

# **Managing Strategic Capabilities, Industry Partnerships and LDRD**

**Presentation to  
The Stimson Task Force**

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# Managing strategic capabilities in the future

**How do we maintain strategic laboratory capabilities originally developed by NW but now utilized by both NW and ITS?**

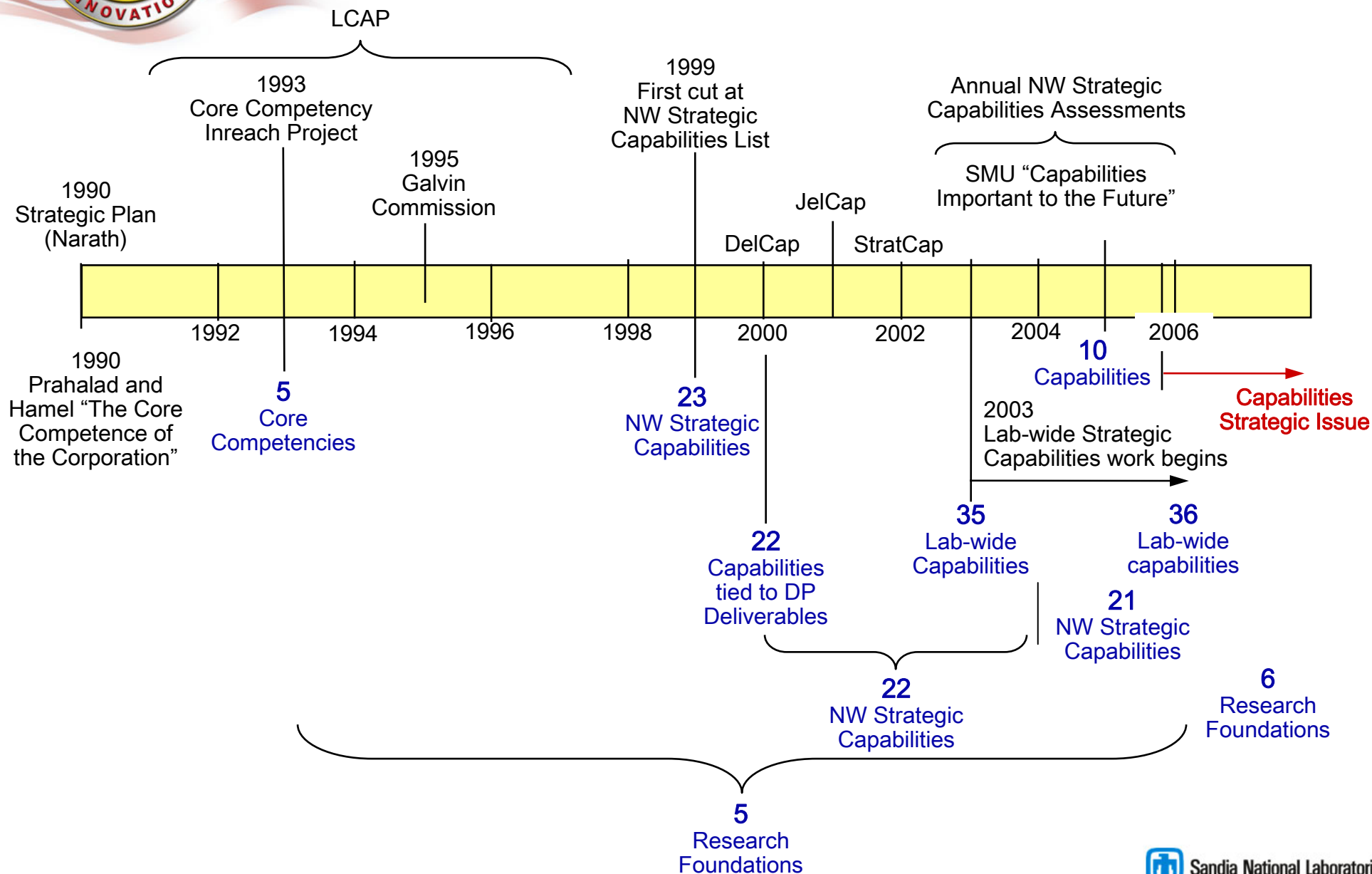
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## **Approach**

- A. Strive for programmatic support from both NW and ITS**
  - Work (people)
  - Maintenance and Operations of Facilities
  - Recapitalization
- B. Utilize limited corporate support for capital equipment**



# We have a long history of studying this problem





# **A new Capabilities Forum has been formed to recommend actions on strategic capabilities**

- **Forum Membership**
  - CTO, Chair
  - NW S&T Deputy
  - ITS Director
  - IES/CFO
  - Institutional Development
- **Roles / Responsibilities – The Forum ...**
  - Is a corporate entity for addressing management of strategic laboratory capabilities
  - Identifies cross-cutting capability needs and issues from SMG/SMU assessments that require corporate attention and decisions
  - Recommends to EO business practices/models and investments
  - Tracks all actions associated with corporate-level decisions



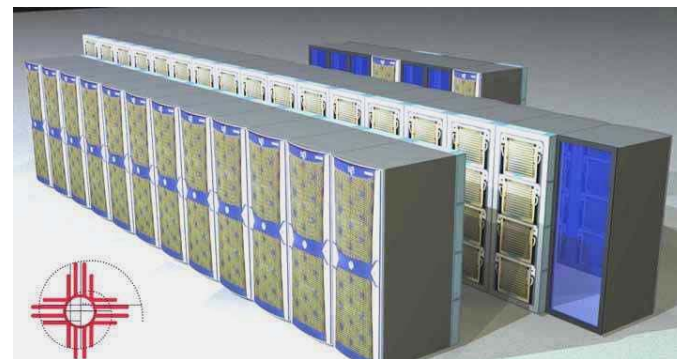
**To date, the Capabilities Forum has identified and focused on three strategic areas**

- **High Performance Computing (HPC)**
  - Capacity/capability environment and advanced computing R&D
- **MESA**
  - Microelectronics, microsystems and nanotechnology
- **Environmental Test**
  - Tech Area 3 large-scale test, thermal test facility, sled track, ...
  - Tech Area 5 reactors, accelerators, component-scale test, experimental support facilities



# Sandia's Overall HPC Strategy

- Build and utilize external partnerships
- Continue to engage NW
- Expand external engagements
- Initiate a broader National Security computing strategy
- Provide institutional investment

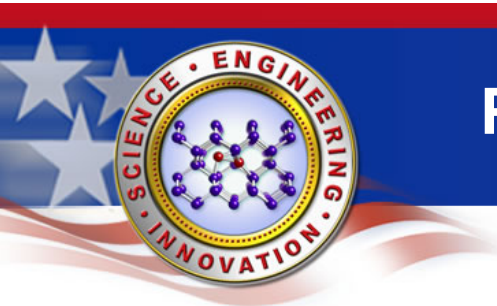


**Red Storm**



**Cray XMT**





# Plan for on-site HPC production capability

- **Red Storm**
- **Tri-Lab Capacity Computing**
- **Institutional investment (FY08)**
- **SNL-NREL investment (FY09)**



<b>FY05</b>	<b>130 Teraflops</b>
<b>FY07</b>	<b>213</b>
<b>FY08 (Sept)</b>	<b>485</b>
<b>FY09 (~Q1)</b>	<b>685</b>
<b>FY09 (TBD)</b>	<b>820</b>



# Capabilities will continue to be a key issue as we manage WFO activities

**The Capabilities Forum will shepherd studies in  
strategic theme areas for capabilities as they emerge**

- **Cyber Security**
- **NA-20 (non-proliferation) Strategy**
- **NNSA Focus Area IV**
- **DoD WFO engagement**







# Industry Partnerships



# Partnerships with industry are essential to Sandia and DOE's success

## Partnerships support our national security mission

- Enhance development of SNL science-based engineering tools
- Ensure a supplier base for SNL mission deliverables
- Support commercialization of mission technologies for broader national use



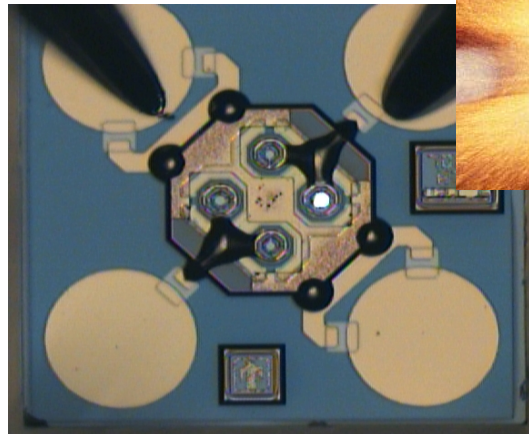
## Partnerships contribute to vital workforce

- Provide challenging problems
- Import best practices into labs
- Help attract world-class staff



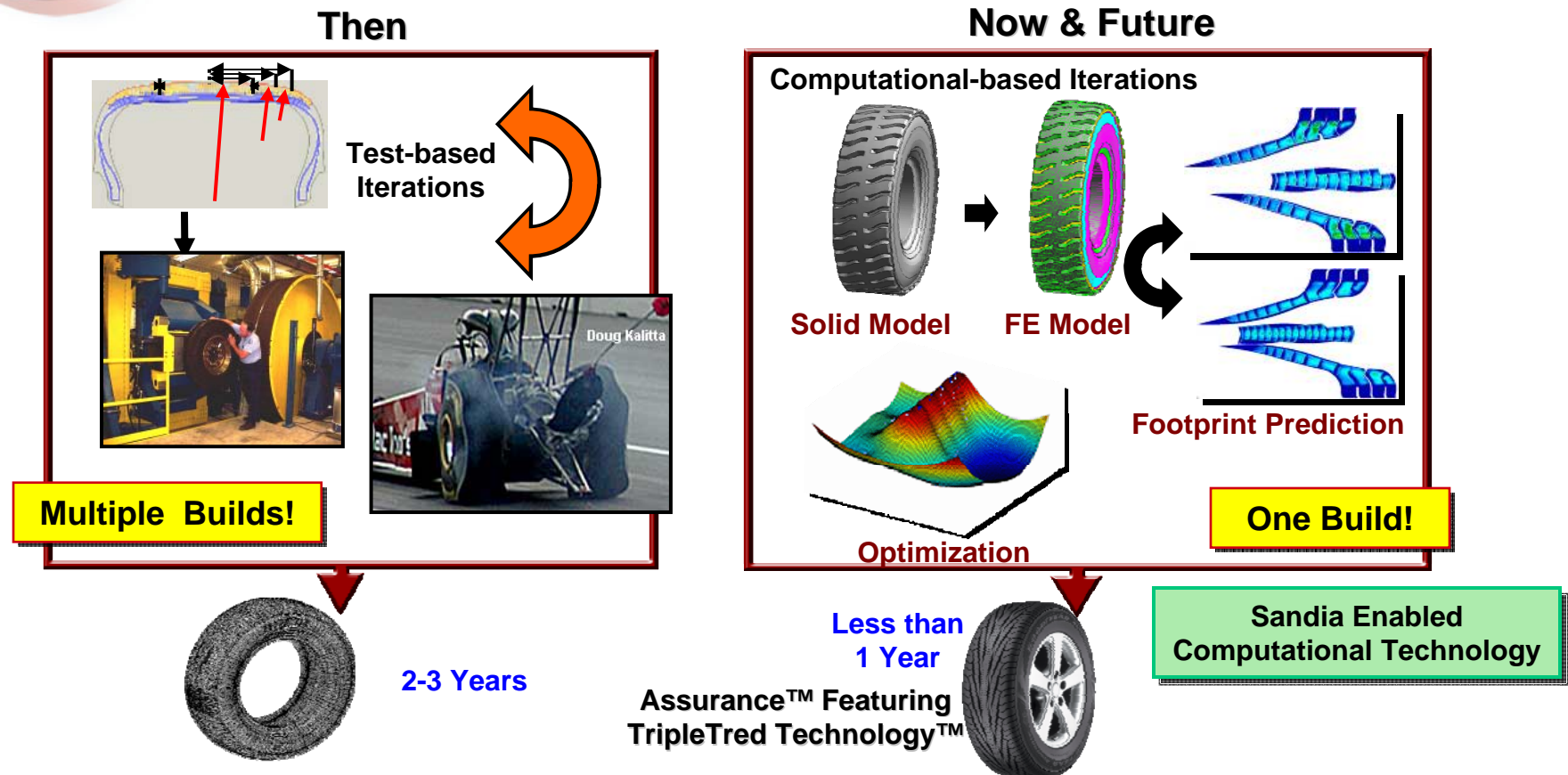
## Partnerships benefit the nation

- Support U.S. competitiveness
- Contribute to U.S. science base

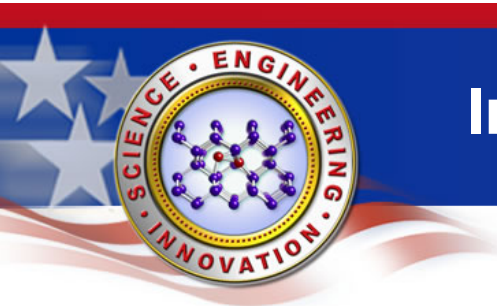




# Dual use benefit is important in industry partnerships

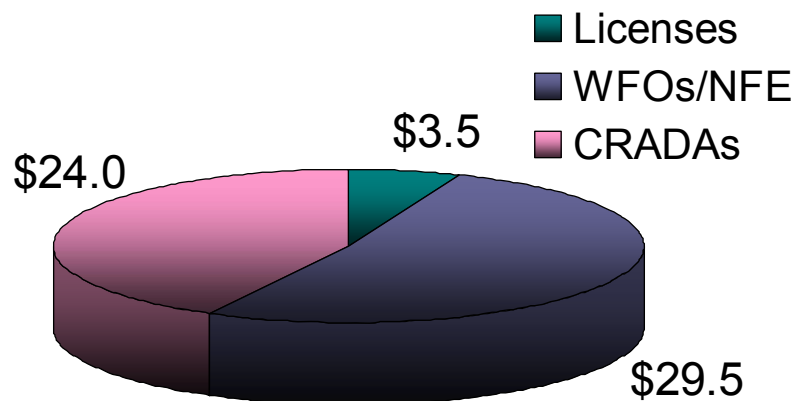


Today 100% of the tire molds designed in Goodyear are modeled before being ordered.  
Sandia gains additional verification, reliability, & validation of our computational tools.



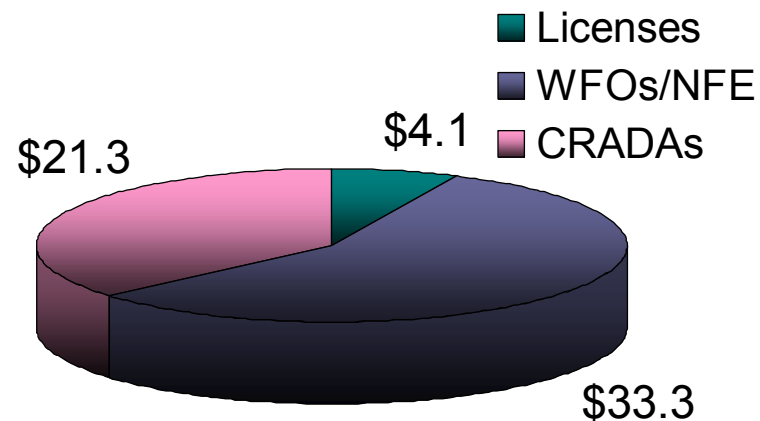
## Industry revenue has been relatively stable

**Industry Funds-in to Sandia  
FY 2006**



**FY06 Total \$57.0 Million**

**Industry Funds-in to Sandia  
FY 2007**

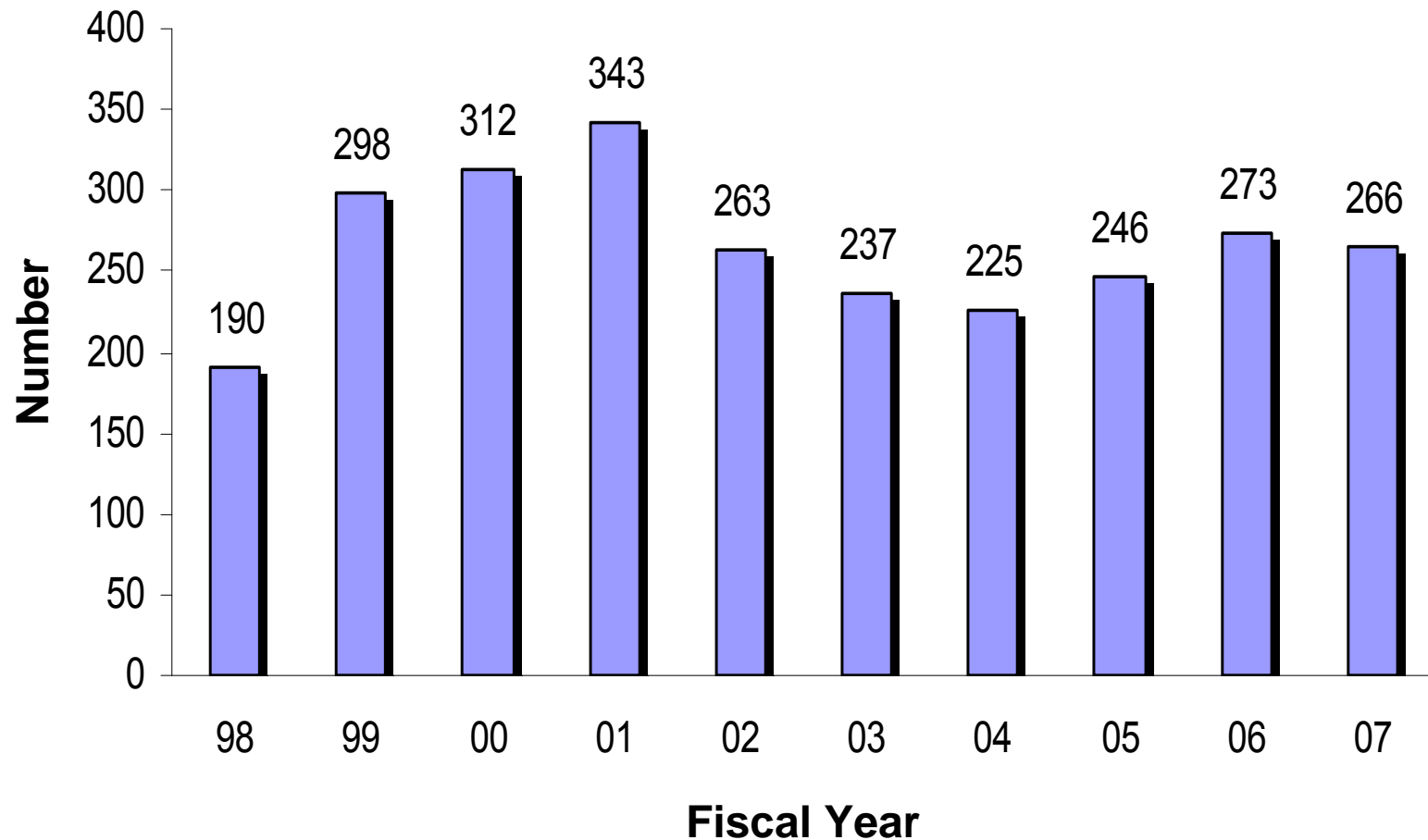


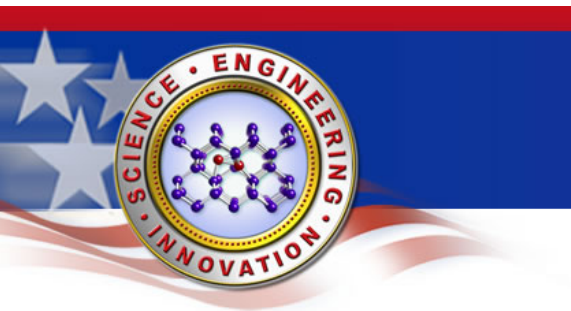
**FY07 Total \$58.7 Million**



# Industry Partnership History

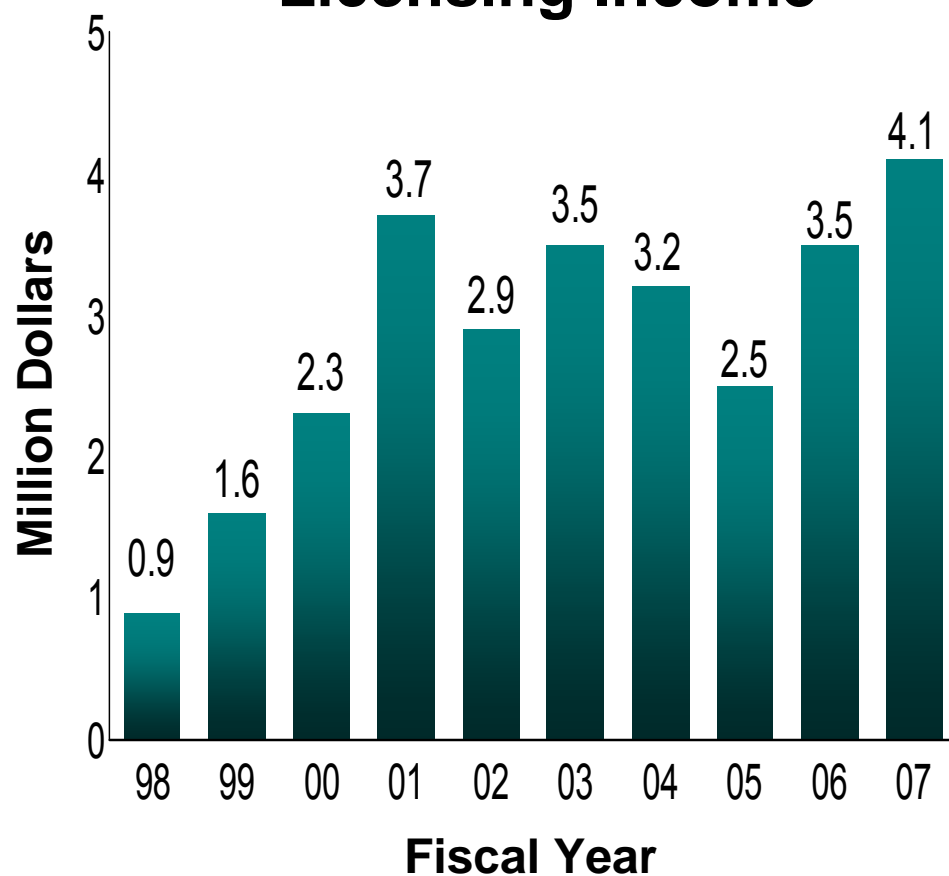
## Sandia CRADA and WFO Agreements



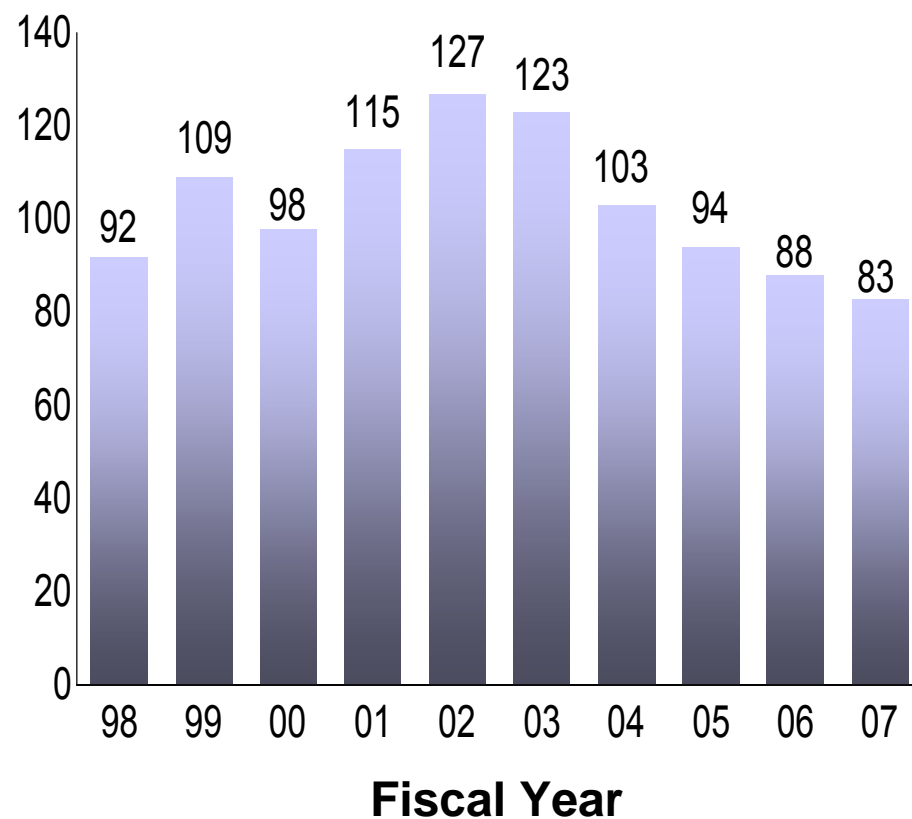


# Licensing and Patent Trends

## Licensing Income



## Patents Issued







# LDRD



**LDRD is the Labs' sole source of discretionary R&D funds for staff-generated, innovative ST&E<sup>1</sup>**

**Laboratory Directed Research and Development (LDRD) Program was authorized by Congress\* and administered by DOE**

### **DOE Order 413.2B - Objectives**

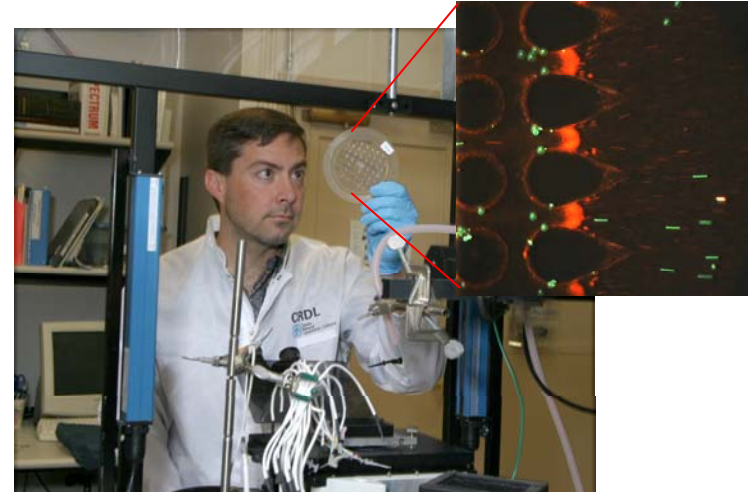
- **Maintain the scientific and technical vitality of the laboratories**
- **Enhance the laboratories' ability to address future DOE/NNSA missions**
- **Foster creativity and stimulate exploration of forefront S&T**
- **Serve as a proving ground for new concepts in R&D**
- **Support high-risk, potentially high-value R&D**

<sup>1</sup>National Defense Authorization Act for Fiscal Year 1991 (P.L. 101-510)

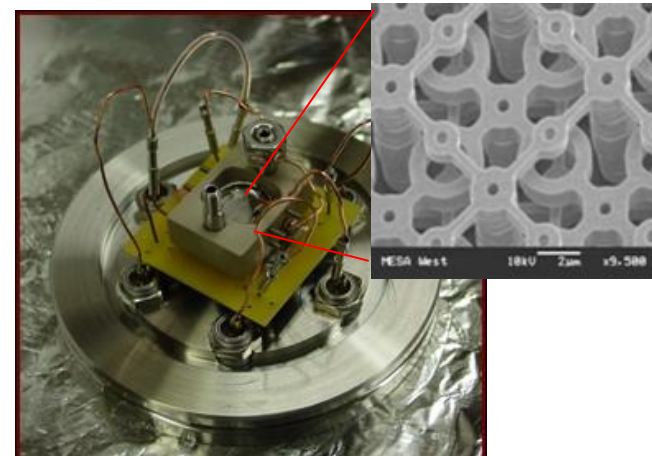


# LDRD is essential for the future of Sandia

- Maintains the vitality of the workforce
- Allows us to be anticipatory and responsive to Nation's needs
- “Seed Corn” of the Labs’ future technologies and capabilities
- A mechanism for professional growth and development



Insulative dielectrophoresis prototype for timely analysis of water supplies.

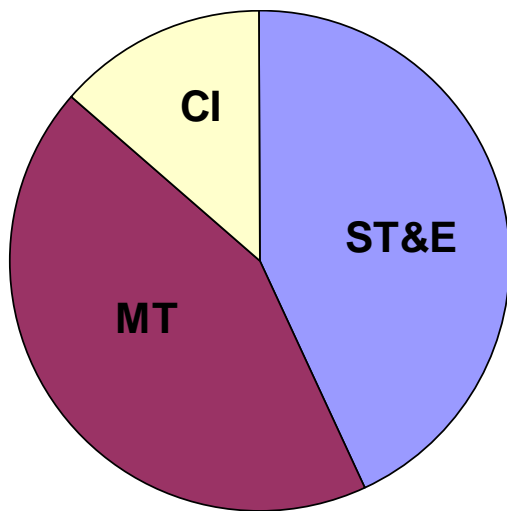


Micro-ion trap for quantum computing



# LDRD has three strategic investment categories

**FY08 LDRD Budget  
\$151M**



**Effective FY08 LDRD  
assessment  
anticipated to be 6.7%**

- **Science, Technology and Engineering (ST&E)**
  - Anticipating future ST&E needs
  - Exploring forefront S&T
- **Mission Technologies (MT)**
  - Seeking S&T innovations aligned with strategic management unit objectives
- **Corporate Investments (CI)**
  - Strategic collaborations with academia and support of risky or long-range R&D areas needed for future missions

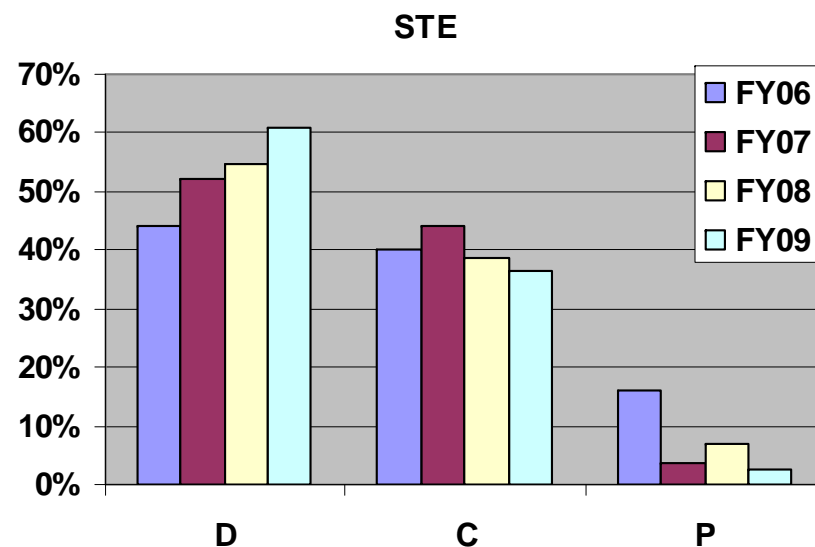
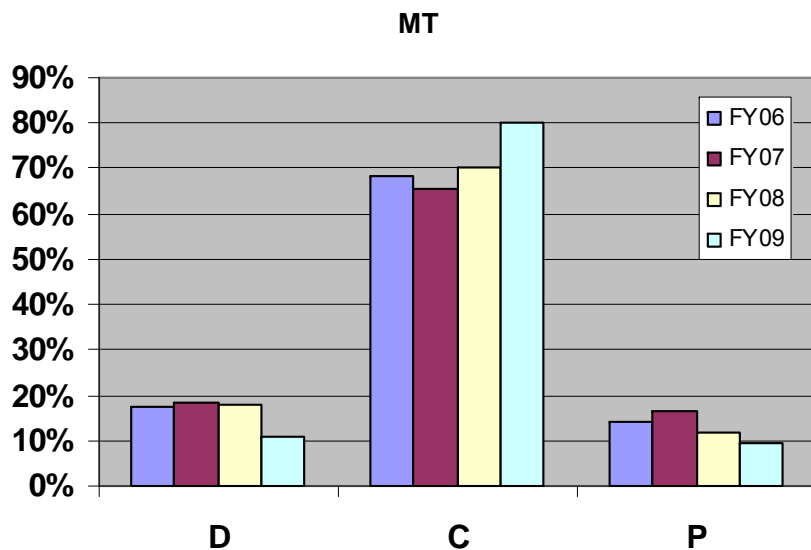


# LDRD spans research to application

**Discover** new understanding or knowledge (use-inspired research)

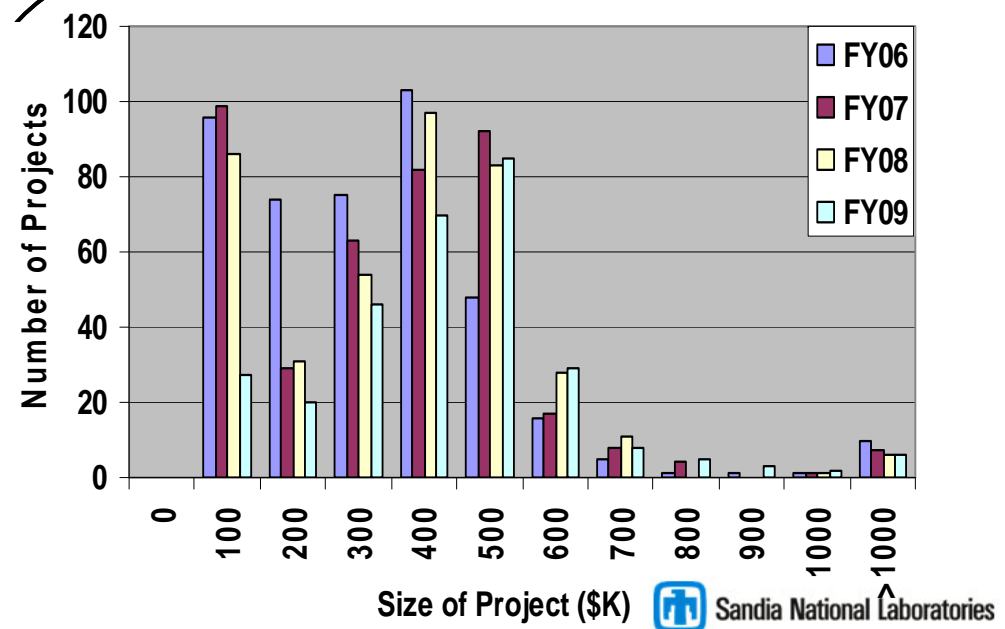
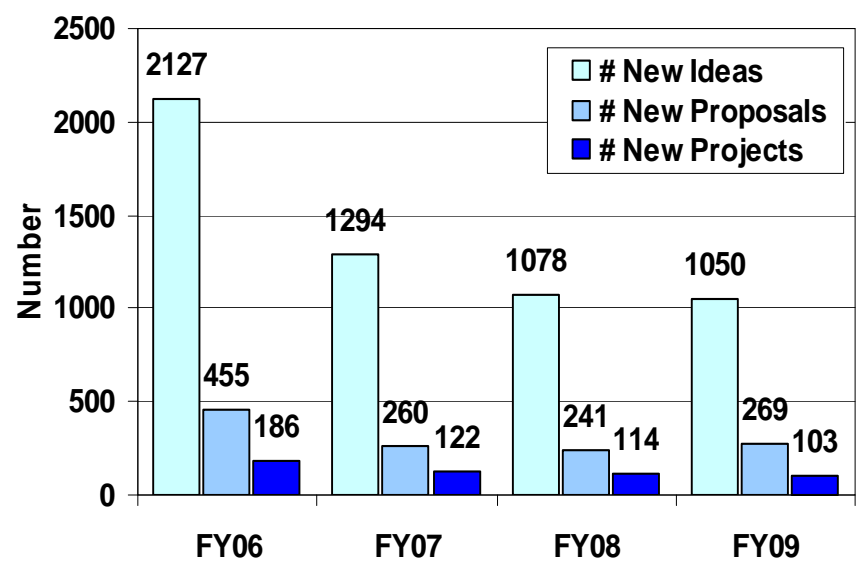
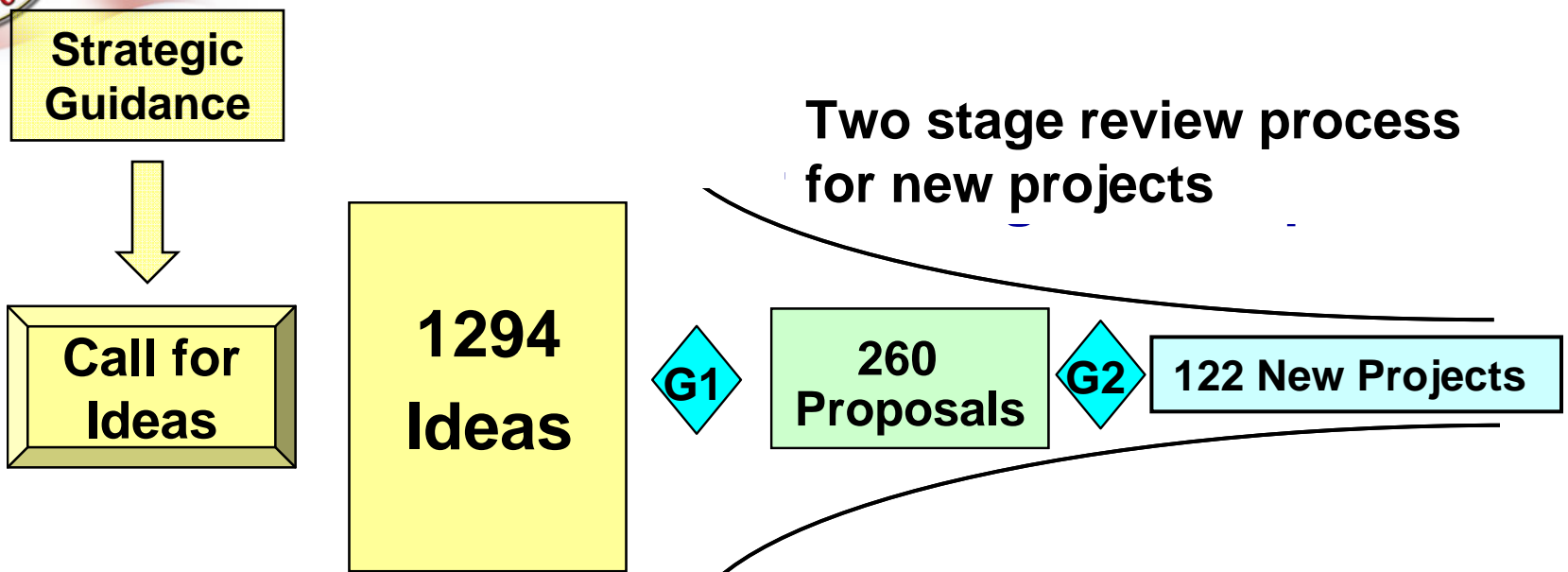
**Create** novel solutions or revolutionary advances by applying or combining knowledge (use-driven research and development)

**Prove** a prospective innovation or concept in a real-world environment (use-driven development)

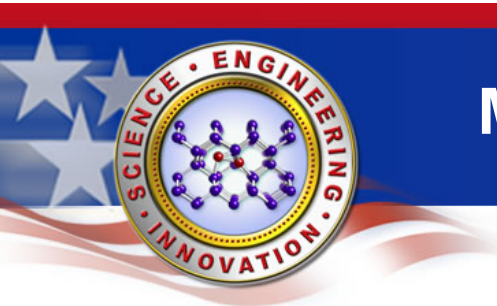




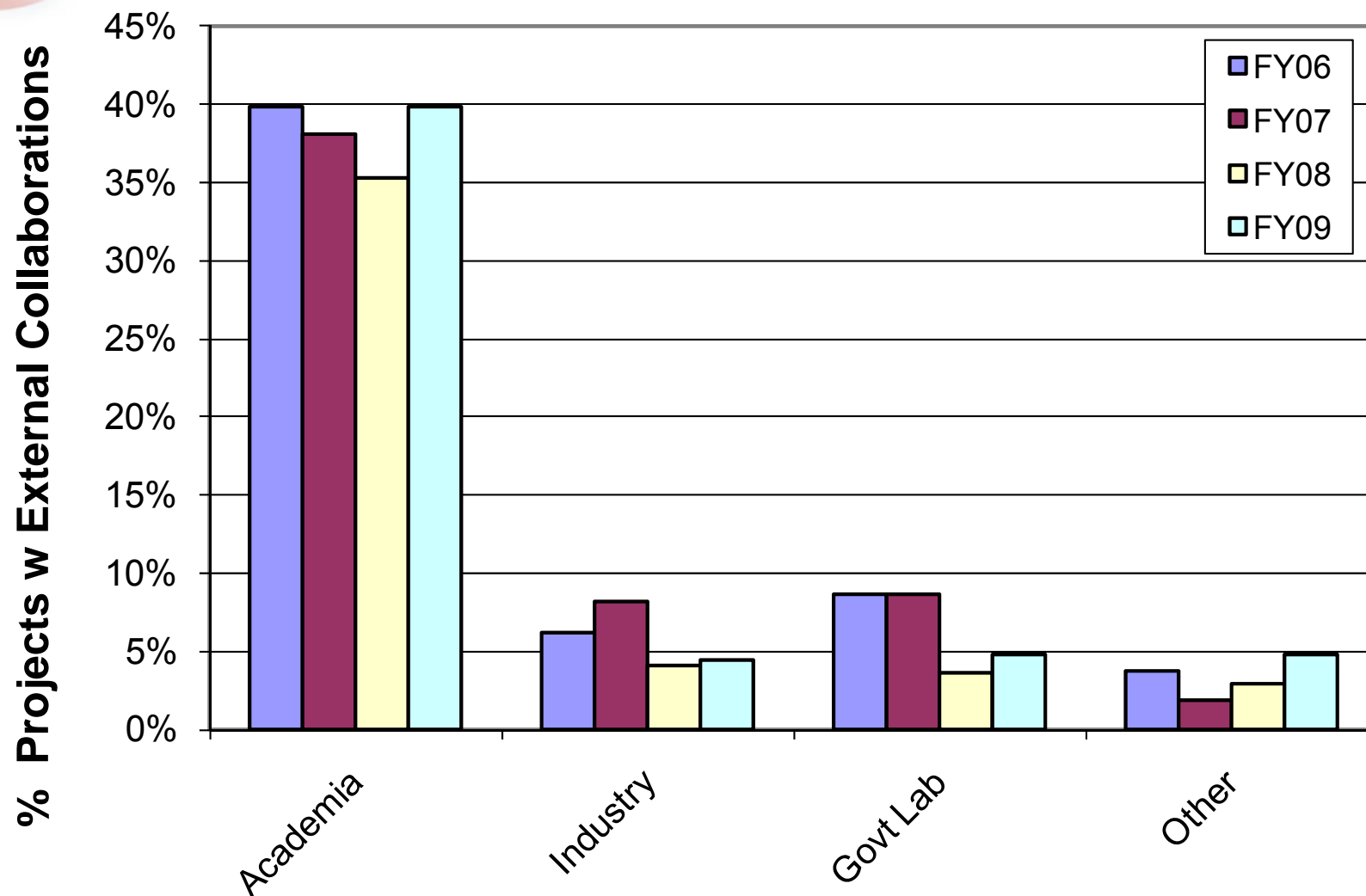
# LDRD project selection is a two stage, bottom-up and top-down process







## Most LDRD projects collaborate externally

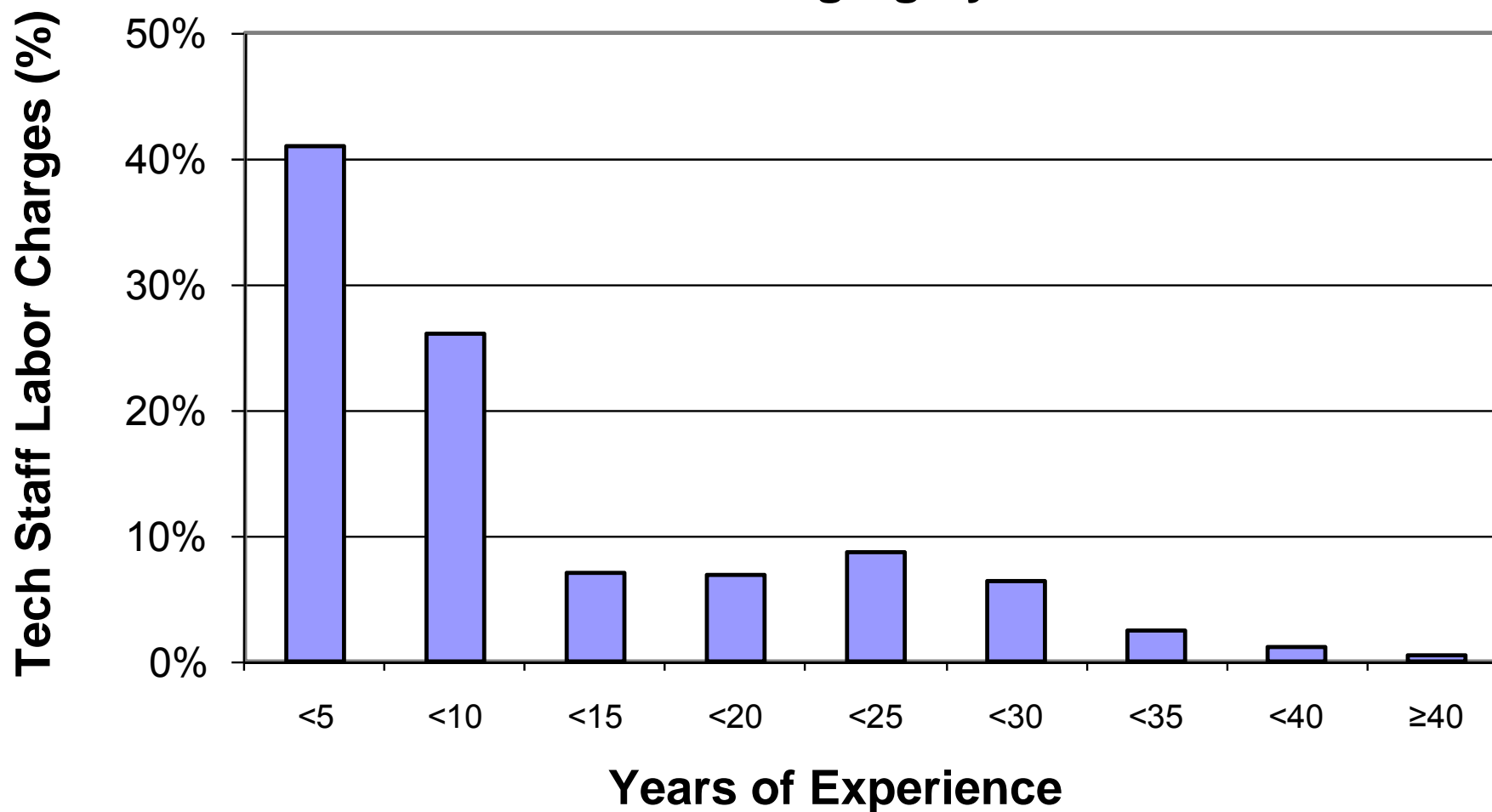


FY06-07 data from Annual Reports; FY08-09 data from proposals



## LDRD supports many early career staff

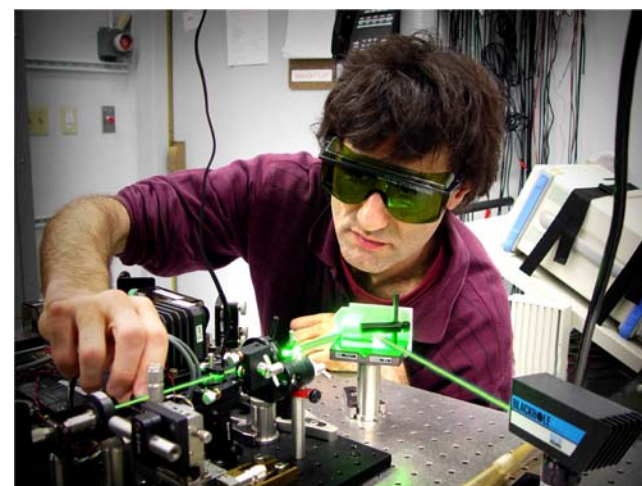
**FY07 Tech Staff Charging by Service Years**





# LDRD Summary

- **Proven to be vital to our future**
  - Innovation
  - Workforce attraction / retention
  - Building mission capabilities
- **Good balance between fundamental research and mission relevant technology development**
- **Strengthened university relationships**
- **Concern over congressional attempt to reduce program size**



Integrated high-power fiber laser technology with multiple applications.