

# UNCLASSIFIED

FY 2008/2009 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET  
Exhibit R-2

DATE: February 2007

BUDGET ACTIVITY: 01  
PROGRAM ELEMENT: 0601103N  
PROGRAM ELEMENT TITLE: UNIVERSITY RESEARCH INITIATIVES

COST: (Dollars in Thousands)

Project Number & Title	FY 2006 Actual	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate	FY 2012 Estimate	FY 2013 Estimate
UNIVERSITY RESEARCH INITIATIVES	84,135	91,724	76,637	73,037	79,870	81,455	82,986	84,565

**A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:** This program includes support for multidisciplinary basic research in a wide range of scientific and engineering disciplines that enable the U.S. Navy to maintain technological superiority, and for university research infrastructure to acquire research instrumentation needed to maintain and improve the quality of university research important to the Navy. Multidisciplinary research efforts involve teams of researchers investigating high priority topics and opportunities that intersect more than one traditional technical discipline. For many military problems this multidisciplinary approach serves to stimulate innovations, accelerate research progress and expedite transition of results into Naval applications. The Defense University Research Instrumentation Program (DURIP) supports university research infrastructure essential to high quality Navy relevant research. The instrumentation program complements other Navy research programs by supporting the purchase of high cost research instrumentation that is necessary to carry out cutting-edge research. The program supports Presidential Early Career Awards for Scientists and Engineers (PECASE), single investigator research efforts performed by outstanding academic scientists and engineers early in their research careers. This program provides the knowledge base, scientific concepts, and technological advances for the maintenance of Naval power and national security.

Due to the number of efforts in this PE, the programs described herein are representative of the work included in this PE.

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**B. PROGRAM CHANGE SUMMARY:**

	<u>FY 2006</u>	<u>FY 2007</u>	<u>FY 2008</u>	<u>FY 2009</u>
FY 2007 President's Budget Submission	86,670	73,322	76,160	77,602
Congressional Action	0	18,750	0	0
Congressional Undistributed Reductions/Rescissions	-112	-348	0	0
Execution Adjustments	12	0	0	0
Non-Pay Inflation Adjustments	0	0	-2	2
Program Adjustments	0	0	1,176	-3,379
Program Realignment	0	0	-697	-1,189
Rate Adjustments	0	0	0	1
SBIR Assessment	-2,435	0	0	0
FY 2008/FY 2009 President's Budget Submission	84,135	91,724	76,637	73,037

**PROGRAM CHANGE SUMMARY EXPLANATION:**

Technical: Not applicable.

Schedule: Not applicable.

**C. OTHER PROGRAM FUNDING SUMMARY:**

Not applicable.

**D. ACQUISITION STRATEGY:**

Not applicable.

**E. PERFORMANCE METRICS:**

This University Research Initiative seeks to improve the quality of defense research conducted by universities and supports the education of engineers and scientists in disciplines critical to national defense needs. The initiative is a collection of specialized research programs performed by academic research institutions. Individual project metrics are tailored to the needs of specific applied research and advanced development

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programs. Example metrics include extending the life of Thermal Barrier Coatings for transition to Total Ownership Cost Future Naval Capability program. It is projected that the life time of Thermal Barrier Coating on Turbine Blades can be doubled. The National Research Council of the National Academies of Science and Engineering's Congressionally directed "Assessment of Department of Defense Basic Research" concluded that the DoD is managing its basic research program effectively.

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COST: (Dollars in Thousands)

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UNIVERSITY RESEARCH INITIATIVES	84,135	91,724	76,637	73,037	79,870	81,455	82,986	84,565

**A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION:** This project includes support for multidisciplinary basic research in a wide range of scientific and engineering disciplines that are important for maintaining the technological superiority of the U.S. Navy and for university research infrastructure to acquire instrumentation needed to maintain and improve the quality of university research important to the Navy. Multidisciplinary research efforts involve teams of researchers investigating high priority topics that intersect more than one traditional technical discipline. For many military problems this multidisciplinary approach serves to stimulate innovations, accelerate research progress and expedite transition of results into Naval applications. The Defense University Research Instrumentation Program (DURIP) project supports university research infrastructure essential to high quality Navy relevant research. The instrumentation project complements other Navy research programs by supporting the purchase of high cost research instrumentation that is necessary to carry out cutting-edge research. The Presidential Early Career Awards for Scientists and Engineers (PECASE) project supports single investigator research efforts performed by outstanding academic scientists and engineers early in their research careers. This project provides the knowledge base, scientific concepts, and technological advances for the maintenance of Naval power and national security.

**B. ACCOMPLISHMENTS/PLANNED PROGRAM:**

	FY 2006	FY 2007	FY 2008	FY 2009
MULTIDISCIPLINARY UNIVERSITY RESEARCH INITIATIVE (MURI)	55,460	56,049	56,333	54,379

Research efforts include high priority topics that intersect more than one traditional discipline. Multidisciplinary University Research Initiative (MURI) topics are selected to address high priority science and technology directions of the Department of the Navy, including the four ONR Grand Challenges (Naval Battlespace Awareness, Electric Power Sources for the Navy and Marine Corps, Naval Materials by Design, and Multifunctional Electronics for Intelligent Naval Sensors).

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## **FY 2006 Accomplishments:**

- Conducted competition for \$5,200K of new MURI awards to address selected high priority Naval science and technology areas, transformational initiatives, and grand challenges, including strategically important DoD research areas. Ten topics were identified for publication via Broad Agency Announcement (BAA) to solicit proposals. These topics addressed implosion, remote sensing, energetic material, dynamic ocean models, persistent surveillance, magnetostriction, human performance, fluid-structure interaction, multifunctional chip, and novel vaccines. Remaining balance was spent to continue MURI projects begun in prior years.

## **FY 2007 Plans:**

- Conduct competition for \$8,300K of new MURI awards to address selected high priority Naval science and technology areas, transformational initiatives, and grand challenges, including strategically important DoD research areas. About eleven high priority research topics will be identified for publication in a BAA to solicit proposals. Remaining balance will be spent to continue MURI projects begun in prior years.

## **FY 2008 Plans:**

- Conduct competition for \$1,840K of new MURI awards to address selected high priority Naval science and technology areas, transformational initiatives, and grand challenges, including strategically important DoD research areas. About two or three high priority research topics will be identified for publication in a BAA to solicit proposals. Remaining balance will be spent to continue MURI projects begun in prior years.

## **FY 2009 Plans:**

- Conduct competition for \$5,250K of new MURI awards to address selected high priority Naval science and technology areas, transformational initiatives, and grand challenges, including strategically important DoD research areas. About seven high priority research topics will be identified for publication in a BAA to solicit proposals. Remaining balance will be spent to continue MURI projects begun in prior years.

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	FY 2006	FY 2007	FY 2008	FY 2009
<b>DEFENSE UNIVERSITY RESEARCH INSTRUMENTATION PROGRAM</b>	16,199	15,978	18,883	17,128

DURIP funds are provided to universities to purchase relatively high cost research instrumentation that is normally not included in single-investigator type research grants. Individual grants range from \$50,000 to \$1,000,000.

DURIP varies during the FY 2007 to FY 2008 period in order to plan an approximately equal number of new MURI awards each year while accommodating the end of the disproportionate number of MURI awards that began in FY 2002. The expectation is that DURIP funding would stabilize after FY 2008.

**FY 2006 Accomplishments:**

- Conducted competition for 62 research instrumentation awards to universities.

**FY 2007 Plans:**

- Conduct competition for approximately 60 research instrumentation awards to universities.

**FY 2008 Plans:**

- Conduct competition for approximately 74 research instrumentation awards to universities.

**FY 2009 Plans:**

- Conduct competition for approximately 70 research instrumentation awards to universities.

	FY 2006	FY 2007	FY 2008	FY 2009
<b>PRESIDENTIAL EARLY CAREER AWARDS</b>	1,049	1,018	1,421	1,530

Presidential Early Career Awards (PECASE) are made to academic scientists early in their research career for extremely prestigious single-investigator research in areas of vital importance to DON. Awards provide

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national recognition and research grants of \$100,000 per year for five years. Starting in FY 2007, PECASE awards are being increased from 100K per year to 200K per year per OSD policy change.

## **FY 2006 Accomplishments:**

- Selected two outstanding university researchers to receive the five-year PECASE research award to conduct research of vital importance to the Navy. Continued PECASE programs begun in earlier years.

## **FY 2007 Plans:**

- Select two outstanding university researchers to receive the five-year PECASE research award to conduct research of importance to the Navy. Continue PECASE programs begun in earlier years.

## **FY 2008 Plans:**

- Select two outstanding university researchers to receive the five-year PECASE research award to conduct research of importance to the Navy. Continue PECASE programs begun in earlier years.

## **FY 2009 Plans:**

- Select two outstanding university researchers to receive the five-year PECASE research award to conduct research of importance to the Navy. Continue PECASE programs begun in earlier years.

## **CONGRESSIONAL PLUS-UPS:**

	FY 2006	FY 2007
BLAST AND IMPACT RESISTANT COMPOSITE STRUCTURES FOR NAVY SHIPS	0	996

This effort supports development of an improved understanding of the response of composite materials and structures to blast, shock and fire effects, and will provide guidance for the design of affordable Navy ship structures with greater survivability characteristics and enhanced performance.

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	FY 2006	FY 2007
CENTER FOR CATASTROPHE PREPAREDNESS AND RESPONSE, NYU	986	0

This effort supported research at the Center for Catastrophe Preparedness and Response, New York University.

	FY 2006	FY 2007
CENTER FOR NANOSCIENCE AND NANOMATERIALS (CNN)	0	996

This effort supports research at the Center for Nanoscience and Nanomaterials.

	FY 2006	FY 2007
CENTER FOR SOUTHEASTERN TROPICAL ADVANCED REMOTE SENSING (CSTARS)	2,395	3,984

FY 2006: This effort supported the Center for Southeastern Tropical Advanced Remote Sensing (CSTARS). CSTARS is a commercial satellite ground station which provides access to many US government, commercial, and foreign-owned satellite sensors such as those from Canada and the European Union. CSTARS showed the capability to rapidly process satellite products, and then developed new products. CSTARS provided timely satellite data to the US Southern Command (USSOUTHCOM).

FY 2007: This effort supports research at the Center for Southeastern Tropical Advanced Remote Sensing.

	FY 2006	FY 2007
DEFENSE COMMERCIALIZATION RESEARCH INITIATIVE TECHNOLOGY, RESEARCH, EDUCATION AND COMMERCIALIZATION CENTER (TRECC)	2,682	3,288

FY 2006: This effort included: Optiputer, A High Performance Collaboratory; Agent Sharing of Archived Provenance (ASAP); Secure, Survivable Multi-Cluster Communication Channels; Technology Transfer and Technology Commercialization Acceleration; and Education Knowledge Center Advancement.

FY 2007: This effort supports the defense commercialization research initiative at the Technology, Research, Education and Commercialization Center.

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	FY 2006	FY 2007
MULTIFUNCTIONAL MATERIALS FOR NAVAL STRUCTURES	958	996

FY 2006: This effort included: development of effective processing of nanoparticles with greater compatibility with marine composite matrix systems; incorporation of nanoparticles in marine composites and sandwich structures, and evaluation of mechanical/physical property enhancements; and evaluation of multifunctional attributes of affordable, fire-resistant, core materials for sandwich structures.

FY 2007: Marine composite materials and composite sandwich structures will be modified to incorporate multifunctional capabilities, through the introduction of nanoparticles, and through use of alternate core materials. Affordable, fly-ash based, fire-resistant eco-core material will be modified and used in composite sandwich structures to enhance fire resistance and energy absorption capacity under dynamic loading.

	FY 2006	FY 2007
NATIONAL SECURITY TRAINING	1,724	1,096

FY 2006: This effort was designed to increase the number of eligible students seeking federal national security careers, by providing students with the credentials for these careers. Additionally, these students were exposed to public service careers in the science and technology disciplines for the purpose of enhancing the future pool of talented applicants for DoD professional positions.

FY 2007: This effort supports national security training research.

	FY 2006	FY 2007
NEUROTECHNOLOGY CENTER	0	1,644

This effort addresses fundamental issues to create safer, more effective human-machine interfaces by elucidating the neural computational processes that lead to movement and by developing interfaces that take advantage of this knowledge.

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	FY 2006	FY 2007
RESEARCH INFRASTRUCTURE FOR THE APPLIED PHYSICS LABORATORY	2,682	3,288

FY 2006: This effort assisted the Navy, DoD and Applied Physics Laboratory (APL) with some necessary research infrastructure updates at the University of Washington APL for Navy/DoD benefit.

FY 2007: This effort supports research infrastructure for the Applied Physics Laboratory.

	FY 2006	FY 2007
SMART, REMOTE SENSING SYSTEMS USING NANOTECHNOLOGY	0	2,391

This effort promotes the understanding of the surface mechanisms of charge transfer in photo induced charge movement sensors, surface nanocrystal structure in thin film gas sensors and surface enhanced raman scattering-based sensors to further the understanding of sensor capabilities in the detection of explosives and their components.

**C. OTHER PROGRAM FUNDING SUMMARY:**

Not applicable.

**D. ACQUISITION STRATEGY:**

Not applicable.