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

BUDGET ACTIVITY: 1 PROGRAM ELEMENT: 0601153N
PROGRAM ELEMENT TITLE: Defense Research Science

(U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 2000 ACTUAL	FY 2001 ESTIMATE	FY 2002 ESTIMATE
0601153N	351,867	377,642	389,829

(U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:. This program sustains U.S. naval science and technology (S&T) superiority, provides new technological concepts for the maintenance of naval power and national security, and helps avoid scientific surprise, while exploiting scientific breakthroughs and providing options for new Future Naval Capabilities (FNCs). It responds to S&T directions of the Department of the Navy (DON) Integrated Warfare Architecture Requirements (IWARs) for long term Navy and Marine Corps improvements, is in consonance with future warfighting concepts and doctrine developed at the Naval Warfare Development Command and the Marine Corps Combat Development Command, and enables technologies to significantly improve the JCS's Future Joint Warfighting Capabilities. It is managed by the Office of Naval Research (ONR) through Program Officers at ONR Headquarters, and the base program of the corporate Naval Research Laboratory (NRL).

The vision of the DON S&T strategy is "to inspire and guide innovation that will provide technology-based options for future Navy and Marine Corps Capabilities", where "Innovation is a process that couples Discovery and Invention with Exploitation and Delivery". DON Basic Research, which includes scientific study and experimentation directed toward increasing knowledge and understanding in national-security related aspects of physical, engineering, environmental and life sciences, is the core of Discovery and Invention. Basic research projects are developed, managed, and related to more advanced aspects of research in some hundred-plus technology and capability-related 'thrusts', which are consolidated in 22 Research Areas. These in turn support the major motivational research focus areas of the Navy and Marine Corps after Next: maritime and space environments that impact operational capability, information science/knowledge management in network-centric operations, sensors and electronic systems for surveillance and tactical applications, energy/power/propulsion for performance gain and sustainment, advanced air/surface/undersea and multi-environment Naval platforms design/signature reduction, and superior human performance/training/care of Sailors and Marines.

Key aspects of the program are the four ONR Grand Challenges which 'inspire and guide' the direction of research: Naval Battlespace Awareness, Electric Power Sources for the Navy and Marine Corps, Naval Materials by Design, and Multifunctional Electronics for Intelligent Naval Sensors; and the National Naval Responsibilities (NNRs), fields upon which a wide range of fundamental naval capabilities depend, and in which ONR is and likely will remain the principal US research sponsor. NNRs are ratified only after close scrutiny, and currently comprise Ocean Acoustics (starting FY99) and Underwater Weapons (starting FY02) with ongoing assessment of Naval Architecture and Hydrodynamics.

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JUSTIFICATION FOR BUDGET ACTIVITY: This program is budgeted within BASIC RESEARCH, Budget Activity 1, because it supports pursuit of fundamental knowledge for the solution of identified military problems.

(U) PROGRAMS PLANS AND ACCOMPLISHMENTS: Basic research in each ONR thrust includes a continuing core program to advance the state of knowledge and maintain top talent with interest and skill in naval problems. Core programs are supplemented by initiatives at the ONR/NRL, department, or division level, to explore promising new avenues or take advantage of breakthroughs and potentially disruptive technologies. Initiatives typically last 2 to 5 years. Here we display a selection of significant initiatives, including the potential start of new NNRs; many fewer starts than completions are shown in this submission because of the newness of this approach and the tendency for successful initiatives to spark enhancements in the core, and because of the institution of new processes (e.g., NNRs, new focusing programs in mechanics and materials, reconstruction of many programs) in response to the FY02 start of the FNCs.

	FY00 - $351,867	FY01 - $377,642	FY02 - $389,829
Initiate	• Compact man portable power supplies (USMC) • Control of multiple autonomous vehicles • Bulk Nanoscale Structural Materials • Human behavior in modeling and simulation • Geologic Clutter • Air-Sea Interaction at Extremes • Visualization of uncertainty • Low noise in GaN • Immune response during hemorrhage	• Ultra-wide band LPI comms(USMC) • National Nanoscience Initiative • Computational Materials • Uncertainty in Naval Battlespace Awareness • Physics based modeling • Compliant computing • Malaria Vaccine • Mobile Augmented Reality	• Comms in the MOUT environment (USMC) • Arabian Gulf Dynamics • Dual drain, magnetically controlled FETs • Collective behavior of collaborating robots • NNR in Undersea Weapons • NNRs in Hydrodynamics/Naval Architecture, and Underwater Weaponry • NNR in Precision Time and Time Interval (Proposed) • NNR in diving medicine (Proposed)
Continue	• Mathematics, Computer and Information Sciences • Electronics and electronic materials • Communications • *RF and *EO/IR sensors	• Mathematics, Computer and Information Sciences • Electronics and electronic materials • Communications • RF and EO/IR sensors	• Mathematics, Computer and Information Sciences • Electronics and electronic materials • Communications • RF and EO/IR sensors

	• Battlespace Environments; oceanographic and meteorological processes • Signal Processing • Acoustics • Physical and Chemical sciences • Functional and Structural Materials • Hydromechanics • Naval Architecture • Energetics and Combustion • Combat Casualty Care • Aviation and Undersea Medicine • Cognitive, neural and biomolecular science • Robotics • Marine Mammals • Environmental microbiology • Fuels and power sources • Nonlinear dynamics • Research Instrumentation • Graduate Education and Postdoctoral Fellowships • *HBCU/MI/TCU Education	• Battlespace Environments; oceanographic and meteorological processes • Signal Processing • Acoustics • Physical and Chemical sciences • Functional and Structural Materials • Hydromechanics • Naval Architecture • Energetics and Combustion • Combat Casualty Care • Aviation and Undersea Medicine • Cognitive, neural and biomolecular science • Robotics • Marine Mammals • Environmental microbiology • Fuels and power sources • Nonlinear dynamics • Research Instrumentation • Graduate Education and Postdoctoral Fellowships • HBCU/MI/TCU Education	• Battlespace Environments; oceanographic and meteorological processes • Signal Processing • Acoustics • Physical and Chemical sciences • Functional and Structural Materials • Hydromechanics • Naval Architecture • Energetics and Combustion • Combat Casualty Care • Aviation and Undersea Medicine • Cognitive, neural and biomolecular science • Robotics • Marine Mammals • Environmental microbiology • Fuels and power sources • Nonlinear dynamics • Research Instrumentation • Graduate Education and Postdoctoral Fellowships • HBCU/MI/TCU Education
Complete	• Coastal Benthic Optical Properties • Sandy Duck Nearshore Experimental Series • Compliant substrates, *FET resonant tunneling • Mechanisms of non-freezing cold injury	• High Frequency Benthic Acoustic Scattering • SiC low power switching • Non-linear filtering for tracking • Condition-based maintenance • Mechanisms of hemorrhagic shock	• Shoaling Wave Dynamics via Remote Sensing • Angstrom materials • Volumetric visualization

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SBIR	FY00	FY01 ($6,759K)	FY02
	•	• Portion of extramural program reserved for Small Business Innovation Research assessment in accordance with 15 USC 638.	•

* RF=Radio Frequency; EO/IR=Electro-Optic/Infrared; HBCU/MI/TCU= Historically Black Colleges and Universities/Minority Institutions/Tribul Colleges and Universities; FET=Field Effect Transistor

(U) PROGRAM CHANGE SUMMARY:

	FY 2000	FY 2001	FY 2002
FY 2001 President's Budget	358,757	381,139	376,751
Adjustments from FY 2001 President's Budget:			
Program Adjustment	0	0	3,737
NWCF Rate Adjustments			1,849
Congressional Rescission	-1,405	-3,497	0
Federal Technology Transfer	-22	0	0
SBIR Adjustment	-5,910	0	0
Execution Adjustment	447		
Non-Pay Inflation Adjustments			492
FY 2002 President's Budget Submission	351,867	377,642	382,829

(U) CHANGE SUMMARY EXPLANATION:

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

(U) OTHER PROGRAM FUNDING SUMMARY: Not Applicable

(U) NAVY RELATED RDT&E:
(U) PE 0601152N In-House Independent Lab Research

(U) NON NAVY RELATED RDT&E:
(U) PE 0601102A Defense Research Sciences (Army)
(U) PE 0601102F Defense Research Sciences (Air Force)

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Activities are coordinated through Defense S&T 6.1 Reliance Scientific Planning Groups

(U) SCHEDULE PROFILE: Not applicable.

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