EXHIBIT R-2, RDT&E Budget Item JustificationSheet					DATE: **February 2000**				
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 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total PE Cost	**1.834**	**1.974**	**1.824**	**1.719**	**1.759**	**1.811**	**1.864**		
Navy Facilities System/Y0995	**1.834**	**1.974**	**1.824**	**1.719**	**1.759**	**1.811**	**1.864**	**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 Real Property Maintenance (RPM) Programs. Project Y0995 is addressing four Navy facility requirements during the fiscal years FY 1999 through FY2001: The High Performance (HP) Magazine, Waterfront Facilities Repair and Upgrade, Facilities Technologies to Reduce the Real Property Maintenance (RPM) Backlog, and the 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 1999	FY 2000	FY 2001
(U) FY 2000 President's Budget:	1.853	1.985	1.916
(U) Appropriated Value:	1.853	1.985	
(U) Adjustments from Pres Budget:	-0.019	-0.011	-0.092
(U) FY 2001 President's Budget Submit:	1.834	1.974	1.824

CHANGE SUMMARY EXPLANATION

(U) Funding: Reflects a combination of general decreases including SBIR transfers (FY99), Across-the-Board Reduction (FY00), and NWCF rate adjustments (FY01).
(U) Schedule: One year delay in completion of one Real Property Maintenance (RPM) technology validation
(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 2000**			
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COST ($ in Millions)	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Navy Facilities System/Y0995	**1.834**	**1.974**	**1.824**	**1.719**	**1.759**	**1.811**	**1.864**	**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 infrastruture. 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 Real Property Maintenance (RPM) Programs. This project is addressing four Navy facility requirements during the fiscal years FY 1999 through FY2001:

(U) THE HIGH PERFORMANCE (HP) MAGAZINE.

(U) Based on current magazine technologies, substantial land areas within Naval activities cannot be used for inhabited buildings in order to satisfy Explosives Safety Quantify Distance (ESQD) arcs. The converse is also true, the Navy is not able to construct new magazines where they are needed because of the presence of inhabited buildings. This effort enables a quantification of the specific hazard scenarios capable of causing ordnance detonation, an improved capability to model an ordnance explosion in a magazine, and the innovative use of energy absorbing construction materials to provide the Navy with a new magazine concept. The new magazine will have smaller ESQD arcs that are based on a Maximum Credible Event (MCE) that is not the detonation of the entire magazine but rather the detonation of the contents of one, much smaller, storage cell within the magazine. For a typical magazines with Net Explosive Weight (NEW) capabilities of 250,000 pounds, the allowable ordnance storage density is increased from 370 pounds/acre to 2,222 pounds/acre. In addition, the number of incompatible classes of ordnance that can be stored in the same magazine is incased from none to eight. This will lead to lower operational costs for the Receipt, Segregation, Storage, and Issue (RSSI) of ordnance and, for some activities, a reduction in the number of magazines required to accomplish their mission.

(U) WATERFRONT FACILITIES REPAIR AND UPGRADE.

(U) Over 75% of the Navy's waterfront facilities are over 45 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, they are unable to satisfy new mission requirements, such as the increase in pier deck capacity required to accomplish more extensive pier-side ship maintenance and repair tasks using truck-mounted cranes that have concentrated outrigger loads of up to 120 tons on a pier originally designed for no concentrated deck loading. This effort integrates new methods to extend the service life of existing waterfront facilities by an additional 15 to 30 years, and to cost effectively upgrade them to satisfy new mission requirements. Specific benefits include increasing the durability of spalled marine concrete repairs from 3 to 15 years, new longer-lasting low-maintenance fendering systems that eliminate the need for the frequent replacement of timber piles, a new Impulse Load Method of assessing the vertical load capacity of pile-supported waterfront structures, and providing new pier upgrade alternatives costing about $5M for a typical pier instead of the now required demolish then replace approach costing about $30M.

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(U) FACILITY TECHNOLOGIES TO REDUCE THE REAL PROPERTY MAINTENANCE (RPM) BACKLOG.

(U) The Real Property Maintenance (RPM) costs to correct critical facility deficiencies are over $2.0B as reported in the FY 1995 Annual Inspection Summary (AIS). Current Navy RPM funding levels are insufficient to prevent the continued growth of the critical backlog of maintenance and repairs. This effort will validate and accelerate the wide-spread implementation of a broad range of advanced facility technologies needed to overcome design and construction practices that are conservative and remain costly because of the high risk the private sector associates with the utilization of new facility technologies. The effort will accelerate the validation, commercialization, and wide-spread implementation of the facility technologies urgently required to reduce the cost of deficiencies in the Navy's RPM backlog by reducing initial construction costs up to 20% and facility components with service lives that are up to 25 years longer.

(U) MODULAR HYBRID PIER.

(U) 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 thrust develops and validates technologies for a mission flexible waterfront infrastructure characterized by significantly reduced life cycle costs. The concepts validated by this project's Waterfront Facilities Repair and Upgrade thrust will enable the Navy to economically extend the useful service life of many existing piers and wharves. They will reduce the Navy's need to construct new piers and wharves, but will not eliminate the need completely. Emerging innovative materials technologies, particularly those that will transition from the Navy's Exploratory Development (6.2) Research Program, can provide a new capability to design replacement structures that have a comparable initial cost yet have far less maintenance and repair cost. Use of fiber-reinforced plastics (FRP) for appurtenances and FRP-reinforced high strength light-weight concrete for structural elements 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 also facilitate change-out of components to repair damage or to modify structure geometry or capacity to adapt to future changes in ship designs. An economic analysis has shown that a modular hybrid pier will have a Net Present Value (NPV) cost that is $8M less over its service life than that for a conventional structure constructed on steel-reinforced concrete.

1. (U) FY 1999 ACCOMPLISHMENTS:

(U) ($0.220M) The High performance (HP) Magazine – Completed standard design of magazine, documentation of operation procedures, and other documentation required to obtain Department of Defense Explosives Safety Board (DDESB) certification.

(U) ($0.660M) Waterfront Repair and Upgrade - Installed and tested two composite submarine camels and backing fender piles (one complete submarine berth) at SUBASE New London. Collected load and energy dissipation performance data. Conducted field test of blocking, whale and camel replacement components comprised of composite wood products. Completed performance specifications for composite fender piling and composite camel systems. Initiated design for upgrade of a pier or wharf using composite structural systems. Validated performance of the falling weight deflectometer (FWD) on a Navy pier having a deck thickness greater than 18-inches.

EXHIBIT R-2a, RDT&E Project Justification		DATE: February 2000
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(U) ($0.954M) Real Property Maintenance (RPM) Backlog Reduction - Initiated large scale field tests to validate performance of selected facility technologies within the general areas of high performance concrete, roofing, coatings and corrosion protection, and composite materials. Continued FY 1999 testing coordination with the Civil Engineering Research Foundation (CERF), and with participating Navy activities. Began technology selection and validation test planning for the FY 2000 tests.

2. (U) FY 2000 PLAN:

(U) ($0.748M) Waterfront Repair and Upgrade - Complete testing for advanced pile and camel systems using composite materials. Complete design and award contract from corrosion stabilization, concrete repair and strengthening with composites of a selected Navy pier. Install instrumentation to monitor long term corrosion state and structural performance.

(U) ($1.226M) Real Property Maintenance (RPM) Backlog Reduction - Continue technology validation tests initiated in FY 1999. Initiate additional tests planned during FY 1999. National performance standards will be used to evaluate resulting test data when they are applicable. When none exist, the resulting test data will be submitted to the National Evaluation Service - Building Innovation Center (NES-BIC) of CERF for independent technical evaluation. Begin technology selection and validation test planning for FY 2001 tests.

3. (U) FY 2001 PLAN:

(U) ($0.250M) Waterfront Repair and Upgrade - Complete initial testing for corrosion stabilization, concrete repair and strengthening with composites. Develop documentation for implementation of new repair and upgrade concepts by both NAVFAC field activities and private-sector contractors. Concepts will be applicable to both repair and upgrade and for both vertical and lateral strengthening.

(U) ($1.299M) Real Property Maintenance (RPM) Backlog Reduction - Continue testing of high temperature airfield pavement, roofing management system, hangar floor coatings systems, moisture-cured urethane coating systems, and additional technologies identified in FY 2000. Begin technology selection and validation test planning for FY 2002 tests.

(U) ($0.275M) Modular Hybrid Pier - Conduct a constructability evaluation of components transitioning from related 6.2 Exploratory Development program. Complete design concept and begin test planning for the major assemblies.

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B. (U) OTHER PROGRAM FUNDING SUMMARY: This project transitions waterfront facility technologies from three Navy Exploratory Development (6.2) Research Programs: PE0602121N - Ship, Submarine and Logistics Technology, PE0602234N - Materials, Electronics and Computer Technology, and PE0603712N - Environmental Quality and Logistics Advanced Technology Demonstrations. 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 Constructed Engineering Reserach Laboratories (CERL) and Waterways Experiment Station (WES) of the U. S. Army Corps of Engineers (USACOE) 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 Real Property Maintenance (RPM) and Military Construction (MILCON) investment through partnerships with RPM and MILCON program and project managers .

C. (U) ACQUISITION STRATEGY: This project is categorized as Non-ACAT (Non Acquisition). The information produced from this project for: 1) specifying the performance of the technology, 2) utilization of the technology in designs, 3) control of quality of the technology during constructions, 4) maintenance of the technology during operations, and 5) life-cycle costs of the technology is transitioned to Navy users by being included or referenced by the applicable Naval Facilities Engineering Command policy, guidance, and criteria. Navy Real Property Maintenance (RPM) and Military Construction (MILCON) program and project managers are then able to implement the technologies in their RPM and MILCON proejcts. Private sector capabiilty to provide the new technology for use by the Navy is developed by including both individual contractors and industry organizations in development and testing of the technology.

EXHIBIT R-2a, RDT&E Project Justification		DATE: **February 2000**
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D. (U) SCHEDULE PROFILE:

FY99	**FY00**	**FY01**
High Performance (HP) Magazine		
Complete all documentation required for DDESB approval of design and operating concepts		
Waterfront Facilities Repair and Upgrade		
Completed impulse load assessment methodology using Falling Weight Deflectometer (FWD) Completed advanced fendering and camel systems using composite materials		
	Complete pier and wharf capability upgrades using composites materials	Complete corrosion stabilization, and concrete repair and strengthening
Real Property Maintenance (RPM) Backlog Reduction		
Begin four technology validations Plan FY2000 initiated technology validations	Complete FY 1999 initiated technology validations Continue FY 2000 initiated technology validations Plan FY 2001 initiated technology validations	Complete FY2000 initiated technology validation Continue FY2001 initiated technology validation Plan FY 2002 initiated technology validations
Modular Hybrid Pier		
		Complete design based on transitioned technologies and planning of testing of new components Continue validation testing of components

Exhibit R-3 Cost Analysis (page 1)									DATE: February 2000				
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	FY 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost to Complete	Total Cost	Target Value of Contract
High Performance (HP) Magazine	WX	NFESC Pt. Hueneme, CA		3.478	85	10/98							
	WR	NSWC Indian Head, MD		45	15	10/98							
	WR	LANTDIV Norfolk, VA		334	100	12/98							
	FP	SVERDRUP St. Louis, MO		236	25	02/99							
Waterfront Facilities Repair and Upgrade	WX	NFESC Pt. Hueneme, CA		770	458	06/99	292	10/99	114	10/00			
	WR	NUWC New London, CT		487	200	06/99				.			
	FP	Contractors TBD Locations TBD					452	04/00	120	05/01			
Real Property Maintenance (RPM) Backlog Reduction	WX	NFESC Pt. Hueneme, CA		200	393	11/98	440	10/99	420	10/00	cont	cont	na
	FP	CERF Washington, DC		45	50	12/98	50	10/99	50	12/00	cont	cont	na
	FP	Contractors TBD Locations TBD			508	09/99	740	06/00	835	05/01	cont	cont	na
Modular Hybrid Pier	WX	NFESC Pt. Hueneme, CA							285	10/00	cont	cont	na
Subtotal Product Development				5.595	1.834		1.974		1.824				

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 2000**				
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 99 Cost	FY 99 Award Date	FY 00 Cost	FY 00 Award Date	FY 01 Cost	FY 01 Award Date	Cost to Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation												
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			5.595	1.842		1.974		1.824			Cont	Cont
Remarks:												

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