FY 2002 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: June 2001

BUDGET ACTIVITY: 2 PROGRAM ELEMENT: 0602805N
PROGRAM ELEMENT TITLE: Dual Use Science & Technology

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 2000 ACTUAL	FY 2001 ESTIMATE	FY 2002 ESTIMATE
Dual Use Science & Technology	7,638	12,452	10,000

(U) Mission Description and Budget Item Justification: The mission of the Dual Use Science and Technology (DUS&T) Program is to prototype and demonstrate new approaches for leveraging commercial research, technology, products, and processes for military benefit. These new approaches to working with industry, many of which were prototyped at DARPA, must become common throughout the Navy in order to take full advantage of the technological dynamism of the commercial sector. While acquisition reform has helped clear the path, and experience has shown leveraging can work; it has also shown that leveraging is still unfamiliar and not widely adopted. The challenge is to spread leveraging of the commercial sector into the Navy and make it a normal way of doing business throughout the entire acquisition spectrum. Specifically, DUS&T encourages the Navy to leverage commercial research and development to improve the performance, cost and/or readiness of military systems. Under this effort, the Navy solicits, evaluates, ranks, and nominates dual use S&T projects for Dual Use S&T funds. Each project is 50% cost shared with industry. 25% is cost shared with the Navy project funds and Dual Use S&T provides the remaining 25%. All projects are awarded using either Cooperative Agreements or Other Transactions. This is essentially learning by doing approach to Dual Use S&T in the Navy, with Dual Use S&T funds providing an incentive.

JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under APPLIED RESEARCH because it investigates technological advances with possible applications toward solution of specific Naval problems, short of a major development effort.

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(U) PROGRAMS PLANS AND ACCOMPLISHMENTS:

* PEBB=Power Electronic Building Blocks; VHDL=very high-speed integrated circuit hardware description language; PZT=lead zirconate titanate; IIS=Intelligent Inference Systems; MMC=Metal Matrix Composite; IR=Infrared; PCS=Power Conversion System; NSSN=Navy's New Attack Submarine; ADLFP=Air Deployable Low Frequency Projector; CAD=Computer Aided Design

	FY00 ($7,638)	FY01 ($12,137)	FY02 ($10,000)
Initiate	• A System for Distributed Registration for Mobile Augmented Reality in Urban Environment • Linear Wide-Band Vacuum Electronic Power Amplifier • Multi-Frequency Design Codes for Linear High Power Amplifiers • High Power Silicon Carbide Transmitter • Affordable Modular Digital Receiver • K/KA-Band Phased Array Antennas for Mobile Platforms • Low Defect Density GaN Substrates from GaN Boules • Band Pass Modulators • Phased Array Weather Radar Technology • Active Control of Combustion Processes • High Rate Fiber Placement for Affordable Composite	• ONR issued a call to Navy activities in October 2000 for FY 2002 topics to be included in a single Joint Army, Navy, and Air Force solicitation to industry for dual use S&T proposals. Selected topics will address Navy needs identified in the Science and Technology Requirements Guide and Navy projects will be expected to provide at least 25% of the total proposed effort with industry providing at least 50%. • 500kW Integrated Fuel Processor • Dual Use of Energy Transduction Materials • Processing of Biased *PZT Material for Use in High Power Sonar Transducers and High Strain Actuators • Design Optimization and Methodology for Stern Flaps	• Agreements for FY 2002 will be awarded in October 2001. Topic areas solicited on which these agreements competed include: Advanced Propulsion, Power and Fuel Efficiency Technology.

	Structures • Friction Stir Welding Technology Commercialization for High Strength Structural Alloys • Scaled-Up Production of Nanstructured Ceramic Powders for Thermal Spray Coating of Military & Commercial Parts • Magnetostrictive Actuators for Marine Propeller Pitch and Flow Control • Dynamically Reconfigurable and Scalable Distributed Shipboard Automation System for Improved Sustainability and Survivability • Thermal Barrier Coatings for Molybdenum Refractory Alloys • Compact Lightweight Heat Exchanger for Turbine Thermal Management • Cost-Effective Fabrication Processes for Advanced Superalloy Disks • High Power Density Integrated Motor-Propulsors and Electric Machines • *IIS Bio-Bots • Simulation Based Intelligent Tutoring for Maintenance • Reconfigurable Control and Fault Identification System	• Hydraulic Systems Replacement Using Magnetostrictive Technology in the 50,000 Pound Linear Thrust Range • NAVAIR Technology Commercialization Initiative to transfer Navy developed technology to the commercial sector. • Initiate fuel cell research utilizing deep sea methane hydrates as a in-situ fuel source.	

	• *MMC Reinforced Magnetic Thrust Disk • Enhanched Bearing Materials • Turbine Engine Propulsion • Nickel-Metal Hydride Aircraft Battery • High Impact, Supply-Base Special Processes Identification • Teaching Factory for Advanced Turbine Engine Welding and Inspection Processes		
Continue	• Qualification of Ausform finishing Process for the Manufacturing of Aerospace Gearing • Advanced Hull Forms • Condition Based Monitoring • Active Control of Radiated Noise • Enhanced Thermographic Inspection • Reduced Cost Manufacturing for BLISKS • Wideband Tactical Communications • *IR Array Technology • Amplifier Development • Very High Power *PEBB Demonstration • Advanced Propulsion	• Active Control of Radiated Noise • Wear/Corrosion/Erosion/Fouling Resistant Coatings and Applications • Enhanced Thermographic Inspection • Reduced Cost Manufacturing for BLISKS • Wideband Tactical Communications • *IR Array Technology • Amplifier Development • A System for Distributed Registration for Mobile Augmented Reality in Urban Environment Algorithm • Linear Wide-Band Vacuum Electronic Power Amplifier	• Qualification of Ausform Finishing Process for the Manufacturing of Aerospace Gearing • Advanced Hull Forms • Very High Power *PEBB Demonstration • A System for Distributed Registration for Mobile Augmented Reality in Urban Environment • Linear Wide-Band Vacuum Electronic Power Amplifier • Multi-Frequency Design Codes for Linear High Power Amplifiers • High Power Silicon Carbide Transmitter • Affordable Modular Digital Receiver • Low Defect Density GaN Substrates from GaN Boules

	Technology-Hydrogen Dense Fuels Stabilized Aluminum Hydride or Alane • Wear/Corrosion/Erosion/Fouling Resistant Coatings and Application Methods • Quantum Devices and Ultra-High Frequency Digital Signal Processing • Affordable Unattended and Distributed Sensor Technology • Advanced High Speed Vessels for the Littoral • Uncooled *IR Imaging Array • Piezo-Electronic Microwave Power Components • Resin Transfer Molding for High Temperature Applications • Artificially Intelligent Tutoring for Advanced Distributed Learning	• Multi-Frequency Design Codes for Linear High Power Amplifiers • High Power Silicon Carbide Transmitter • Affordable Modular Digital Receiver • Low Defect Density GaN Substrates from GaN Boules • Band Pass Modulators • Active Control of Combustion Processes • High Rate Fiber Placement for Affordable Composite Structures • Friction Stir Welding Technology Commercialization for High Strength Structural Alloys • Scaled-up Production of Nanostructured Ceramic Powders for Thermal Spray Coating • Magnetostrictive Actuators for Marine Propeller Pitch and Flow Control • Dynamically Reconfigurable and Scalable Distributed Shipboard Automation System for Improved Sustainability and Survivability • Thermal Barrier Coatings for Molybdenum Refractory Alloys	from GaN Boules • Band Pass Modulators • Active Control of Combustion Processes • Magnetostrictive Actuators for Marine Propeller Pitch and Flow Control • Dynamically Reconfigurable and Scalable Distributed Shipboard Automation System for Improved Sustainability and Survivability • Thermal Barrier Coatings for Molybdenum Refractory Alloys • Cost-Effective Fabrication Processes for Advanced Superalloy Disks • High Power Density Integrated Motor-Propulsors and Electric Machines • *IIS Bio-Bots • Reconfigurable Control and Fault Indentification System • *MMC Reinforced Magnetic Thrust Disk • Enhanced Bearing Materials • Nickel-Metal Hydride Aircraft Battery • Advanced Propulsion Technology-Hydrogen Dense Fuels Stabilized Aluminum Hydride or Alane • Fuel Cells

		• Cost-Effective Fabrication Processes for Advanced Superalloy Disks • High Power Density Integrated Motor-Propulsors and Electric Machines • *IIS Bio-Bots • Reconfigurable Control and Fault Identification System • *MMC Reinforced Magnetic Thrust Disk • Enhanced Bearing Materials • Turbine Engine Propulsion • Nickel-Metal Hydride Aircraft Battery • High Impact, Supply-Base Special Processes Identification • Qualification of Ausform finishing Process for the Manufacturing of Aerospace Gearing • Advanced Hull Forms • Very High Power *PEBB Demonstration • Advanced Propulsion Technology-Hydrogen Dense Fuels Stabilized Aluminum Hydride or Alane	
Complete	• *PCS – power quality equipment that can be used as a dynamic	• Quantum Devices and Ultra-High Frequency Digital Signal	• High Rate Fiber Placement for Affordable Composite Structures

	voltage regulator source with ride through fault capability. The inverter phase leg of the *PCS has applications in propulsion drive systems • Introduction of compact DC/DC Isolation into the NAVY DC Zonal type architecture as part of the Integrated Power System program • *CAD-Driven Laser Forming Process under consideration for wing component on F/A-18 E/F • Nanostructured coatings approved as replacement for • hard chrome on a series of submarine components • GEDAE™ a multi-processor software development tool used on Navy's *NSSN acoustic search processing string, Tactical Environmental Digital Signal Processor, *ADLFP, and Air Force's Rivet Joint. • Complete design of a database for an OC-48c Asynchronous Transfer Mode Segmentation and Reassembly engine. From this effort two sub-items are available. The first is an Application Specific Integrated Circuit design that is being fabricated by National Security	Processing • Condition Based Maintenance • Affordable Unattended and Distributed Sensor Technology • Advanced High Speed Vessels for the Littoral • Uncooled *IR Imaging Array • Piezo-Electronic Microwave Power Components • Resin Transfer Molding for High Temperature Applications • Artificially Intelligent Tutoring for Advanced Distributed Learning • K/KA-Band Phased Array Antennas for Mobile Platforms • Phased Array Weather Radar Technology • Compact Lightweight Heat Exchanger for Turbine Thermal Management • Simulation Based Intelligent Tutoring for Maintenance • Teaching Factory for Advanced Turbine Engine Welding and Inspection Processes	• Friction Stir Welding Technology Commercialization for High Strength Structural Alloys • Scaled-up Production of Nanostructured Ceramic Powders for Thermal Spray Coating • Compact Lightweight Heat Exchanger for Turbine Thermal Management • Turbine Engine Propulsion • High Impact, Supply-Base Special Processes Identification • Active Control of Radiated Noise • Enhanced Thermographic Inspection • Reduced Cost Manufacturing for BLISKS • Wideband Tactical Communications • *IR Array Technology • Amplifier Development

	Agency using its 0.5 micron Complimentary Metal Oxide Semiconductor line. The second is a set of *VHDL code synthesizable to Field Programmable Gate Array. The *VHDL code has been tested and used by Naval Research Laboratories staff, and will be used in the Gigabit ATM Network Adapter project. • Demonstrated the feasibility of replacing aging and/or obsolescent processors with a verifiable hardware device that can execute both legacy and new higher order language software in real-time, deterministic systems.		
SBIR	FY00	FY01 ($315K)	FY02
		• Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.	

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(U) PROGRAM CHANGE SUMMARY FOR TOTAL PE:

	FY 2000	FY 2001	FY 2002
FY 2001 PRESBUDG	9,945	10,067	10,218
Adjustments from FY 2001 President's Budget:			
Congressional Plus-ups		2,500	
Revised Economic Assumption	-39	-115	
SBIR	-245		
Execution Adjustment	-2,023		
Program Adjustment			-218
FY 2002 PRESBUDG Submission	7,638	12,452	10,000

(U) Schedule: Not Applicable.
(U) Technical: Not Applicable.

(U) OTHER PROGRAM FUNDING SUMMARY: The Navy’s S&T program contributes to this effort.

(U) This program adheres to Tri-Service Dual Use Science and Technology Program

(U) RELATED RDT&E:
(U) PE 0602805F (Air Force's Dual Use Science and Technology Program)
(U) PE 0602805F (Air Force's Dual Use Science and Technology Program)

(U) SCHEDULE PROFILE: Not applicable.