



# **Federal Demonstration Project Update September 7-9, 2008 Presented by**

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# The Army Research Office



- Manages \$500M of Army focused basic research across the country
- Integrated with DOD and National R&D Community

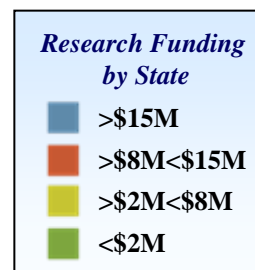
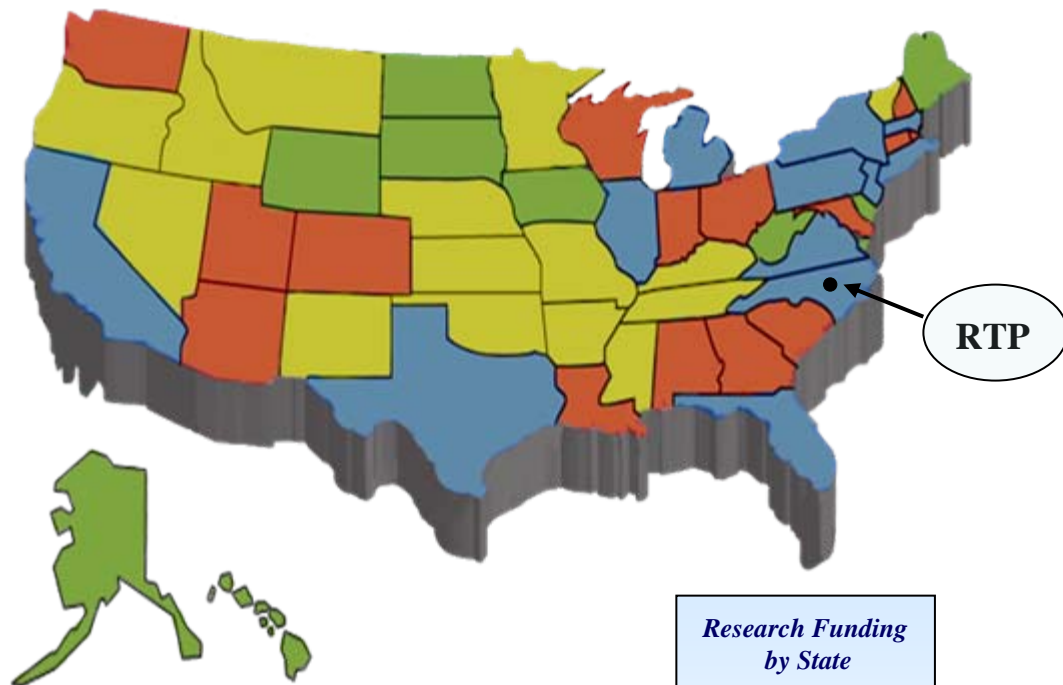
**Funds Army Research**  
at over 200 Academic  
Institutions

Develops Science to  
Ensure Army **Technological**  
**Superiority**

**Assesses Scientific**  
**Opportunities** to Achieve  
Army Vision

**Strengthens the**  
**research infrastructure**  
at HBCU/MIs

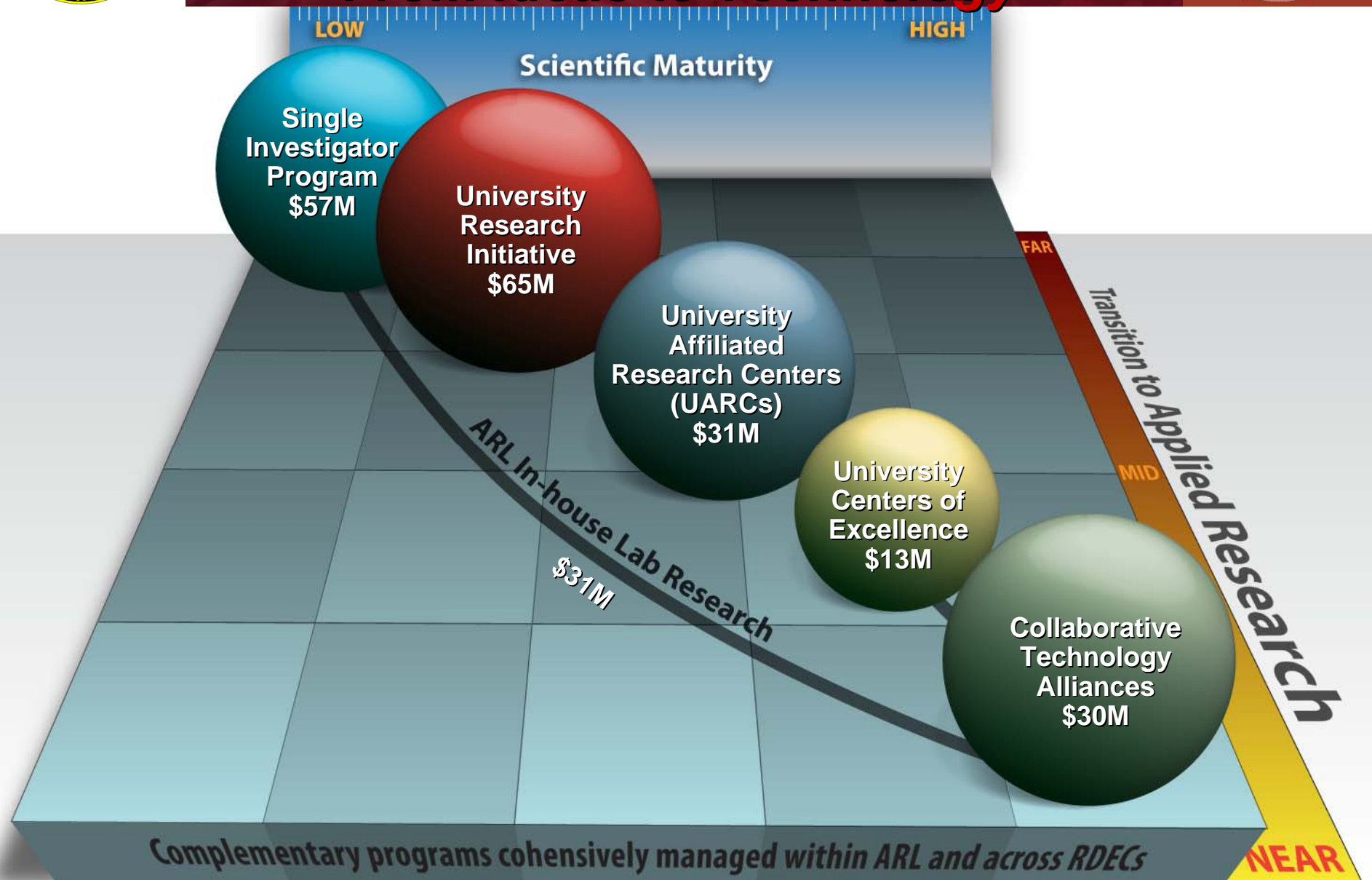
**Educates a Superior**  
**Workforce** in Army-Critical  
Technologies





# ARL Basic Research Portfolio

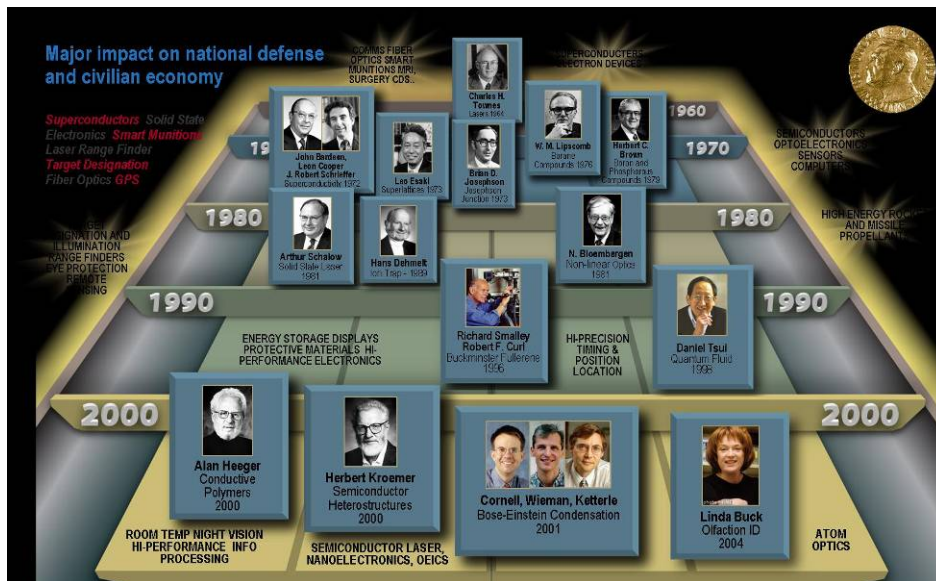
## *From Ideas to Technology*



TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.



# Single Investigator Program Leverages World-Class Academic Expertise

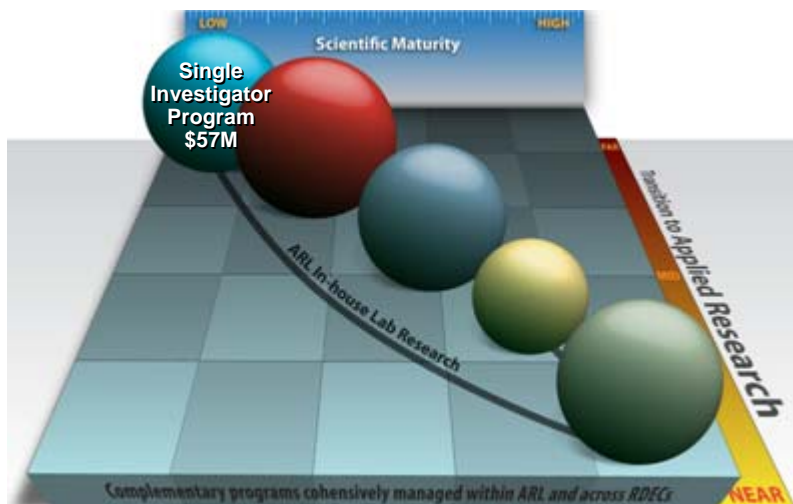


## 6.1 Dollars

(\$M)	FY08	FY09	FY10	FY11	FY12
61102	54.7	68.3	66.9	69.2	71.0

- **Rapid and agile exploitation of novel science opportunities world-wide**
- **Extremely cost-effective**
- **All states and D.C.**
- **>250 institutions**
- **Graduate students supported: ~1400**
- **~ 900 university grants, \$112k/yr grant**

**Exploit the innovation and flexibility of academia**

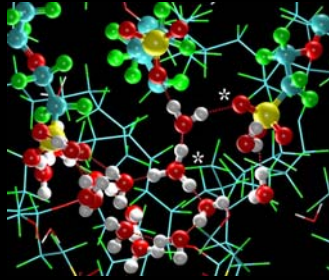


**TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.**





# University Research Initiative



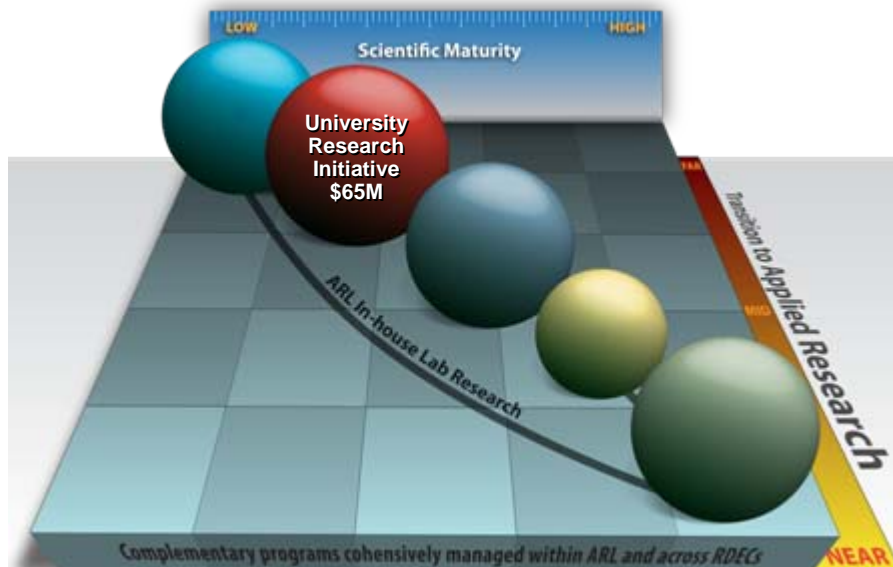
**Experimental Study of  
Polymeric Membranes in  
Fuel Cells**

(\$M)	FY08	FY09	FY10	FY11	FY12
61103	62.9	77.0	76.4	77.8	80.7

***Includes MURI, DURIP, PECASE***

## **Multi-Disciplinary University Research Initiative (MURIs)**

- ***Research vital to the Army, but applicable to multiple Services***
- ***Investigates high priority, transformational topics such as biologically inspired mobile networks of autonomous vehicles, self-assembling multifunctional ceramic composites***
- ***Critical mass of researchers; \$1.25M/year, 5-years***
- ***Approximately 10 new initiatives started annually***





# University Affiliated Research Centers (UARCs) University Led with Industry Partnership(s)



**Electrodynamics &  
Hypervelocity Physics**



**Soldier Survivability**

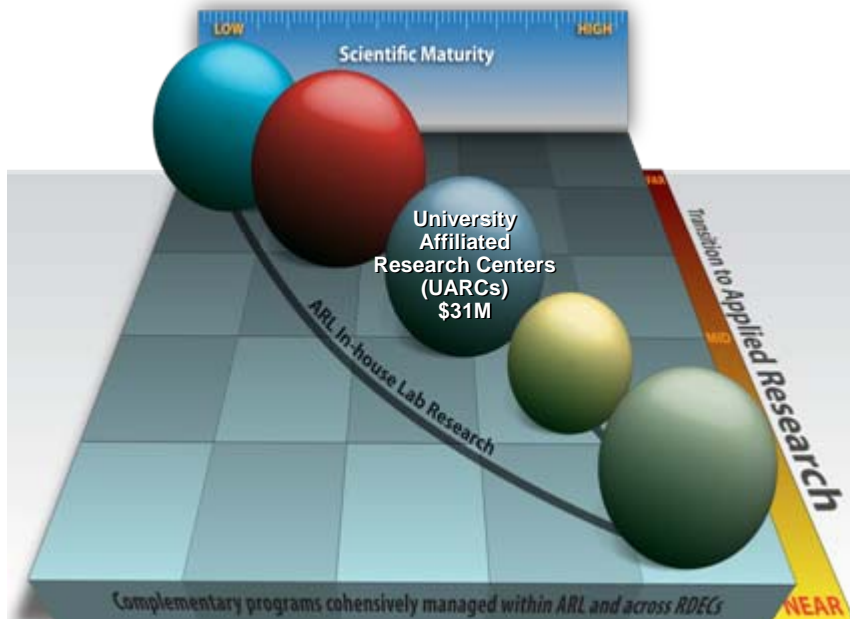


**Immersive  
Environments**



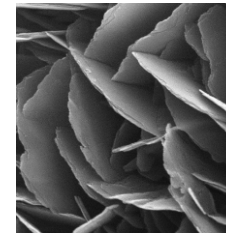
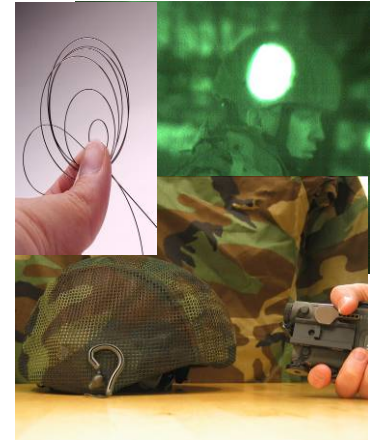
**Biotechnology**

**High intensity focus on emerging opportunities**



(\$M)	FY08	FY09	FY10	FY11	FY12
61104	29.5	35.0	33.6	35.4	37.7

**Optoelectronic **fiber-device**  
covering for ID and line-of-  
sight IR communication**



**Bio-Inspired Materials  
for Lightweight  
Portable Energy**



## **Relevant MLPs**

<b>Sensing</b>	<b>Survivability</b>
<b>Power &amp; Energy</b>	<b>Lethality</b>
<b>Human Dimension</b>	<b>Battle Command</b>

**TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.**



# University Centers of Excellence

University Researchers Focused on Army Interests Over Long Term



## Battlefield Capability Enhancement Centers



**Sensor Fusion**



**Battlefield Communications**

**North Carolina A&T State University**

explore. discover. become.

**C2 Decisionmaking**

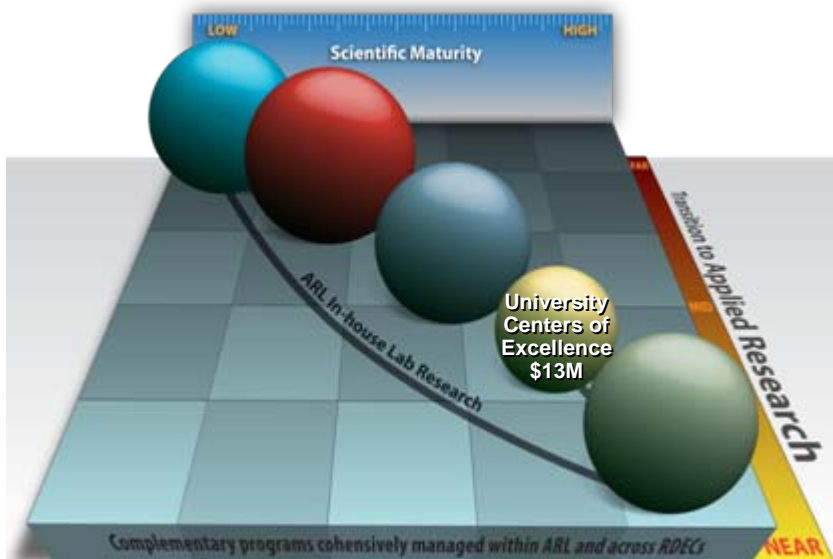


**Flexible Displays**

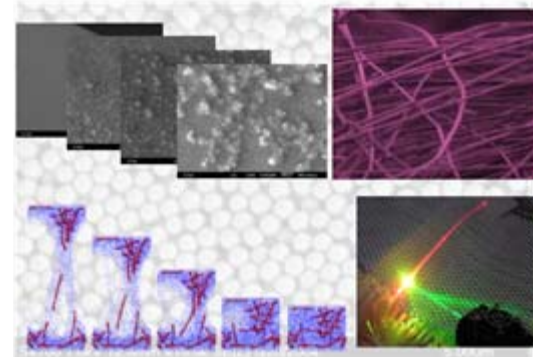


**Extremities Protection**

- Cooperative Agreement – 5 Efforts
- HBCU/MI lead with TRADOC Battle Lab Collaboration
- Focus on rapid transition of basic research
- \$500K/year efforts
- New 5 yr program starts beginning FY09



**High Perf Computing**



**Materials**

(\$M)	FY08	FY09	FY10	FY11	FY12
61104	7.1	9.1	9.2	9.6	10.0

**TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.**



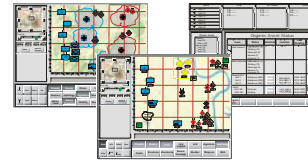


# Collaborative Technology Alliances

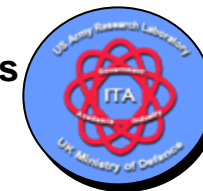
## Industry-Led Partnerships with Universities and the Army



(\$M)	FY08	FY09	FY10	FY11	FY12
61104	27.8	33.1	34.6	35.5	36.4



Advanced  
Decision Architectures



International  
Technology  
Alliance

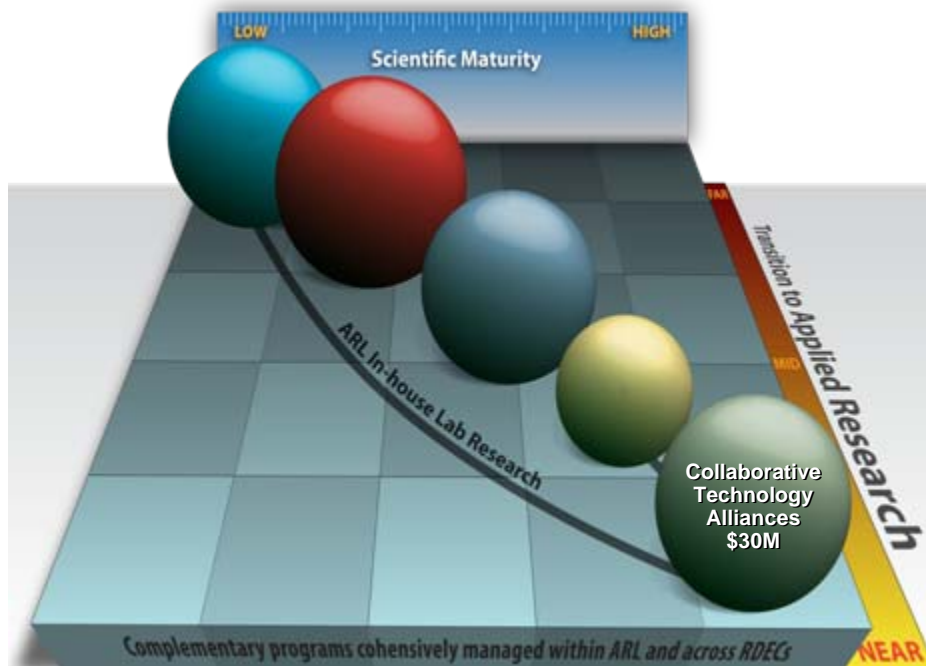
MAST



Robotics



Comms & Networks



### ***FUTURE CTA INVESTMENTS***

- Topics Under Consideration
  - Robotics (continuation)
  - Cognition and Neuroergonomics
- Proposed Commencement FY10
  - Network Science (FY 09)





# FY08 Investment Strategy



## LEVERAGE

### **DARPA ~ \$98M**

- Microactive Flow Control
- Power Sources
- VLSI Photonics
- MEMS
- Spins in Semiconductors
- MetaMaterials

### **DTRA ~ \$31.2M**

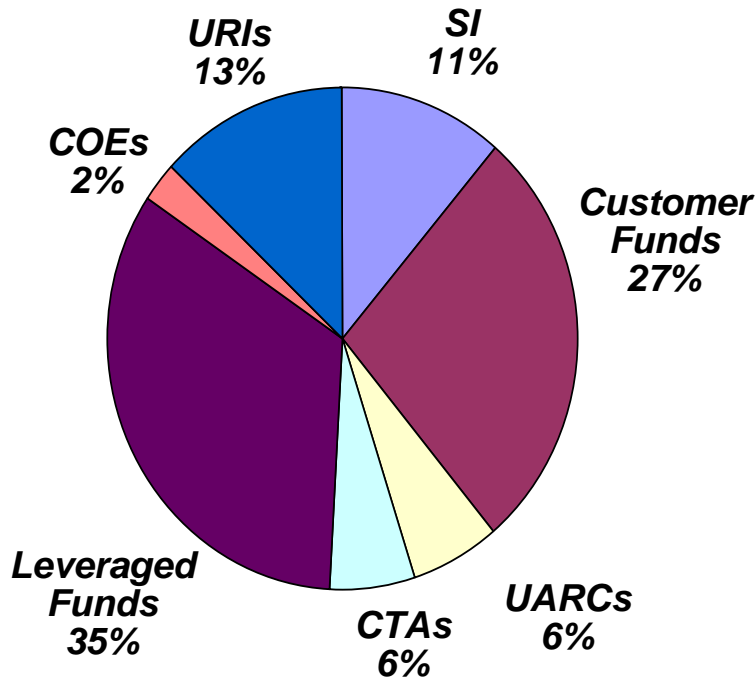
- Chem Bio Defense

### **DDR&E ~ \$15.2M**

- HBCU/MI program
- DEPCOR

### **SBIR/STTR ~ \$27.3M**

**Cong Adds ~ \$16.4M**  
(6.1)



**Extramural Research  
FY08 \$500.2M**

## CUSTOMERS

- All RDECs
- Corps of Engineers Labs
  - **Terrestrial Sciences**
  - **Engineering Sciences**
- Medical Res & Matl Command
- **Bio & Chemical Sciences**
- **Mathematical Sciences**
- ASA(ALT)
- **e.g. Board on Army S&T**
- Missile Defense Agency

## COLLABORATIONS

- Missile Defense Agency
- DARPA
- DTRA
- DDR&E
  - **e.g. HBCU/MI, DEPCOR**



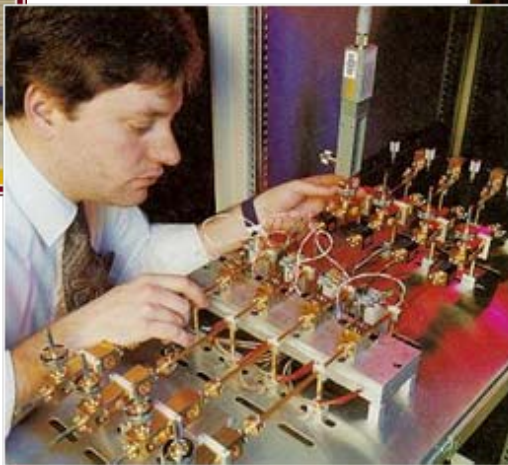
# Small Business Technology Transfer (STTR) Program



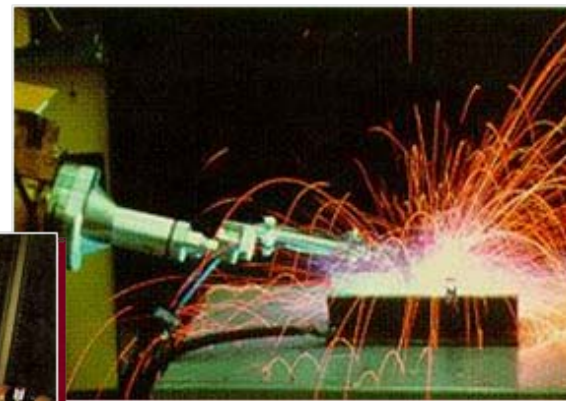
## High Tech Teaming – Small Business and Research Institutions



**Phase I - Feasibility Study**  
**\$100K with no Options**  
**Six Months Performance**  
**One in Ten Win**



**Phase II - Development**  
**\$750K**  
**One in Three Win**  
**Two Years Performance**



**Phase III - Commercialization**  
**No More STTR Funds...**  
**One in Eight Successful**

## ***Army STTR...***

**Pursues innovations through teaming  
with small businesses and research institutes.**

**\$16.7M for FY06**

**TECHNOLOGY DRIVEN. WARRIGHTER FOCUSED.**



# ARO Funded Nobel Laureates



Major impact on national defense  
and civilian economy

*Nobel Laureate Examples:*  
**Superconductors** Solid State  
**Electronics** **Smart Munitions**  
**Laser Range Finder**  
**Target Designation**  
**Fiber Optics** **GPS**

TARGET  
DESIGNATION AND  
ILLUMINATION  
RANGE FINDERS  
EYE PROTECTION  
REMOTE  
SENSING

COMMS FIBER  
OPTICS SMART  
MUNITIONS MRI,  
SURGERY CDS..

SUPERCONDUCTORS  
ELECTRON DEVICES

SEMICONDUCTORS  
OPTOELECTRONICS  
SENSORS  
COMPUTERS

HIGH ENERGY ROCKET  
AND MISSILE  
PROPELLANTS

1980

1980

1990

2000

2000



John Bardeen,  
Leon Cooper  
J. Robert Schrieffer  
Superconductivity 1972



Leo Esaki  
Superlattices 1973



Charles H.  
Townes  
Lasers 1964



Brian D.  
Josephson  
Josephson  
Junction 1973



W. M. Lipscomb  
Borane  
Compounds 1976



Herbert C.  
Brown  
Boron and  
Phosphorous  
Compounds 1979



Arthur Schalow  
Solid State Laser  
1981



Hans Dehmelt  
Ion Trap - 1989



N. Bloembergen  
Non-linear Optics  
1981



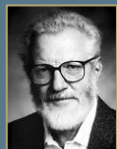
Richard Smalley  
Robert F. Curl  
Buckminster Fullerene  
1996



Daniel Tsui  
Quantum Fluid  
1998



Alan Heeger  
Conductive  
Polymers  
2000



Herbert Kroemer  
Semiconductor  
Heterostructures  
2000



Cornell, Wieman, Ketterle  
Bose-Einstein Condensation  
2001



Linda Buck  
Olfaction ID  
2004

ROOM TEMP NIGHT VISION  
HI-PERFORMANCE INFO  
PROCESSING

SEMICONDUCTOR LASER,  
NANOELECTRONICS, OEICS

ATOM  
OPTICS

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# Active BAAs



- IARPA Advanced Materials and Fabrication for Coherent Superconducting Qubits Program, W911NF-08-R-0011, 16 DEC 2008
- RF Technology Solutions to Detect and Locate Improvised Explosive Device (IED) Threats, W911NF-08-R-0009, 29 August 2008
- Depart. of Defense (DoD) Historically Black colleges and Universities and Minority Institutions (HBCU/MI) FY 2008, W911NF-08-R-0008, 18 SEP 08
- Department of Defense (DoD) Minerva Research Initiative, W911NF-08-R-0007, 03 OCT 2008
- Defense University Research Instrumentation Program (DURIP) FY 2009, AFOSR-BAA-2008-5, 26 August 2008
- U.S. Army Research Office BAA, FY 2007 – FY 2011 revised, W911NF-07-R-0003-02, 30 SEP 2011
- Note: All BAAs can be found at:  
<http://www.arl.army.mil/www/default.cfm?Action=6&Page=8>



# Research Terms and Conditions



- Approved by ARO Management for implementation on 1 July 2008
- Utilized for FDP and Non-FDP Awards
- Agency Specific Requirements Updated as 1 July 2008
- Web-link for Research Terms & Cond., Sub-award Requirement, Implementation, Agency Specific and Prior Approval Docs:

<http://www.arl.army.mil/www/default.cfm?Action=29&Page=218>



# Implementation Document



- ***Continuing Institutional Members from Phase IV:***
- *Existing grants will not be modified. New grants awarded after 1 July 2008 will contain new Terms and Conditions*
- ***New Institutional Members in Phase V:***
- *New grants awarded after 1 July 2008 will contain new Terms and Conditions*
- ***Emerging Research Institutions in Phase V:***
- *New grants awarded after 1 July 2008 will contain new Terms and Conditions*
- ***Outgoing Institutions from Phase IV:***
- *Existing grants will not be modified.*





# QUESTIONS



- ANY QUESTIONS?

Ernie Dixon

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