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| Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification | | | | | | | | DATE: May 2009 | | |
| APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 1 - Basic Research | | | | | R-1 ITEM NOMENCLATURE PE 0601103A University Research Initiatives | | | | | |
| COST (\$ in Millions) | FY 2008 Actual | FY 2009 Estimate | FY 2010 Estimate | FY 2011 Estimate | FY 2012 Estimate | FY 2013 Estimate | FY 2014 Estimate | FY 2015 Estimate | Cost To Complete | Total Cost |
| Total Program Element | 79.544 | 89.632 | 88.421 | | | | | | Continuing | Continuing |
| D55: University Research Initiative | 62.926 | 76.725 | 78.421 | | | | | | Continuing | Continuing |
| D58: URI ACTIVITIES (CA) | 12.174 | 8.921 | .000 | | | | | | Continuing | Continuing |
| D66: MEDICAL UNIVERSITY RESEARCH INITIATIVES (CA) | 4.444 | 3.986 | .000 | | | | | | Continuing | Continuing |
| V72: Minerva | .000 | .000 | 10.000 | | | | | | Continuing | Continuing |
| A. Mission Description and Budget Item Justification | | | | | | | | | | |
| <p>The objective of this program element (PE) is to support Army efforts in the Multidisciplinary University Research Initiative (MURI) program, the Defense University Research Instrumentation Program (DURIP) and the Presidential Early Career Awards for Scientists and Engineers (PECASE) program by funding basic research in a wide range of scientific and engineering disciplines pertinent to maintaining the U.S. land combat technology superiority. Army MURI program efforts involve teams of researchers investigating high-priority; transformational topics that intersect more than one traditional technical discipline (e.g. Intelligent Luminescence for Communication, Display, and Identification). For many complex problems, this multidisciplinary approach serves to accelerate research progress and expedite transition of results to application. The DURIP provides funds to acquire major research equipment to augment current, or devise new, research capabilities in support of Army transformational research. The PECASE program funds single-investigator research efforts performed by outstanding academic scientists and engineers early in their independent research careers. Project D58 funds for specific congressional special interest items.</p> <p>The cited work is consistent with the Department of Defense Research and Engineering Strategic Basic Research Plan, the Army Science and Technology Master Plan, the Army Modernization Strategy.</p> <p>Work on this project is performed extramurally by the Army Research Laboratory (ARL), Research Triangle Park, NC.</p> | | | | | | | | | | |

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| Exhibit R-2, PB 2010 Army RDT&E Budget Item Justification | | | DATE: May 2009 | |
| APPROPRIATION/BUDGET ACTIVITY | | R-1 ITEM NOMENCLATURE | | |
| 2040 - Research, Development, Test & Evaluation, Army/BA 1 - Basic Research | | PE 0601103A University Research Initiatives | | |
| B. Program Change Summary (\$ in Millions) | | | | |
| | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
| Previous President's Budget | 82.416 | 76.980 | 76.364 | |
| Current BES/President's Budget | 79.544 | 89.632 | 88.421 | |
| Total Adjustments | -2.872 | 12.652 | 12.057 | |
| Congressional Program Reductions | .000 | -.298 | | |
| Congressional Rescissions | .000 | .000 | | |
| Total Congressional Increases | .000 | 12.950 | | |
| Total Reprogrammings | -.566 | .000 | | |
| SBIR/STTR Transfer | -2.306 | .000 | | |
| Change Summary Explanation | | | | |
| FY09 increases are due to congressional adds. | | | | |
| FY10 increase is due to new project for Minerva Initiative. | | | | |

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| Exhibit R-2a, PB 2010 Army RDT&E Project Justification | | | | | | | | | DATE: May 2009 | |
| APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 1 - Basic Research | | | | R-1 ITEM NOMENCLATURE PE 0601103A University Research Initiatives | | | | | PROJECT NUMBER D55 | |
| COST (\$ in Millions) | FY 2008 Actual | FY 2009 Estimate | FY 2010 Estimate | FY 2011 Estimate | FY 2012 Estimate | FY 2013 Estimate | FY 2014 Estimate | FY 2015 Estimate | Cost To Complete | Total Cost |
| D55: University Research Initiative | 62.926 | 76.725 | 78.421 | | | | | | Continuing | Continuing |

A. Mission Description and Budget Item Justification

The objective of this project is to support the Multidisciplinary University Research Initiative (MURI), the Defense University Research Instrumentation Program (DURIP) and the Presidential Early Career Awards for Scientists and Engineers (PECASE) program. The MURI program funds university basic research in a wide range of scientific and engineering disciplines pertinent to maintaining US land combat technology superiority. Army MURI efforts involve teams of researchers investigating high-priority, transformational topics that intersect more than one traditional technical discipline (e.g. Intelligent Luminescence for Communication, Display, and Identification). For many complex problems, this multidisciplinary approach serves to accelerate research progress and expedite transition of results to application. The DURIP provides funds to acquire major research equipment to augment current, or devise new, research capabilities in support of Army transformational research. The PECASE program funds single-investigator research efforts performed by outstanding academic scientists and engineers early in their independent research careers.

The cited work is consistent with the Department of Defense Research and Engineering Strategic Basic Research Plan, the Army Modernization Strategy, and the Army Science and Technology Master Plan.

Work on this project is performed extramurally by the Army Research Laboratory (ARL) located in Research Triangle Park, NC.

B. Accomplishments/Planned Program (\$ in Millions)

| | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| Defense University Research Instrumentation Program (DURIP): In FY08, under the Defense University Research Instrumentation Program (DURIP) continued acquisition of instrumentation that enhanced the current research infrastructure and provided new research capabilities at selected universities to enable scientific exploration and discovery in promising areas vital to Army transformational technologies. In FY09, DURIP funds competitive grants for instrumentation. In FY10, will continue to fund competitive grants for research instrumentation to enhance universities' capabilities to conduct world class research critical to Army transformation. | 10.594 | 11.819 | 13.086 | |
| Multidisciplinary University Research Initiative (MURI): In FY08, supported MURI awards made in prior years and initiated eleven new awards. Awarded were Dynamic Models of the Effect of Culture on Collaboration and Negotiation; Modeling Cultural Factors in Collaboration and Negotiation; | 51.374 | 60.819 | 59.102 | |

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| Exhibit R-2a, PB 2010 Army RDT&E Project Justification | | | DATE: May 2009 | | |
| APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 1 - Basic Research | R-1 ITEM NOMENCLATURE PE 0601103A University Research Initiatives | | | PROJECT NUMBER D55 | |
| B. Accomplishments/Planned Program (\$ in Millions) | FY 2008 | FY 2009 | FY 2010 | FY 2011 | |
| The Analysis and Classification of Brain Signals for Covert Speech Communication; A Brain-Based Communication and Orientation System; A Unified Approach to Abductive Inference; Electrical Control of Magnetic Dynamics in Hybrid Metal-Semiconductor Systems; Room Temperature Spin-Mediated Coupling in Hybrid Magnetic, Organic and Oxide Structures and Devices; Tools for the Analysis and Design of Complex Multi-scale Networks; Stochastic Control of Multi-scale Networks: Modeling, Analysis and Algorithms; Spray and Combustion of Gelled Hypergolic Propellants for Future Rocket and Missile Engines; and Spray and Combustion of Gelled Hypergolic Propellants. In FY09, MURI topics are Disruptive Fibers for Flexible Armor, Network-based Hard/Soft Information Fusion, and Tailored Stress-Wave Mitigation. Integrated Quantum Circuits, Adaptive Structural Materials, Transformational Optics, Emergent Phenomena at Complex Oxide Interfaces, Application of Systems Biology to Regenerative Medicine, Mechanisms of Bacterial Spore Germination, Opportunistic Sensing, and Cyber Situation Awareness. In FY10, will continue to support MURI awards made in prior years and initiate new awards in research critical to the Army's future operating capabilities. Effective transition mechanisms include collaboration among principal investigators, participation by 6.2/6.3 program managers in MURI program reviews, and communication of the MURI research results to the Army Research Laboratory, the Research, Development, and Engineering Centers, and industry. | | | | | |
| Presidential Early Career Awards for Scientists and Engineers (PECASE): Supports PECASE investigators started in prior years. In FY08, selected three new investigators for PECASE awards. In FY09 increase the number of new investigator awards. In FY10 will increase the number of new investigator awards. | .958 | 1.938 | 2.952 | | |
| Small Business Innovative Research/Small Business Technology Transfer Programs | .000 | 2.149 | .000 | | |
| The Minerva Research Initiative (MRI) is a university-based social science research program initiated by the Secretary of Defense. It focuses on areas in the social sciences of strategic importance to U.S. national security policy. It seeks to increase the Department's intellectual capital in the social sciences and improve its ability to address future challenges and build bridges between the Department and the social science community. Minerva will bring together universities, research institutions, and individual scholars and support multidisciplinary and cross-institutional projects addressing specific topic areas determined by the Department. Proposals have been solicited that address the following topics: (1) Chinese Military and Technology Research and Archive Programs, (2) Studies of the Strategic Impact of Religious and Cultural Changes within the Islamic World, (3) | .000 | .000 | 3.281 | | |

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| Exhibit R-2a, PB 2010 Army RDT&E Project Justification | | | DATE: May 2009 | |
| APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 1 - Basic Research | R-1 ITEM NOMENCLATURE PE 0601103A University Research Initiatives | | PROJECT NUMBER D55 | |
| <u>B. Accomplishments/Planned Program (\$ in Millions)</u> | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
| Iraqi Perspectives Project, (4) Studies of Terrorist Organization and Ideologies, (5) New Approaches to Understanding Dimensions of National Security, Conflict, and Cooperation. Within the Army four awards will be funded and continued in FY10, FY11 and FY12. Minerva projects have been designed to address a wide range of potential applications leveraging cultural dimensions in support of national and military objectives: qualitative and quantitative input to intelligence, planning, and execution from the national to the tactical level; to cultural modeling and knowledge base initiatives such as the Human, Social, Cultural, and Behavioral Modeling program and the human terrain project; and to training at all levels from senior officer education to small unit tactical exercises. | | | | |
| Total | 62.926 | 76.725 | 78.421 | |
| <u>C. Other Program Funding Summary (\$ in Millions)</u> N/A | | | | |
| <u>D. Acquisition Strategy</u> N/A | | | | |
| <u>E. Performance Metrics</u> Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010. | | | | |

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| Exhibit R-2a, PB 2010 Army RDT&E Project Justification | | | | | | | | | DATE: May 2009 | |
| APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 1 - Basic Research | | | | R-1 ITEM NOMENCLATURE PE 0601103A University Research Initiatives | | | | | PROJECT NUMBER D58 | |
| COST (\$ in Millions) | FY 2008 Actual | FY 2009 Estimate | FY 2010 Estimate | FY 2011 Estimate | FY 2012 Estimate | FY 2013 Estimate | FY 2014 Estimate | FY 2015 Estimate | Cost To Complete | Total Cost |
| D58: URI ACTIVITIES (CA) | 12.174 | 8.921 | .000 | | | | | | Continuing | Continuing |
| <u>A. Mission Description and Budget Item Justification</u> Congressional Interest Item funding provided for University Research Initiatives. | | | | | | | | | | |
| <u>B. Accomplishments/Planned Program (\$ in Millions)</u> | | | | | | | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
| Laboratory for Engineered Human Protection (LEHP) | | | | | | | 1.546 | .000 | .000 | |
| Low Temperature Vehicle Performance Research | | | | | | | .774 | 1.550 | .000 | |
| Massively Broadband Wireless Integrated Circuits | | | | | | | 1.159 | .000 | .000 | |
| University Research Initiatives | | | | | | | 7.728 | .000 | .000 | |
| Hi-tech Eyes for the Battlefield | | | | | | | .967 | 1.550 | .000 | |
| Nanosystems Through Optical Biosensors | | | | | | | .000 | 1.550 | .000 | |
| Electrofluidic Chromatophores for Adaptive Camouflage | | | | | | | .000 | 1.695 | .000 | |
| Columbia College Chicago Construct Program | | | | | | | .000 | .776 | .000 | |
| Open Source Intelligence for Force Protection and Intelligence | | | | | | | .000 | 1.550 | .000 | |
| SBIR/STTR | | | | | | | .000 | .250 | .000 | |
| Total | | | | | | | 12.174 | 8.921 | .000 | |
| <u>C. Other Program Funding Summary (\$ in Millions)</u> N/A | | | | | | | | | | |
| <u>D. Acquisition Strategy</u> N/A | | | | | | | | | | |

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| APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 1 - Basic Research | R-1 ITEM NOMENCLATURE PE 0601103A University Research Initiatives | PROJECT NUMBER D58 |
| <u>E. Performance Metrics</u> Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010. | | |

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| APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 1 - Basic Research | | | | R-1 ITEM NOMENCLATURE PE 0601103A University Research Initiatives | | | | | PROJECT NUMBER D66 | |
| COST (\$ in Millions) | FY 2008 Actual | FY 2009 Estimate | FY 2010 Estimate | FY 2011 Estimate | FY 2012 Estimate | FY 2013 Estimate | FY 2014 Estimate | FY 2015 Estimate | Cost To Complete | Total Cost |
| D66: MEDICAL UNIVERSITY RESEARCH INITIATIVES (CA) | 4.444 | 3.986 | .000 | | | | | | Continuing | Continuing |
| <u>A. Mission Description and Budget Item Justification</u> Congressional Interest Item funding provided for Medical University Research Initiatives. | | | | | | | | | | |
| <u>B. Accomplishments/Planned Program (\$ in Millions)</u> | | | | | | | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
| Burn and Shock Trauma Institute | | | | | | | 1.546 | 1.938 | .000 | |
| Nanomedical Technologies Research | | | | | | | 1.932 | .000 | .000 | |
| Consortium for Bone and Tissue Repair and Regeneration | | | | | | | .966 | .000 | .000 | |
| DoD International Diabetes Research Initiative | | | | | | | .000 | 1.937 | .000 | |
| SBIR/STTR | | | | | | | .000 | .111 | .000 | |
| Total | | | | | | | 4.444 | 3.986 | .000 | |
| <u>C. Other Program Funding Summary (\$ in Millions)</u> N/A | | | | | | | | | | |
| <u>D. Acquisition Strategy</u> N/A | | | | | | | | | | |
| <u>E. Performance Metrics</u> Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010. | | | | | | | | | | |

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| Exhibit R-2a, PB 2010 Army RDT&E Project Justification | | | | | | | | DATE: May 2009 | | |
| APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 1 - Basic Research | | | | R-1 ITEM NOMENCLATURE PE 0601103A University Research Initiatives | | | | | PROJECT NUMBER V72 | |
| COST (\$ in Millions) | FY 2008 Actual | FY 2009 Estimate | FY 2010 Estimate | FY 2011 Estimate | FY 2012 Estimate | FY 2013 Estimate | FY 2014 Estimate | FY 2015 Estimate | Cost To Complete | Total Cost |
| V72: Minerva | .000 | .000 | 10.000 | | | | | | Continuing | Continuing |

A. Mission Description and Budget Item Justification

The objective of this project is to support the Minerva Research Initiative (MRI), a university-based social science research program initiated by the Secretary of Defense in FY09. It focuses on areas in the social sciences that are of strategic importance to U.S. national security policy which have not been substantially pursued in the past. Under the Minerva project research will be performed to understand the internal military-political dynamics of repressive regimes, the vulnerabilities of regimes and institutions to various kinds of influence and instability, the nature of crowd dynamics, the potential to influence public opinions and attitudes in diverse cultures, cultural effects on network security and military operations, the influence of technology on military capabilities of potential adversaries and allies, and other intersections of social-cultural issues with military activities. Predictive models and other analysis tools will be developed. Leveraging the expertise in the social sciences within the academic community is needed to provide understanding of the roots of terrorist organizations and the challenges and opportunities for military operations in a culturally diverse environment. Better understanding at a fundamental level and new computational tools will provide a beneficial impact on war fighting capabilities at the national policy, military strategy, operational, and tactical levels, and will enhance the capabilities of intelligence activities at all levels. All research results will be open source. Work in this project will be executed extramurally by the Army Research Office.

B. Accomplishments/Planned Program (\$ in Millions)

| | FY 2008 | FY 2009 | FY 2010 | FY 2011 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| Minerva Research Initiative: In FY10, Minerva projects will be solicited addressing topics focusing on social science and cultural issues affecting US military warfighting capabilities. Topics will address the relationship of foreign military and technology capabilities, national and military implications of foreign religious and cultural changes, foreign perspectives of US policy and strategy, terrorist organizations and ideologies, and other issues of national security, conflict and cooperation. | .000 | .000 | 10.000 | |
| Total | .000 | .000 | 10.000 | |

C. Other Program Funding Summary (\$ in Millions)

N/A

D. Acquisition Strategy

N/A

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| APPROPRIATION/BUDGET ACTIVITY 2040 - Research, Development, Test & Evaluation, Army/BA 1 - Basic Research | R-1 ITEM NOMENCLATURE PE 0601103A University Research Initiatives | PROJECT NUMBER V72 |
| <p><u>E. Performance Metrics</u></p> <p>Performance metrics used in the preparation of this justification material may be found in the FY 2010 Army Performance Budget Justification Book, dated May 2010.</p> | | |

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