



ARL HBCU/MI Partnered Research Initiative Program Overview November 2017

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ARL Special Program Outreach Coordinator



Vision

The Nation's Premier Laboratory for Land Forces.

Mission

DISCOVER, **INNOVATE**, and **TRANSITION**
Science and Technology to ensure dominant
strategic land power

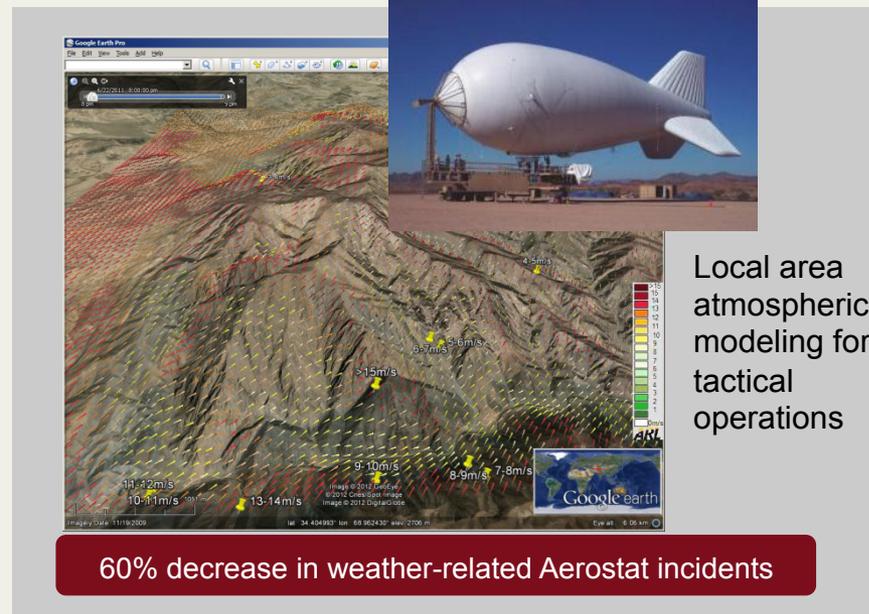
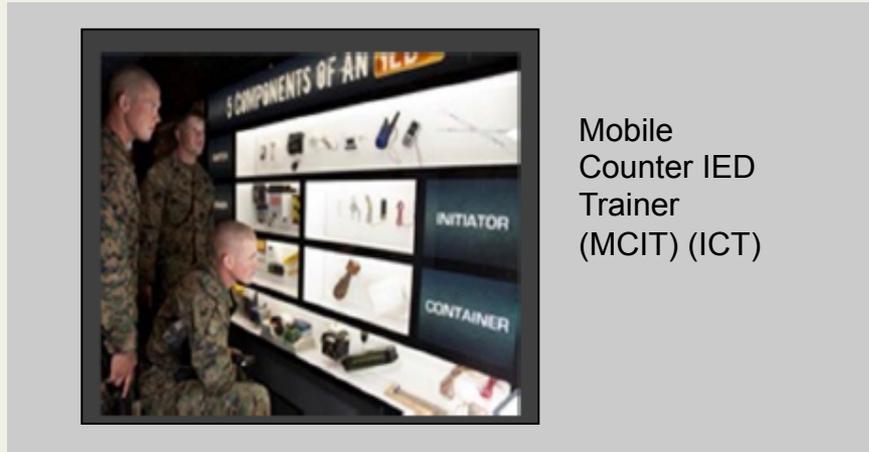
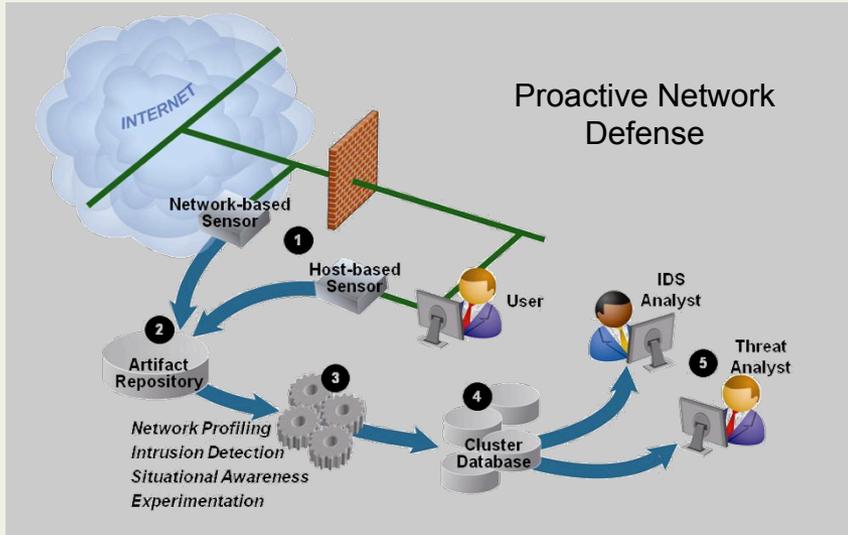
Making today's Army and the next Army obsolete



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Making a Difference for the Warfighter





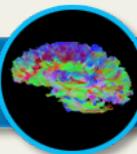
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ARL S&T Campaigns



Extramural Basic Research

Steering and oversight of the systematic study to increase fundamental knowledge and understanding in physical, engineering, environmental, and life sciences related to long-term national security needs.



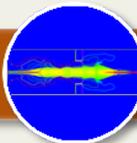
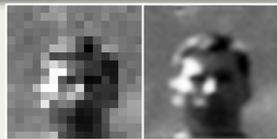
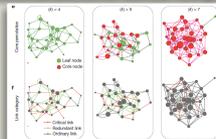
Human Sciences

Fundamental understanding of Warfighter performance enhancement, training aids, and man-machine integration.



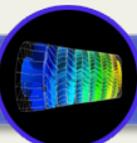
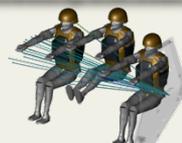
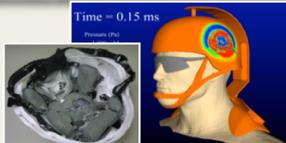
Information Sciences

Fundamental understanding of information generation, collection, assurance, distribution, and exploitation.



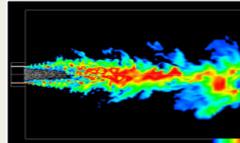
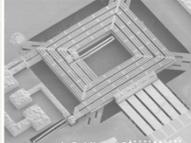
Sciences for Lethality & Protection

Fundamental understanding of emerging technologies that support weapon systems, protection systems, and injury mechanisms affecting the Warfighter.



Sciences for Maneuver

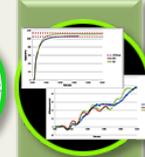
Fundamental understanding of the design, integration, control, and exploitation of highly adaptive platforms in complex environments.



Computational Sciences
Fundamental understanding of computer hardware, high efficiency algorithms, and novel mathematical methods.



Materials Research
Fundamental understanding of structural, electronic, photonic, and energy materials & devices.



Assessment and Analysis
Quantitatively Assess the development and application of analytical tools and methodologies to quantitatively assess the military utility of Army, DoD, and select foreign combat systems.

ARL Campaign Publications <http://www.arl.army.mil/publications>



Vision

- *An Army HBCU/MI program established in FY04 under special initiative by ASA(ALT)*
- *Center of Excellence (COE) Model*
- *Explores/matures technologies with potential to enhance Future Force*
- *Team with Battle Labs for requirements input and continuing refinement/prioritization*
- *Enable/enhance/leverage HBCU/MI organic capabilities*

Execution

- *BCE Broad Agency Announcement released in December 2003*
 - *17 proposals received*
 - *5 selected for award at 4 universities*
 - *Awarded as cooperative agreements*
- *Each BCE site funded for approximately \$500K/yr for 5 years*
- *Contract awards late FY04/early FY05*
- *FY08 last year of funding; expenditures continued into FY09 with one-year awards for competitive continuing research*
- *Annual program management reviews*



Center for Environmentally Stable Flexible Displays

North Carolina A&T State University

Develop environmentally stable flexible optoelectronic displays for the soldier and vehicles to enhance situation awareness and decision-making capability

Center for Human-Centric Command & Control Decision Making

North Carolina A&T State University

Design a test bed for cognitive process experiments and decision-aiding software for specified military tasks

Center for Battlefield Sensor Fusion

Tennessee State University

Investigate 2D and 3D stationary and non-stationary distributed sensors with varying operational modalities for reliable sensor fusion

Center for Development of Flexible Extremities Protection

Tuskegee University

Conduct research utilizing shear thickening fluid/fabric composites to provide light-weight flexible protection to soldiers facing multiple battlefield threats.

Center for Line of Sight/Beyond Line of Sight (LOS/BLOS) Lethality

Prairie View A&M University

Develop algorithms to configure a mobile ad hoc network architecture to provide all necessary sensor data for LOS/BLOS lethality



Vision

- *An Army HBCU program established as the second phase of the former Battlefield Capability Enhancement Program under special initiative by ASA(ALT) – Employs Center of Excellence Model*
- *Enhance research programs and capabilities of a select number of high-interest scientific and engineering disciplines through Army-relevant, topic-focused, near-transition-ready innovative research.*
- *Strengthen the capacity of HBCUs to provide excellence in education and provide opportunity for HBCUs to conduct research critical to the national security functions of the Department of Defense.*

Execution

- *PIRT Broad Agency Announcement released in July 2010, closed October 2010*
 - *11 topics, numerous proposals per topic – highly competitive!*
 - *5 proposals selected for award at 4 universities in 4 topic areas*
 - *Awarded as cooperative agreements in 3QFY11*
- *Each PIRT site funded for ~\$500K/yr for 3 years – base period and two 1-year options (total 5 years)*
- *Each cooperative agreement has an agreement manager (CAM) and Co-CAM from ARL/ARO and other ARL Directorates to enable transition*



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Partnership in Research Transition
Program

ARL



Center for Advanced Algorithms

Delaware State University

Exploit applied mathematics, computer science and electrical engineering to develop key enabling algorithms to support and improve remote sensor systems currently under consideration or already deployed to defeat improvised explosive devices (IEDs).

Center for Nano to Continuum Multi-Scale Modeling Techniques and Analysis for Cementitious Materials under Dynamic Loading

North Carolina A&T State University

Evolve a multi-scale nano to continuum modeling methodology that links and transcends across different length scales that will impact design and development of advanced cement material for force and materiel protection from direct, ballistic and shock threats in theater and homeland security.

Center for Lower Atmospheric Research Using Lidar Remote Sensing

Hampton University

Develop equipment and techniques to conduct basic remote-sensing research of the troposphere to assess the viability of using a portable, scanning LIDAR to monitor and characterize visibility and air quality over a local region and participate in a network of LIDAR systems .

Center for Extracting Social Meaning from Linguistic Structures in African Languages

Howard University

Identify the social meaning of linguistic features in a set of African languages and design the automatic analysis procedures that will make it feasible for a computer to extract the social meaning from an electronic text.

Center for Bayesian Imaging and Advanced Signal Processing for Landmine and IED Detection Using GPR

Howard University

Develop and apply innovative signal processing and computational electromagnetic methods to ground penetrating radar (GPR) based landmine and improvised explosive devices (IEDs) detection systems in order to drastically improve their performance and to evaluate the methods using synthetic and real GPR data obtained from the U.S. Government.

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The Nation's Premier Laboratory for Land Forces



Vision

- *An Army HBCU program established as the third phase of the former Battlefield Capability Enhancement Program under special initiative by ASA(ALT) – Employs High Performance Research Consortium Model*
- *Enhance research programs and capabilities of a select number of high-interest scientific and engineering disciplines through Army-relevant, topic-focused, near-transition-ready innovative research.*
- *Strengthen the capacity of HBCUs to provide excellence in education and provide opportunity for HBCUs to conduct research critical to the national security functions of the Department of Defense.*

Execution

- *PRI call for White Paper released in January 2016, closed June 2016*
 - *6 topics, aligned with current CTAs CRAs*
 - *4 proposals selected for award at 4 universities in 4 topic areas*
 - *Awarded as cooperative agreements*
 - *Each PRI site funded for ~\$160-450K/yr for 4 years – base period and one 1-year option (total 4 years)*
- *Each cooperative agreement has an agreement manager (CAM) and Co-CAM from ARL/ARO and other ARL Directorates to enable transition*



Cognitive and Neuroergonomics (CTA)

City College of New York

Aimed at advancing and accelerating the maturation of neuroscience-based approaches to understanding Soldier performance in operation environments and to enhancing future soldier-system development.

Materials in Extreme Dynamic Environments (CRA)

North Carolina A & T State University

Expand the fundamental understanding in the area of multi-scale Materials in ultra-high loading rate environments.

Cyber Security (CRA)

University of Texas at El Paso

Develop fundamental knowledge of the laws, theories, theoretically-grounded concepts, and empirically validated models to enable the rapid design of cyber defense tools and predictive analysis of malicious activities on Army networks.

Multidisciplinary Modeling of Electronic Materials (CRA)

New Mexico Institute of Mining and Technology

Create multiscale models to support development of future electronic materials and devices.



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FY16 ARL HBCU/MI Programs & Activity



ARL- ARO Core HBCU/MI Program (1980-Present)

To engage and incentivize greater participation of HBCUs/MIs in basic research.

Funding: \$20.6M
Impact: 10 HBCUs, 28 MIs

Partnership in Research Transition (PRI) Program (2017-Present)

To enhance the programs and capabilities of a select number of high-interest scientific and engineering disciplines through innovative research.

Funding: \$1.3M
Impact: 4 HBCUs

DoD Research and Education Program (REP) - (1992 – Present)

Tri-Service program administered and awards executed by ARL-ARO for OSD. Aims to enhance research capabilities of HBCUs/MIs and to strengthen their education programs in STEM disciplines relevant to the defense mission.

Funding: \$29.2M
Impact: 23 HBCUs, 32 MIs, 1 TCU

Grant and Cooperative Agreement Awards in FY16

Collaborative Technology/ Research Alliances (CTA/ CRAs), High Performance Computing Research, and University Affiliated Research Centers (UARCs)

To encourage greater HBCU/MI participation on university & industry-led research teams in areas of high Army interest.

Funding: ~\$3.7M RDT&E
Impact: 4 HBCUs, 11 MIs

Contract Research, Development, Test and Evaluation

Primarily to leverage unique capabilities of a minority-serving institution in Electronic Warfare, Cyber and System of Systems supporting ARL at White Sands Missile Range.

Funding: \$7.5M RDT&E
Impact: 2 MIs

Open Campus

Build science and technology ecosystem that will encourage ground-breaking advances in areas of relevance to the Army through research collaboration.

Impact: 1 HBCU, 3 MIs
Mechanisms: 8 JWS, 4
CRADAs

Educational Outreach

Inspire, develop and recruit students, graduates and experienced professionals to execute fundamental research for ARL in support of this Nation's defense through:

*Seminar Series
Mobile STEM Workshops
Faculty Fellow Research Teams
University Student Internships
Research Apprenticeships
Educational Partnership Agreements*

Impact: 44 HBCU/MIs Engaged

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