.356	1.807		1.713		2.124			Cont.	Cont.
Remarks:												