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FY 2000 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET

DATE: February 1999

BUDGET ACTIVITY: 3 PROGRAM ELEMENT: 0603792N
 PROGRAM ELEMENT TITLE: Advanced Technology Transition

PROJECT NUMBER & TITLE	FY 1998 ACTUAL	FY 1999 ESTIMATE	FY 2000 ESTIMATE	FY 2001 ESTIMATE	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R1889 Advanced Technology Demonstration	68,054	64,174	75,635	77,756	79,511	81,394	83,298	85,260	CONT.	CONT.
R2382 Fast Patrol Craft	9,500	0	0	0	0	0	0	0	0	0
R2383 High Frequency Surface Wave Radar (HFSWR)	3,795	0	0	0	0	0	0	0	0	0
R2411 SWATH Technology Development	4,745	0	0	0	0	0	0	0	0	0
R2600 SLICE Trailer	0	9,478	0	0	0	0	0	0	0	0
TOTAL	86,094	73,652	75,635	77,756	79,511	81,394	83,298	85,260	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program demonstrates high-risk/high-payoff technologies that could significantly improve the warfighting capabilities of the fleet and joint forces, and provides the opportunity to identify and move emerging technologies quickly and efficiently from the laboratory to the fleet. Advanced Technology Demonstration (ATD) programs are selected for a match between technological potential and Navy requirements which are derived from operational issues of concern to the fleet and Joint Warfighting Capabilities Assessment. Risk-reducing ATDs cover integrating and assessing technology in a realistic operational environment and are focused on laying the technical foundations for acquiring improvements to future joint warfighting capabilities. Each demonstration is designed to assess the extent to which the technology is feasible, affordable, and compatible with operational concepts and projected force structure.

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(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is budgeted within the Advanced Technology Development Budget Activity because it encompasses design, development, simulation, experimental testing and/or prototype hardware to validate technological feasibility and concept of operations, and reduce technological risk prior to initiation of a new acquisition program or transition to an ongoing acquisition program.

(U) PROGRAM CHANGE FOR TOTAL PROGRAM ELEMENT (PE):

	FY 1998	FY 1999	FY 2000
FY 1999 President's Budget	83,510	74,392	76,316
Appropriated Value		73,892	
Adjustments from FY 1999 President's Budget	+2,584	-740	-681
FY 2000 President's Budget Submission	86,094	73,652	75,635

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(U) CHANGE SUMMARY EXPLANATION:

(U) Funding: FY 1998 increase (+\$2,584) reflects Actual Execution Update (+\$2,777) and Small Business Innovation Research Reduction (-\$193). FY 1999 decrease (-\$740) reflects reductions for Revised Economic Assumptions (-\$170), Civilian Personnel Underexecution (-\$62), Congressional Reduction (-\$10,000), Federally Funded Research and Development Center Distribution (-\$8), and Congressional Add for SLICE Trailer (+\$9,500). FY 2000 decrease (-\$681) reflects net Navy Working Capital Fund Rate Adjustment (-\$681).

(U) Schedule: Reductions have delayed initiation of Reactive Material Advanced Warhead from FY 1999 to FY 2000 and have significantly curtailed FY 1999 efforts for Advanced Linear Motor.

(U) Technical: Low Cost Missile System was terminated for high payoff technical alternatives, cost growth and lack of transition support. FY 1999 efforts are limited to documentation of progress to date.

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(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

(U) FY 1998 ACCOMPLISHMENTS:

- (U) (\$255) HIGHLY RESPONSIVE MISSILE CONTROL SYSTEM -- Completed ATD.

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- (U) (\$1,080) TACTICAL AIRCRAFT DIRECTED INFRARED COUNTERMEASURES (DIRCM) -- Completed ATD: conducted flight testing and field demonstrations of developed hardware and countermeasures techniques.
- (U) (\$4,231) ADVANCED EMBEDDED TRAINING FOR SHIPBOARD SYSTEMS -- Completed ATD: conducted final demonstration of shipboard prototype and evaluated system performance.
- (U) (\$4,500) ADVANCED ELECTRONIC COUNTERMEASURES (ECM) TRANSMITTER FOR SHIP DEFENSE -- Completed ATD: completed system integration, lab and field testing, and conducted final demonstration.
- (U) (\$4,500) MULTI-BEAM, MULTI-FREQUENCY, SUBMARINE SUPER HIGH FREQUENCY (SHF) PHASED ARRAY ANTENNA -- Completed ATD: completed X-band antenna array fabrication; conducted demonstration.
- (U) (\$3,111) SMART SKINS ARRAY -- Continued ATD: fabricated Advanced Development Model (ADM) and conducted ADM ground test/analysis.
- (U) (\$4,450) COMPETENT MUNITIONS FOR THE 5" GUN -- Continued ATD: completed laboratory testing of inertial-only guidance fuse package and global positioning system/inertial guidance fuse package.
- (U) (\$6,095) LOW COST MISSILE SYSTEM -- Continued ATD: completed fabrication of subsystems. Integrated subsystems, conducted aerodynamic/wind tunnel testing, hardware-in-the-loop simulation and booster insensitive munitions testing.
- (U) (\$6,123) MULTIFUNCTION ELECTRONICS RADIATING SYSTEM (MERS) -- Continued ATD: completed fabrication of performance model and conducted mast mock-up performance tests; built demonstration model and performed component shipboard environmental tests.
- (U) (\$5,180) BEST BUY -- Continued ATD: fabricated and tested composite airframe components; fabricated and tested high lift-to-drag airframe.
- (U) (\$5,600) ADVANCED TACTICAL ACOUSTIC COMMUNICATIONS -- Continued ATD: demonstrated a real-time voice/data link between submarine and surface vessel and a real-time slow scan video link between submarine and submarine.
- (U) (\$4,000) ADVANCED COMMUNICATION INTELLIGENCE (COMINT) VOICE PROCESSING -- Continued ATD: fabricated and assembled voice processor components; conducted subsystem testing.
- (U) (\$2,100) DNA VACCINES FOR COMPLEX MULTISTAGE ORGANISMS, AND OTHER ORGANISMS OF MILITARY IMPORTANCE -- Initiated ATD to demonstrate DNA vaccines designed to protect against complex, multistage microorganisms or against multiple simple pathogens. Performed gene cloning to produce human-use plasmids.
- (U) (\$3,990) LOW OBSERVABLE MULTI-FUNCTION STACK -- Initiated ATD to demonstrate a surface ship composite exhaust stack having embedded multi-function satellite communication array antennas. Completed stack and antenna designs.
- (U) (\$3,000) RAPID AIRBORNE MINE CLEARANCE SYSTEM (RAMICS) -- Initiated ATD to demonstrate an airborne system to detect, target, and explosively destroy near surface mines using laser directed (LIDAR) fire of a supercavitating

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projectile from a helicopter mounted gun. Conducted tower demonstration of projectile lethality against key mine types.

- (U) (\$4,872) AFFORDABLE ARRAY TECHNOLOGY -- Initiated ATD to demonstrate an affordable, reliable, and all-optical acoustic sensor/array technology for reconfigurable large aperture sonar arrays. Conducted lake tow test for baseline of thinline system noise.
- (U) (\$2,546) ADVANCED SURFACE SITUATIONAL AWARENESS -- Classified program.
- (U) (\$2,421) Selected and performed planning for FY00 start ATDs. Conducted independent reviews of on-going ATD programs.

(U) FY 1999 PLAN:

- (U) (\$3,146) SMART SKINS ARRAY -- Complete ATD: conduct F/A-18 testing to demonstrate operational utility.
- (U) (\$493) LOW COST MISSILE SYSTEM -- Document completed activities of terminated ATD.
- (U) (\$1,446) COMPETENT MUNITIONS FOR THE 5" GUN -- Complete ATD: conduct flight testing demonstration.
- (U) (\$5,418) BEST BUY -- Continue ATD: demonstrate two-piece composite projectile gun auto-loading and conduct flight test of unguided composite projectile.
- (U) (\$4,446) ADVANCED TACTICAL ACOUSTIC COMMUNICATIONS -- Complete ATD: demonstrate multi-net connectivity between submarines, ships, and aircraft.
- (U) (\$4,046) ADVANCED COMINT VOICE PROCESSING -- Complete ATD: perform system integration with ES-3 aircraft and conduct flight demonstration of automated voice processing system.
- (U) (\$5,046) ANTI-TORPEDO TORPEDO (ATT) TECHNOLOGY FOR SURFACE AND SUBMARINE APPLICATIONS -- Continue ATD, as coupled with NATO effort, with at-sea tests in realistic environments.
- (U) (\$4,746) DNA VACCINES FOR COMPLEX MULTISTAGE ORGANISMS AND OTHER ORGANISMS OF MILITARY IMPORTANCE -- Continue ATD: continue clinical trials, combined multi-stage DNA vaccines.
- (U) (\$4,546) RAMICS - Continue ATD: demonstrate system integration/gun-sensor interface.
- (U) (\$4,446) AFFORDABLE ARRAY TECHNOLOGY -- Continue ATD: perform tow and reel tests, develop array/transmitter/receiver.
- (U) (\$5,146) LOW OBSERVABLE MULTI-FUNCTION STACK -- Continue ATD: fabricate stack/shroud and antenna; evaluate test articles.
- (U) (\$5,546) PLASMA-ARC PYROLYSIS OF SHIPBOARD SOLID WASTE -- Initiate ATD to demonstrate full-scale plasma-arc pyrolysis system for controlled thermal destruction of shipboard wastes. Perform preliminary design.

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- (U) (\$4,046) LONG-ENDURANCE, LOW FREQUENCY ACOUSTIC SOURCE (LELFAS)-- Initiate ATD to demonstrate a low-cost, affordable, rapidly deployable, long-endurance, low frequency acoustic source. Perform initial system design and analysis. Develop high-energy density thermal power source.
- (U) (\$1,046) ADVANCED LINEAR MOTOR -- Initiate ATD: demonstrate an aircraft recovery system using linear motor technology. Develop preliminary concept and conduct design evaluations.
- (U) (\$4,046) REDUCED SHIPS' CREW BY VIRTUAL PRESENCE (RSVP) -- Initiate ATD: demonstrate at sea an automated system providing environmental, machinery, structural and personnel situational awareness. Define requirements, develop system architecture, conduct feasibility demonstrations and initiate subsystem development.
- (U) (\$3,846) SHIPBOARD HIGHBAND MULTIFUNCTION RECEIVE SYSTEM (HBMRS) - Initiate ATD: develop and demonstrate radar, electronic warfare and communication functions in a phased array. Perform prototype design; design, fabricate and test sub-array and transmit/receive modules.
- (U) (\$1,700) Select and perform planning for FY01 start ATDs. Conduct independent reviews of on-going ATD programs.
- (U) (\$1,019) Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.

(U) FY 2000 PLAN:

- (U) (\$1,429) BEST BUY -- Complete ATD: conduct long-range firing demonstration of projectiles to validate payload capacity and the ability to dispense submunitions over target area.
- (U) (\$5,030) ANTI-TORPEDO TORPEDO (ATT) TECHNOLOGY FOR SURFACE AND SUBMARINE APPLICATIONS -- Complete ATD with at-sea tests.
- (U) (\$3,830) DNA VACCINES FOR COMPLEX MULTISTAGE ORGANISMS AND OTHER ORGANISMS OF MILITARY IMPORTANCE -- Complete ATD: complete clinical trials.
- (U) (\$7,530) RAMICS - Complete ATD: demonstrate system targeting on an operational platform.
- (U) (\$5,130) AFFORDABLE ARRAY TECHNOLOGY -- Complete ATD: complete development of prototype array and conduct research vessel tow tests.
- (U) (\$4,530) LOW OBSERVABLE MULTI-FUNCTION STACK -- Continue ATD: conduct land-based demonstration of antenna hardware. Install stack suppresser and shroud/antennas on test ship.
- (U) (\$4,830) PLASMA-ARC PYROLYSIS OF SHIPBOARD SOLID WASTE -- Continue ATD: design and test feed subsystem in lab-scale reactor; demonstrate process control with various waste feed mixtures.

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- (U) (\$5,530) LONG-ENDURANCE, LOW FREQUENCY ACOUSTIC SOURCE (LELFAS)-- Continue ATD: finalize system design and initiate system fabrication.
- (U) (\$4,230) ADVANCED LINEAR MOTOR -- Continue ATD: complete prototype design; conduct critical component testing and complete test site design.
- (U) (\$5,530) REDUCED SHIPS' CREW BY VIRTUAL PRESENCE (RSVP) -- Continue ATD: perform lab prototype system development, integration and demonstration and conduct system development Final Acceptance Tests.
- (U) (\$5,831) SHIPBOARD Highband Multifunction Receive System (HBMRs) -- Continue ATD: perform software development; fabricate and test beamformer; and conduct shared aperture system integration.
- (U) (\$4,381) REACTIVE MATERIAL ADVANCED WARHEAD -- Initiate ATD: demonstrate capability of solid reactive materials to extend mission kill in air, cruise missiles and ship self-defense arenas. Characterize materials and parameterize fragment design. Develop initial warhead concept and conduct initial vulnerability tests and analyses.
- (U) (\$3,030) ADVANCED SHIPBOARD CRANE MOTION CONTROL SYSTEM: Initiate ATD: develop and demonstrate a crane control system that combines recent advances in nonlinear control system technologies with existing strategic Auxiliary Crane Ship electro-hydraulic cranes.
- (U) (\$4,032) BUOYANT CABLE ANTENNA FOR HIGH DATA RATE SUB COMMS: Initiate ATD: develop and demonstrate an advanced Buoyant Cable Antenna (BCA) System to provide a submerged submarine with two-way, higher data rate Ultra High Frequency Fleet Satellite Communications and line-of-sight (LOS), L-band (Iridium) and K-band communications, as well as accessory sensor functions - Global Positioning System, Video, and Radar Early Warning.
- (U) (\$4,030) MULTI-PLATFORM BROADBAND PROCESSING: Initiate ATD: develop and demonstrate a common, broadband integrated processing architecture for submarine, surface ship, and weapon sonar system platforms.
- (U) (\$5,032) COMPOUND HELICOPTER CONCEPT: Initiate ATD: demonstrate reduction in fatigue loads, vibration levels and maintenance requirements through use of pumpjet for forward thrust with vectoring vanes at the tail, aimed at Airborne Mine Countermeasures (MCM) towing missions.
- (U) (\$1,700) Select and perform planning for FY02 start ATDs. Conduct independent reviews of on-going ATD programs.

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B. (U) PROGRAM CHANGE SUMMARY: See Total Program Change Summary for PE.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

- (U) PE 0601153N Defense Research Sciences
- (U) PE 0602111N Air and Surface Launched Weapons Technology
- (U) PE 0602121N Ship, Submarine and Logistics Technology
- (U) PE 0602122N Aircraft Technology
- (U) PE 0602232N Communications, Command and Control, Intelligence, Surveillance and Reconnaissance (C3ISR)
- (U) PE 0602233N Human Systems Technology
- (U) PE 0602234N Materials, Electronics and Computer Technology
- (U) PE 0602270N Electronic Warfare Technology
- (U) PE 0602314N Undersea Warfare Surveillance Technology
- (U) PE 0602435N Oceanographic and Atmospheric Technology
- (U) PE 0602633N Undersea Warfare Weapon Technology

D. (U) SCHEDULE PROFILE: Not applicable.

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