Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Navy										DATE: February 2010	
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 1: *Basic Research*				R-1 ITEM NOMENCLATURE PE 0601103N: *University Research Initiatives*							
COST ($ in Millions)	**FY 2009 Actual**	**FY 2010 Estimate**	**FY 2011 Base Estimate**	**FY 2011 OCO Estimate**	**FY 2011 Total Estimate**	**FY 2012 Estimate**	**FY 2013 Estimate**	**FY 2014 Estimate**	**FY 2015 Estimate**	**Cost To Complete**	**Total Cost**
Total Program Element	102.411	102.246	108.679	0.000	108.679	113.157	121.996	121.109	123.650	Continuing	Continuing
0000: *University Research Initiatives*	95.430	99.059	108.679	0.000	108.679	113.157	121.996	121.109	123.650	Continuing	Continuing
9999: *Congressional Adds*	6.981	3.187	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	62.737

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 University Research Initiative (MURI) 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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Navy	DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 1: *Basic Research*	**R-1 ITEM NOMENCLATURE** PE 0601103N: *University Research Initiatives*

B. Program Change Summary ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
Previous President's Budget	108.612	99.472	0.000	0.000	0.000
Current President's Budget	102.411	102.246	108.679	0.000	108.679
Total Adjustments	-6.201	2.774	108.679	0.000	108.679
• Congressional General Reductions		-0.426			
• Congressional Directed Reductions		0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds		3.200			
• Congressional Directed Transfers		0.000			
• Reprogrammings	-1.716	0.000			
• SBIR/STTR Transfer	-3.288	0.000			
• Program Adjustments	0.000	0.000	108.679	0.000	108.679
• Congressional Recision Adjustments	0.003	0.000	0.000	0.000	0.000
• Congressional Add Adjustments	-1.200	0.000	0.000	0.000	0.000

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2009	FY 2010
Project: 9999: *Congressional Adds*		
Congressional Add: *Center for Assured Critical Application and Infrastructure Security*	0.000	1.195
Congressional Add: *Ship Model Testing*	0.000	1.992
Congressional Add: *Human Neural Cell-Based Biosensor*	0.997	0.000
Congressional Add: *Low Acoustic and Thermal Signature Battlefield Power Source*	1.994	0.000
Congressional Add: *National Security Training*	1.596	0.000
Congressional Add: *Next Generation Automated Technology for Landmine Detection*	1.596	0.000
Congressional Add: *Radiation Hardness and Survivability of Electronic Systems*	0.798	0.000
Congressional Add Subtotals for Project: 9999	6.981	3.187
Congressional Add Totals for all Projects	6.981	3.187

Exhibit R-2, RDT&E Budget Item Justification: PB 2011 Navy	DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 1: *Basic Research*	**R-1 ITEM NOMENCLATURE** PE 0601103N: *University Research Initiatives*

Change Summary Explanation

Technical: Not applicable.

Schedule: Not applicable.

FY11 from previous President's Budget is shown as zero because no FY11-15 data was presented in President's Budget 2010.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601103N: *University Research Initiatives*	PROJECT 0000: *University Research Initiatives*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
0000: *University Research Initiatives*	95.430	99.059	108.679	0.000	108.679	113.157	121.996	121.109	123.650	Continuing	Continuing

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. MURI 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 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 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 ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
DEFENSE UNIVERSITY RESEARCH INSTRUMENTATION PROGRAM (DURIP)	30.843	20.312	16.831	0.000	16.831
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 $50K to $1M. The DURIP program is an Office of the Secretary of Defense (OSD) interest item and OSD directs that funding for the DURIP efforts be awarded after OSD announces the awardees, which typically takes place towards the second half of the fiscal year. In turn, universities need to purchase the instrumentation and take delivery before any billings are generated. It frequently takes several months for delivery and billing to be completed. The program decreases in FY 2010 and again in FY 2011 to allow for an increase in the MURI and					

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601103N: *University Research Initiatives*	PROJECT 0000: *University Research Initiatives*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
PECASE programs to accommodate OSD directed initiatives. *FY 2009 Accomplishments:* - Conducted competition for 82 research instrumentation awards to universities. Acquisition Workforce Fund: - Funded DoD Acquisition Workforce Fund. *FY 2010 Plans:* - Conduct competition for research instrumentation awards to universities. *FY 2011 Base Plans:* - Conduct competition for research instrumentation awards to universities.					
MULTIDISCIPLINARY UNIVERSITY RESEARCH INITIATIVE (MURI) Research efforts include high priority topics that intersect more than one traditional discipline. MURI topics are selected to address Naval Science and Technology (S&T) Focus Areas as described in the Naval S&T Strategic Plan. The MURI program is an OSD interest item and OSD directs that funding for the MURI efforts be awarded after OSD announces the awardees, which typically takes place towards the second half of the fiscal year. Since the MURI program funds academic researchers, execution of the efforts typically ramps up during the summer academic break months. MURI projects make significant contributions to Navy and DoD objectives by; speeding up scientific programs by cross-fertilization of ideas, hastening the transition of basic research to practical applications, and training students in cross-disciplinary approaches to science and engineering research of importance to DoD. The increase from FY 2010 and out is due to OSD direction to increase peer-reviewed basic research in order to develop innovative solutions and to enhance the science and engineering	63.177	72.453	86.133	0.000	86.133

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601103N: *University Research Initiatives*	PROJECT 0000: *University Research Initiatives*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
personnel base, accordingly, additional MURI awards will be made in FY 2010 and out. *FY 2009 Accomplishments:* - Conducted competition for new MURI awards addressing selected high priority Naval S&T areas, transformational activities, and grand challenges, including strategically important DoD research areas. Six topics were identified for publication via Broad Agency Announcement (BAA) to solicit proposals. These topics addressed cyber security, science of autonomy, undersea biologics, electronic materials, human-computer interactions, and advanced training. - Continued MURI projects begun in prior years. *FY 2010 Plans:* - Conduct competition for new MURI awards to address selected high priority Naval S&T areas, transformational initiatives, and grand challenges, including strategically important DoD research areas. Approximately seven high priority research topics will be identified for publication in a BAA to solicit proposals. - Continue MURI projects begun in prior years. *FY 2011 Base Plans:* - Conduct competition for new MURI awards to address selected high priority Naval S&T areas, transformational initiatives, and grand challenges, including strategically important DoD research areas. Approximately seven high priority research topics will be identified for publication in a BAA to solicit proposals. - Continue MURI projects begun in prior years.					
PRESIDENTIAL EARLY CAREER AWARDS (PECASE) PECASE awards are made to academic scientists early in their research career for extremely prestigious single-investigator research in areas of vital importance to the Navy. Awards provide national	1.410	6.294	5.715	0.000	5.715

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601103N: *University Research Initiatives*	PROJECT 0000: *University Research Initiatives*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010	FY 2011 Base	FY 2011 OCO	FY 2011 Total
recognition and research grants of up to $200K per year for five years. OSD, with policy and oversight responsibility for the PECASE program, directed that the number of PECASE awards be increased to a maximum of 15 new awards per year. The funding increase from FY 2009 to FY 2010 reflects the fiscal impact of OSD's direction. An increase in the number of awards permits a larger number of these outstanding researchers to contribute to the DoN S&T requirements. *FY 2009 Accomplishments:* - Selected 9 outstanding university researchers to receive the five-year PECASE research award to conduct research of importance to the Navy. - Continued PECASE programs begun in earlier years. *FY 2010 Plans:* - Select 15 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 2011 Base Plans:* - Select 15 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.					
Accomplishments/Planned Programs Subtotals	95.430	99.059	108.679	0.000	108.679

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 1: *Basic Research*	**R-1 ITEM NOMENCLATURE** PE 0601103N: *University Research Initiatives*	**PROJECT** 0000: *University Research Initiatives*

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 programs. Example metrics include extending the life of Thermal Barrier Coatings for transition to the Enterprise and Platform Enablers 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.

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy			DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601103N: *University Research Initiatives*	PROJECT 9999: *Congressional Adds*	

COST ($ in Millions)	FY 2009 Actual	FY 2010 Estimate	FY 2011 Base Estimate	FY 2011 OCO Estimate	FY 2011 Total Estimate	FY 2012 Estimate	FY 2013 Estimate	FY 2014 Estimate	FY 2015 Estimate	Cost To Complete	Total Cost
9999: *Congressional Adds*	6.981	3.187	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	62.737

A. Mission Description and Budget Item Justification

This project shows Congressional Adds to this Program Element.

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010
Congressional Add: Center for Assured Critical Application and Infrastructure Security *FY 2010 Plans:* This effort supports Center for Assured Critical Application and Infrastructure Security research.	0.000	1.195
Congressional Add: Ship Model Testing *FY 2010 Plans:* This effort supports Ship Model Testing research.	0.000	1.992
Congressional Add: Human Neural Cell-Based Biosensor *FY 2009 Accomplishments:* This effort supported the investigation of human stem-cell derived neuronal cultures for use in a prototype biosensor that utilizes networks of mammalian neurons on microelectrode arrays as the sensor element for unknown toxicants and hazardous combinations of otherwise non-threatening compounds. A human neural progenitor population was generated that can be easily expanded and used to produce consistent human neural populations in vitro. Additionally, two dimensional networks were formed from the human neural progenitor-derived neurons in adherent culture on multi-electrode	0.997	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
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B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010
arrays.		
Congressional Add: Low Acoustic and Thermal Signature Battlefield Power Source *FY 2009 Accomplishments:* This effort developed a road map of fuel cell activities for portable fuel cell sources applications; worked in materials and modeling activities for the development of a porous stainless steel substrate with a palladium coating for hydrogen filtration; and fabrication techniques were explored to examine integration of the porous substrate with the remaining components of the fuel cell.	1.994	0.000
Congressional Add: National Security Training *FY 2009 Accomplishments:* This effort supported enhancement of the number of eligible students seeking Defense Department national security positions by providing students with the credentials for these careers. Additionally, these students were exposed to public service careers in the S&T disciplines for the purpose of enhancing the future pool of talented applicants for DoD S&T professional positions.	1.596	0.000
Congressional Add: Next Generation Automated Technology for Landmine Detection *FY 2009 Accomplishments:* Research was conducted into a novel approach for detecting landmines with a network of autonomous vehicles, which could speed up landmine clearing while keeping people safe.	1.596	0.000
Congressional Add: Radiation Hardness and Survivability of Electronic Systems	0.798	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2011 Navy		DATE: February 2010
APPROPRIATION/BUDGET ACTIVITY 1319: *Research, Development, Test & Evaluation, Navy* BA 1: *Basic Research*	R-1 ITEM NOMENCLATURE PE 0601103N: *University Research Initiatives*	PROJECT 9999: *Congressional Adds*

B. Accomplishments/Planned Program ($ in Millions)

	FY 2009	FY 2010
FY 2009 Accomplishments: This effort researched the development of novel electronic systems based on magnetic switching devices that promise significantly lower power requirements and increased radiation hardness compared to conventional microelectronic systems.		
Congressional Adds Subtotals	6.981	3.187

C. Other Program Funding Summary ($ in Millions)

N/A

D. Acquisition Strategy

N/A

E. Performance Metrics

This project shows Congressional Adds to this Program Element.