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Exhibit R-2, RDT&E Budget Item Justification	Date: February 1999
APPROPRIATION/BUDGET ACTIVITY RDT&E,N/4	R-1 ITEM NOMENCLATURE ADVANCED SURFACE MACHINERY/0603573N

COST (\$ in Millions)	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	Cost to Complete	Total Cost
Total P.E. Cost	29.514	34.444*	17.727	3.664	3.664	2.747	1.829	0	Cont	Cont
Advanced Surface Machinery/S1314	29.514	34.444	17.727	3.664	3.664	2.747	1.829	0	Cont	Cont
Quantity of RDT&E Articles & Cost: N/A										

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Advanced Surface Machinery (ASM) Programs develop affordable advanced machinery and subsystems for surface ship propulsion, electric and auxiliary requirements

(U) ICR Gas Turbine Engine. The ICR Gas Turbine Engine is a next generation marine propulsion gas turbine. ICR will reduce life cycle fuel cost and provide a minimum impact alternative to increase range.

(U) A contract for ICR Advanced Development (AD) with an option for Full Scale Development was awarded to Westinghouse Electric Corporation in December 1991. The ICR is derived from the Rolls-Royce RB211 aircraft engine and through the introduction of an intercooled, recuperator, and variable area nozzles achieves approximately a 25% to 27% propulsion annual fuel savings when compared to the LM2500 on a mechanical drive ship. The RB211 is a commercial aircraft engine with over 2000 engines delivered to date and production projected well into the next century.

(U) ICR developmental full scale system testing began in July 1994 and is continuing at Pyestock, U. K.. Recuperator recovery efforts are continuing following the failure in January 1995 of the initial recuperator. A second generation recuperator, which is the exhaust heat recovery unit that provides most of the fuel efficiency gains, was delivered to the test site in December 1995. To date a series of eight (8) engine tests have been completed with over 1400 hours of successful testing including over 1150 hours with the redesigned recuperator which performed satisfactorily. Tests to date have met objectives.

* This amount includes a proposed \$10.1 million reprogramming action

(U) A Cooperative Agreement between the United Kingdom (U.K.) and United States governments was signed by USD(A&T) on 21 June 1994 and revised in March 1997 for in-kind and cash contributions to the ICR program. A Cooperative Agreement between the French and United States governments was signed by ASN(RD&A) on 30 August 95 for in-kind and cash contributions to the ICR program.

(U) The FY1998 and FY 1999 funds for Integrated Power Systems (IPS) were budgeted and executed under P.E. 0603573N/Project S1314. IPS funding has transitioned to P.E. 06031513N/Project 32471 for both budget and execution in FY 2000 and out.

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(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 1998 ACCOMPLISHMENTS:

- (U) (\$ 28.648) ICR: Initiated manufacture of Engineering Developmental Model (EDM) recuperator. Completed Design Review Four (DR4) Performed testing on B/4 engine. Testing included high pressure turbine metal temperature measurements and functional and performance testing. Initiated strip and inspection of the B/4 engine.
- (U) (\$.866) Systems Engineering: Perform module development, systems integration and other systems engineering tasks required to maintain the ICR engine as viable candidate for the DD21.

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2. (U) FY 1999 PLAN:

- (U) (\$33.939*) ICR: Complete the manufacture and deliver the EDM recuperator. Install the recuperator at the Royal Navy test facility in Pyestock and perform the last development test at Pyestock. Initiate a 500 hour development and endurance test at NAVSSES, Philadelphia. The test site will be configured for ICR testing. The engine, recuperator, enclosure and all ancillary hardware will be delivered to the site, assembled and installed. Test running will begin. Modification of the Memoranda of Understanding with the U.K. and France will complete. This modification will implement the "Essential Program".
* Includes proposed \$10.1 million reprogramming action.

- (U) (\$.505) Portion of extramural program is reserved for Small Business Innovation Research assessment in accordance with 15 USC 638..

3. (U) FY 2000 PLAN:

- (U) (\$17.727) ICR: The 500 hour development and endurance test at NAVSSES, Philadelphia will complete. A final development Design Review called DR5 will be conducted. Following this design review, the development portion of the "Essential Program" will be complete. At that time, the joint U.S./U.K. and U.S./France programs will be transitioned to U.K./France for management of the qualification portion of the program. The U.S. Navy will remain engaged in Allied qualification efforts to ensure that qualification testing and test results comply with US Navy requirements.

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B. Program Change Summary:

	<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>
FY 1999 President's Budget:	46.324	58.419	83.821
Appropriated Value:	49.741	58.419	
Adjustments to FY 1998 Appropriated/ FY 1999 President's Budget:	-20.227	-34.075	-66.094
FY 2000/01 OSD Budget Submit:	29.514	24.344	17.727

Funding: FY 1998 reductions -19.600K Programmatic Adjustments, -1.311K General Reductions, -1.125K SBIR Reduction, -.993K Execution Updates, -.106K Economic Assumptions. FY 1998 increases include: +2.908K Below Threshold Reprogramming.

FY 1999: reductions -.134K Revised Economic Assumptions, -.012K Civpers Underexecution, -34.014K Programmatic Adjustment. Increase include .085K Restructure/Adjustment

FY 2000: -73.800K Programmatic Adjustments, -.031K Outsourcing adjustments, -.273K Economic Assumptions. Increases include 7.700K Essential Program, .030K NWCF Rates - Naval Surface Warfare and .280K NATO Research and Development.

Schedule: ICR - No change. IPS program transitions to P.E. 0603513N/Project 32471, in FY 2000.

Technical: IPS program transitions to P.E. 0603513N/Project 32471 in FY 2000. In FY 2000, the ICR program will transition the qualification portion of program to Allied countries for completion.

C. Other Program Funding Summary:

<u>FY 1998</u>	<u>FY 1999</u>	<u>FY 2000</u>	<u>FY 2001</u>	<u>FY 2002</u>	<u>FY 2003</u>	<u>FY 2004</u>	<u>FY 2005</u>	<u>To Complete</u>	<u>Total Cost</u>

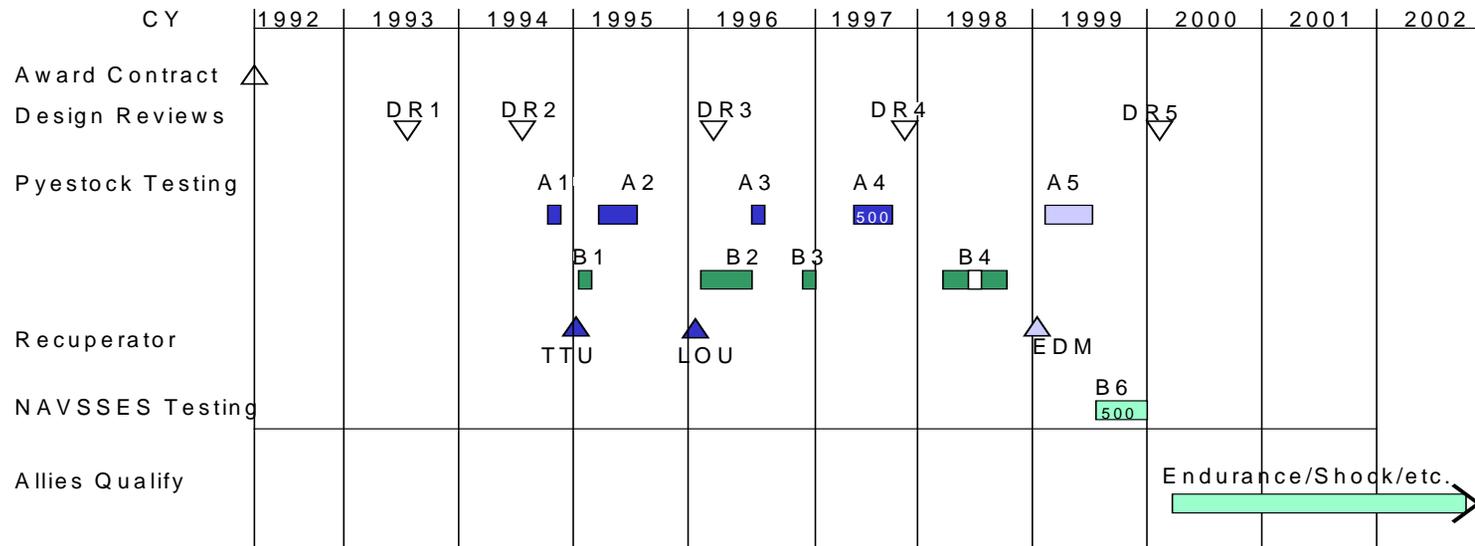
D. Acquisition Strategy: IPS and ICR are candidate systems for DD-21

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E. Schedule Profile:

IC R Engine Schedule



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Exhibit R-3 Cost Analysis (\$ in millions)		Date: February 1999
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Cost Categories (Tailor to WBS, or System/Item Requirements)	Contract Method & Type	Performing Activity & Location	Total Pys Cost	FY99 Cost	FY99 Award Date	FY00 Cost	FY00 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development	C/CPAF	Northrop Grumman, Sunnyvale ,CA	119.165	18.562	Nov 98	13.780	Nov 99	CONT.	CONT.	CONT.
Ancillary Hardware Development										
Systems Engineering										
Licenses										
Tooling										-
GFE										
Award Fees	C/CPAF	Northrop Grumman, Sunnyvale ,CA	2.522	.882	Aug 99	1.009	July 00	CONT.	CONT.	CONT.
Subtotal Product Development			121.687	19.444		14.789		CONT.	CONT.	CONT.
Remarks										

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Exhibit R-3 Project Cost Analysis
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Development Support	C/CPFF	GRC/Arlington, VA	.208	.250	Oct 98	.250	Oct 99	CONT.	CONT.	CONT.
Software Development										
Training Development										
Integrated Logistics Support										
Configuration Management										
Technical Data										
GFE										
Subtotal Support			.208	.250		.250		CONT	CONT	CONT
Remarks:										
Developmental Test & Evaluation	WR	NSWC/CD Phila,PA	1.770	3.350	Oct 98	.879	Oct 99	CONT	CONT	CONT
Operational Test & Evaluation										
Tooling										
GFE										
Subtotal T&E			1.770	3.350		.879		CONT	CONT	CONT
Remarks:										

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Contractor Engineering Support										
Government Engineering Support	WR	NSWC/CD Phila,PA	5.415	1.200		1.709		CONT	CONT	CONT
Program Management Support										
Program Management Personnel										
Travel			338	.100		.100		CONT	CONT	CONT
Labor (Research Personnel)										
Overhead										
Subtotal Management			5.753	1.300		1.809		CONT	CONT	CONT
Remarks:										
Total Cost			129.418	24.344		17.727		CONT	CONT	CONT
Remarks:										

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