

Managing Strategic Capabilities, Industry Partnerships and LDRD

**Presentation to
The Stimson Task Force**

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Sandia National Laboratories
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Managing strategic capabilities in the future

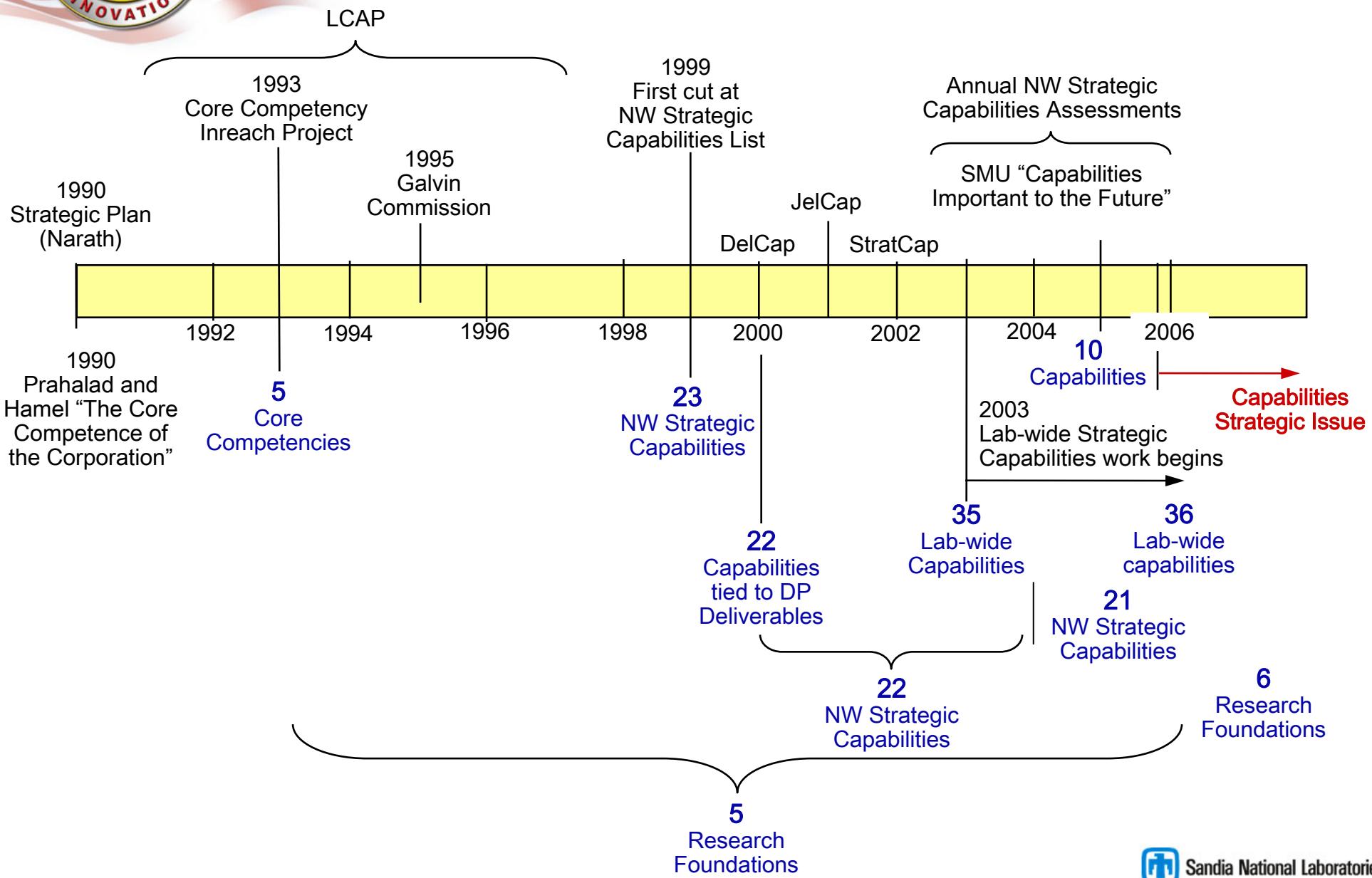
How do we maintain strategic laboratory capabilities originally developed by NW but now utilized by both NW and ITS?

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



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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



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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

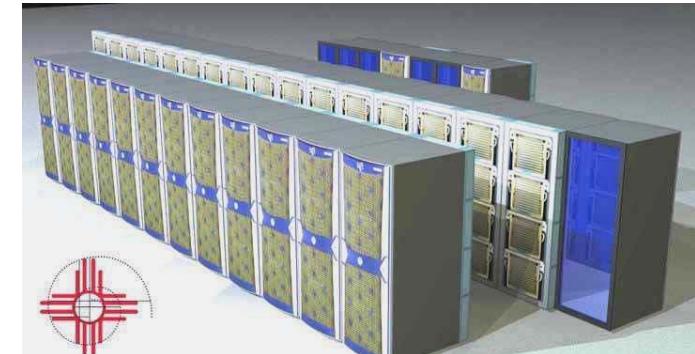


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Sandia's Overall HPC Strategy

- 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



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Plan for on-site HPC production capability

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



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



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



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Industry Partnerships



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

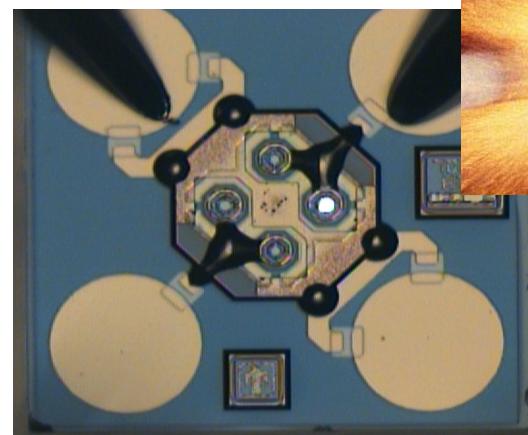
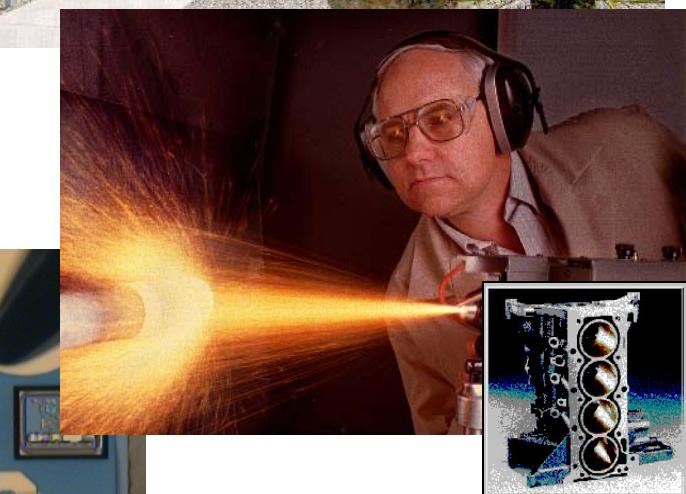
Partnerships support our national security mission

- 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

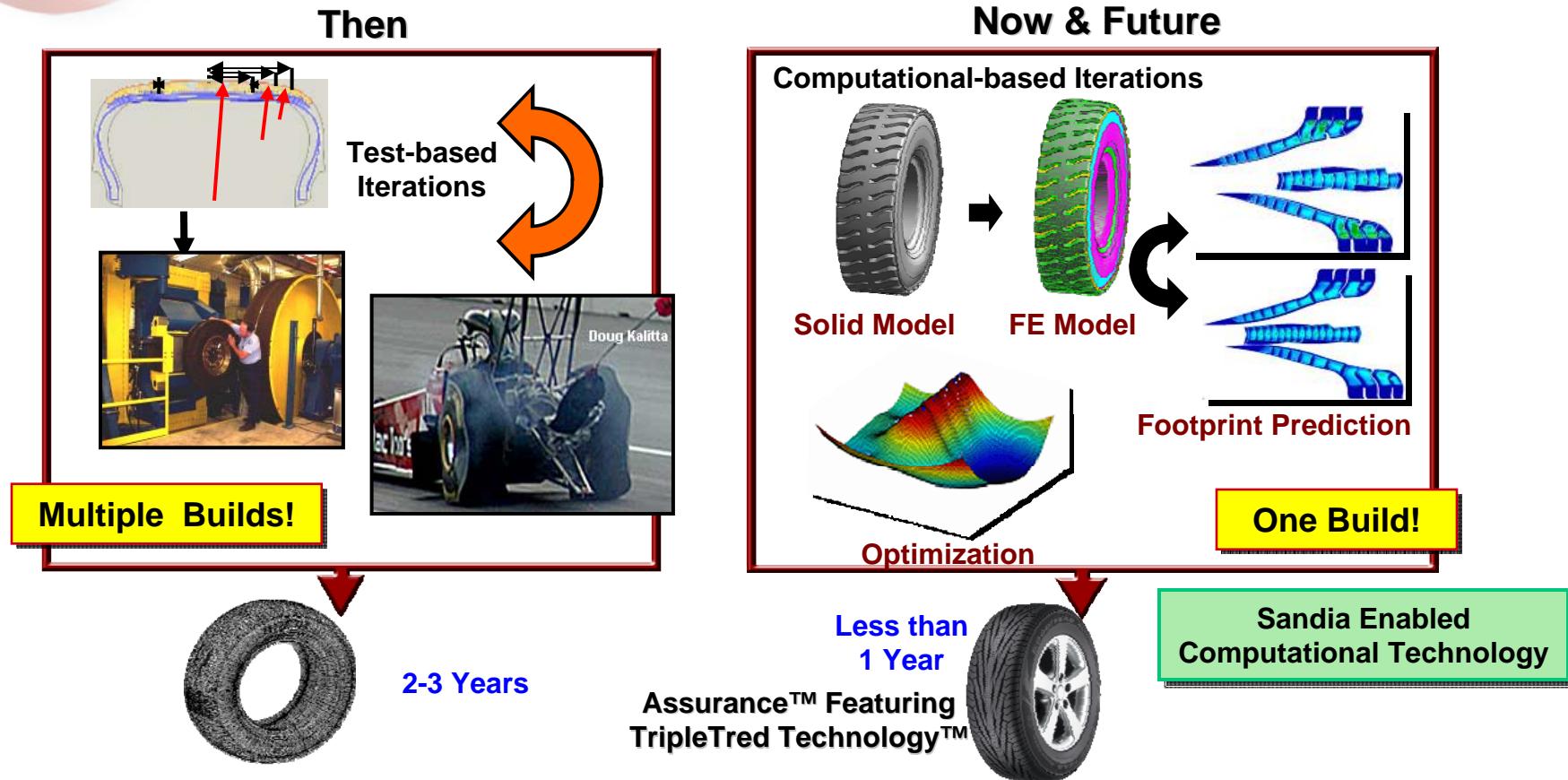


Partnerships benefit the nation

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



Dual use benefit is important in industry partnerships



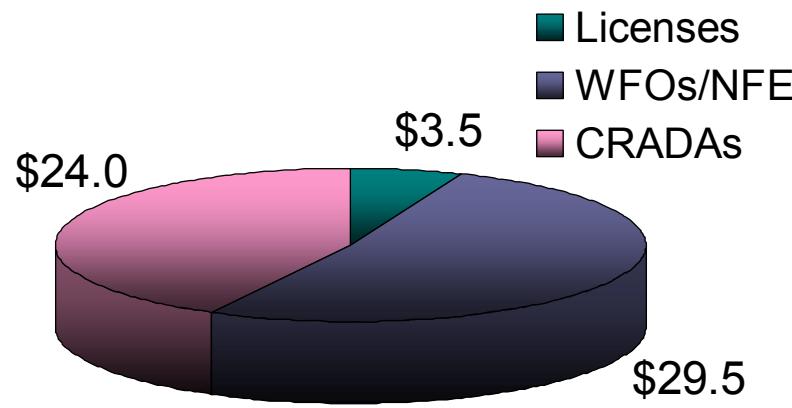
Today 100% of the tire molds designed in Goodyear are modeled before being ordered.

Sandia gains additional verification, reliability, & validation of our computational tools.



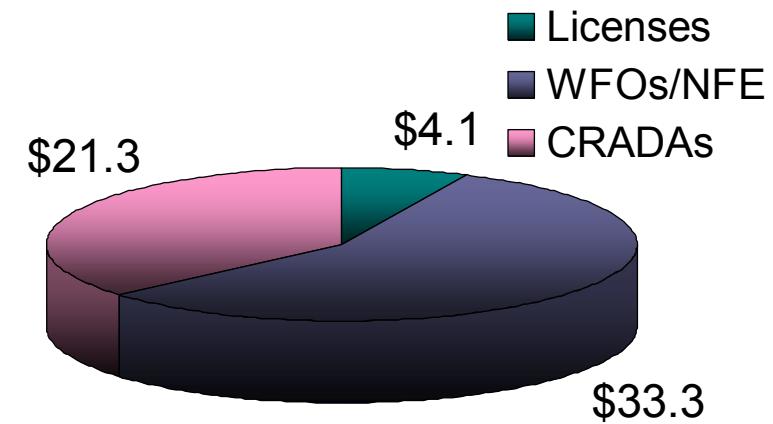
Industry revenue has been relatively stable

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



FY06 Total \$57.0 Million

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

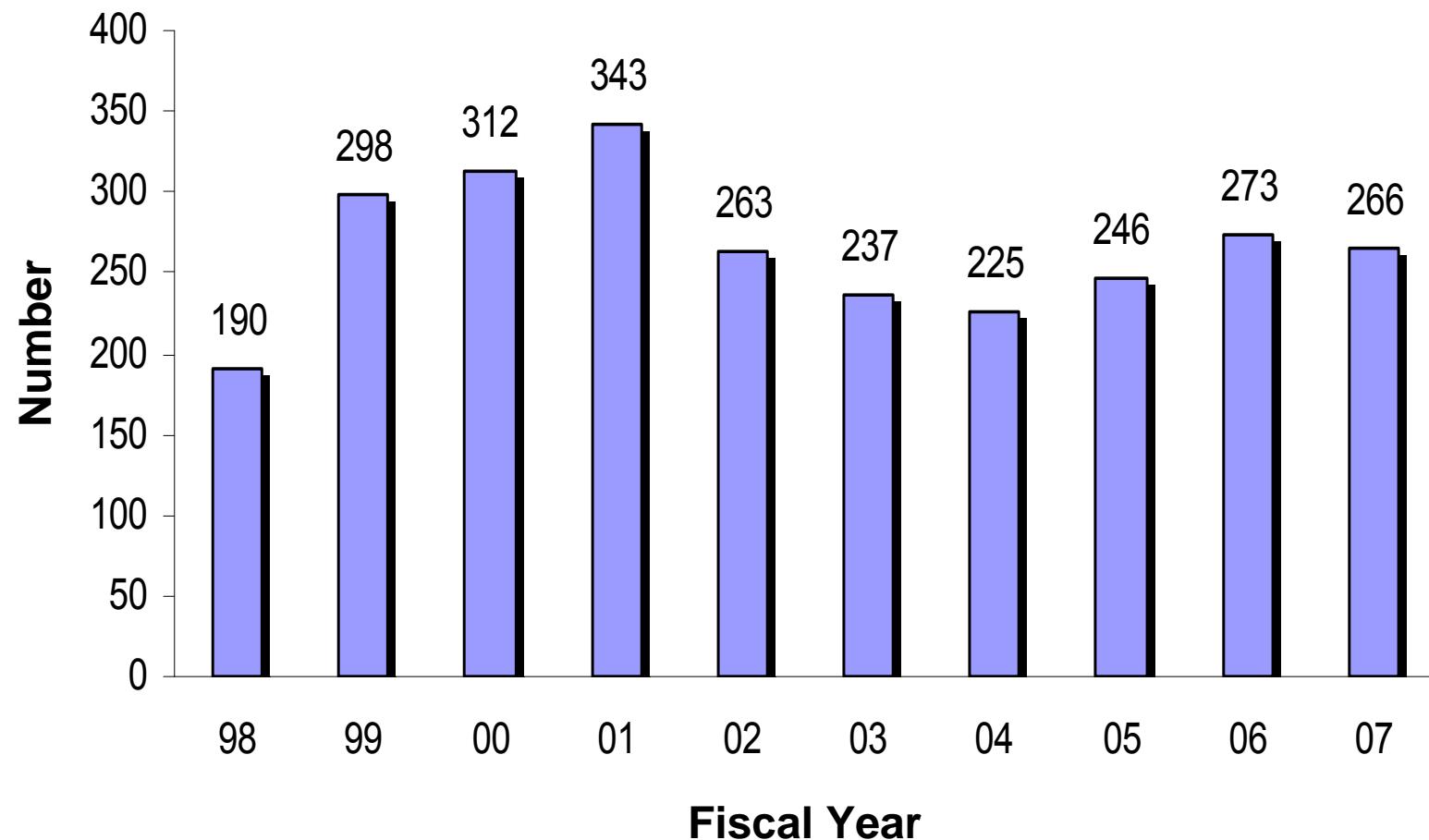


FY07 Total \$58.7 Million



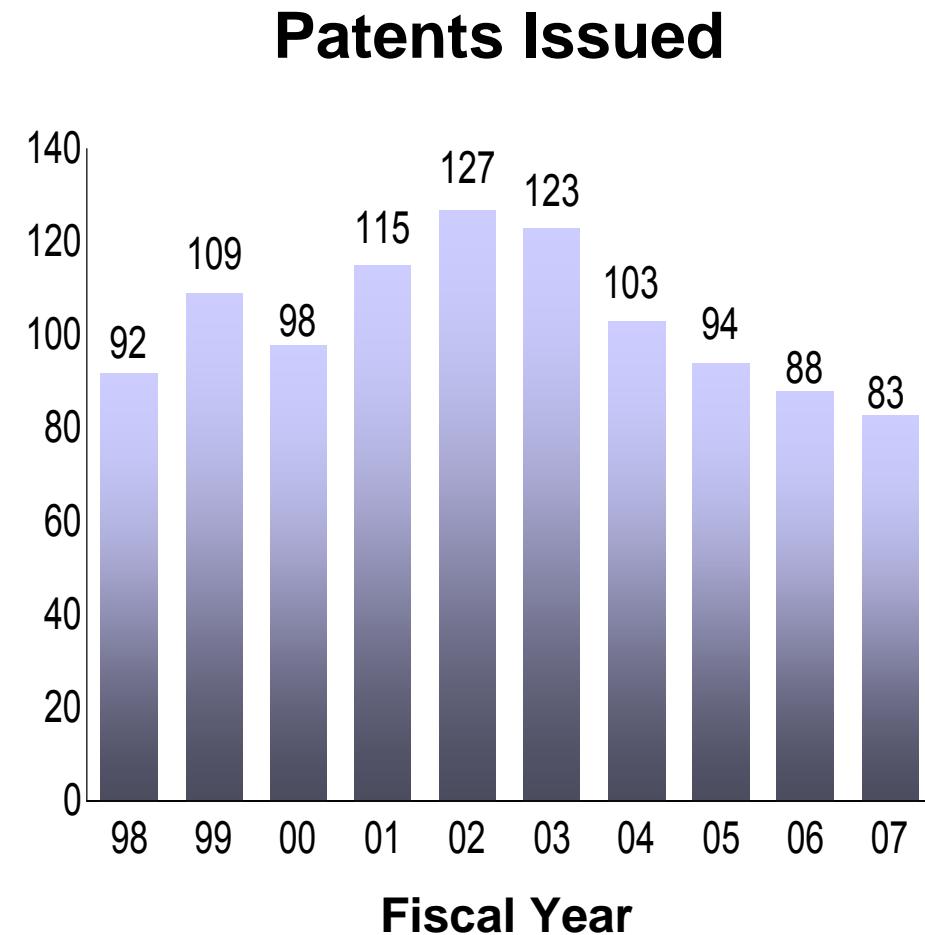
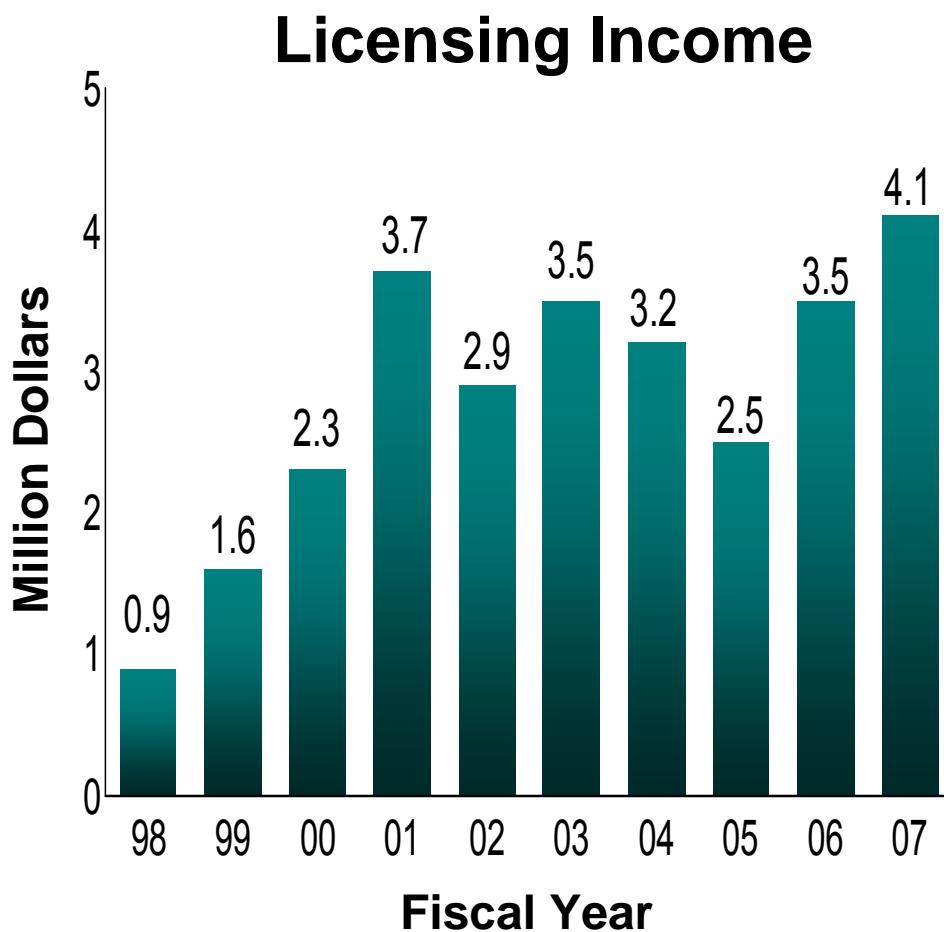
Industry Partnership History

Sandia CRADA and WFO Agreements





Licensing and Patent Trends



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LDRD



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LDRD is the Labs' sole source of discretionary R&D funds for staff-generated, innovative ST&E¹

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

DOE Order 413.2B - Objectives

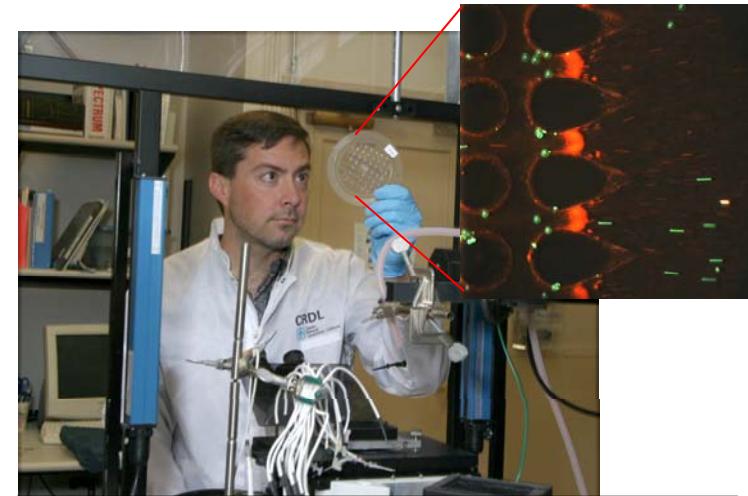
- Maintain the scientific and technical vitality of the laboratories
- Enhance the laboratories' ability to address future DOE/NNSA missions
- Foster creativity and stimulate exploration of forefront S&T
- Serve as a proving ground for new concepts in R&D
- Support high-risk, potentially high-value R&D

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

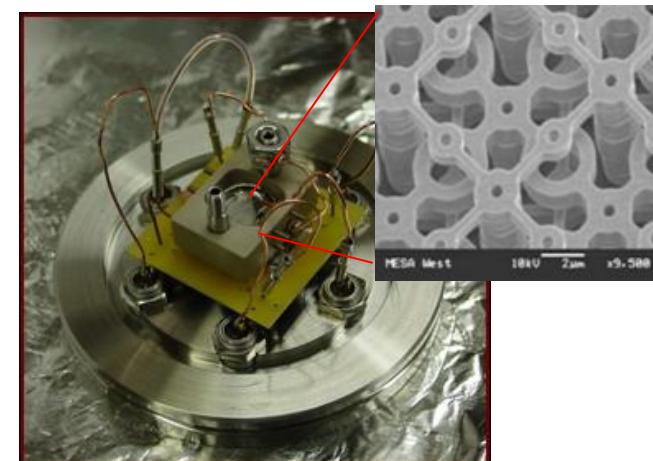


LDRD is essential for the future of Sandia

- **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

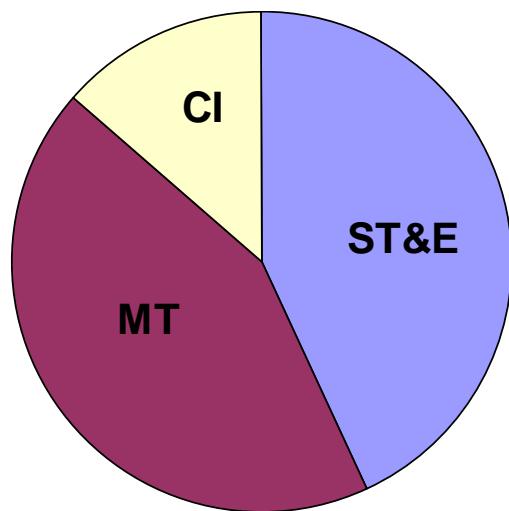


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LDRD has three strategic investment categories

**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



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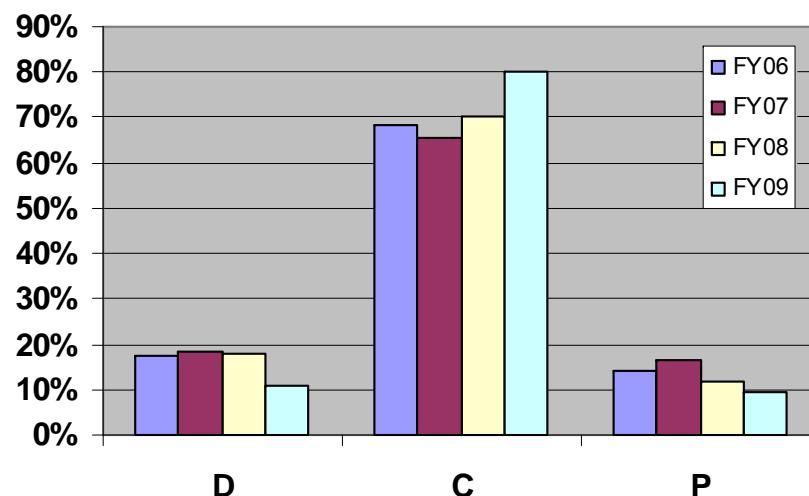
LDRD spans research to application

Discover new understanding or knowledge (use-inspired research)

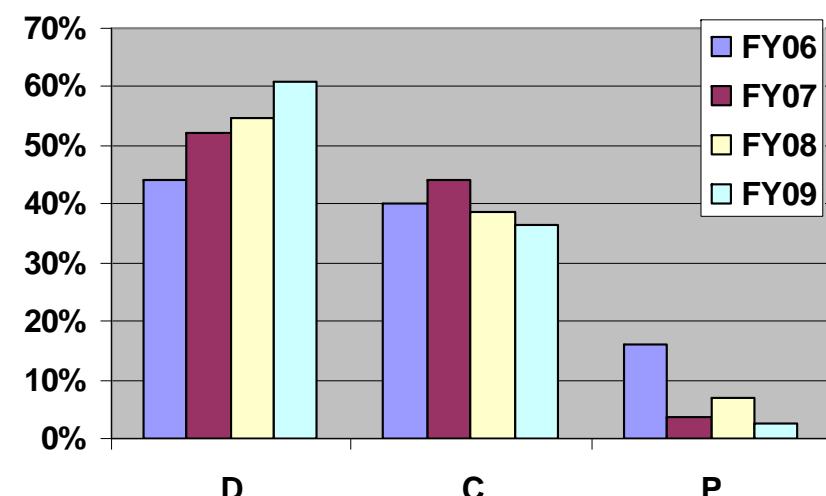
Create novel solutions or revolutionary advances by applying or combining knowledge (use-driven research and development)

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

MT



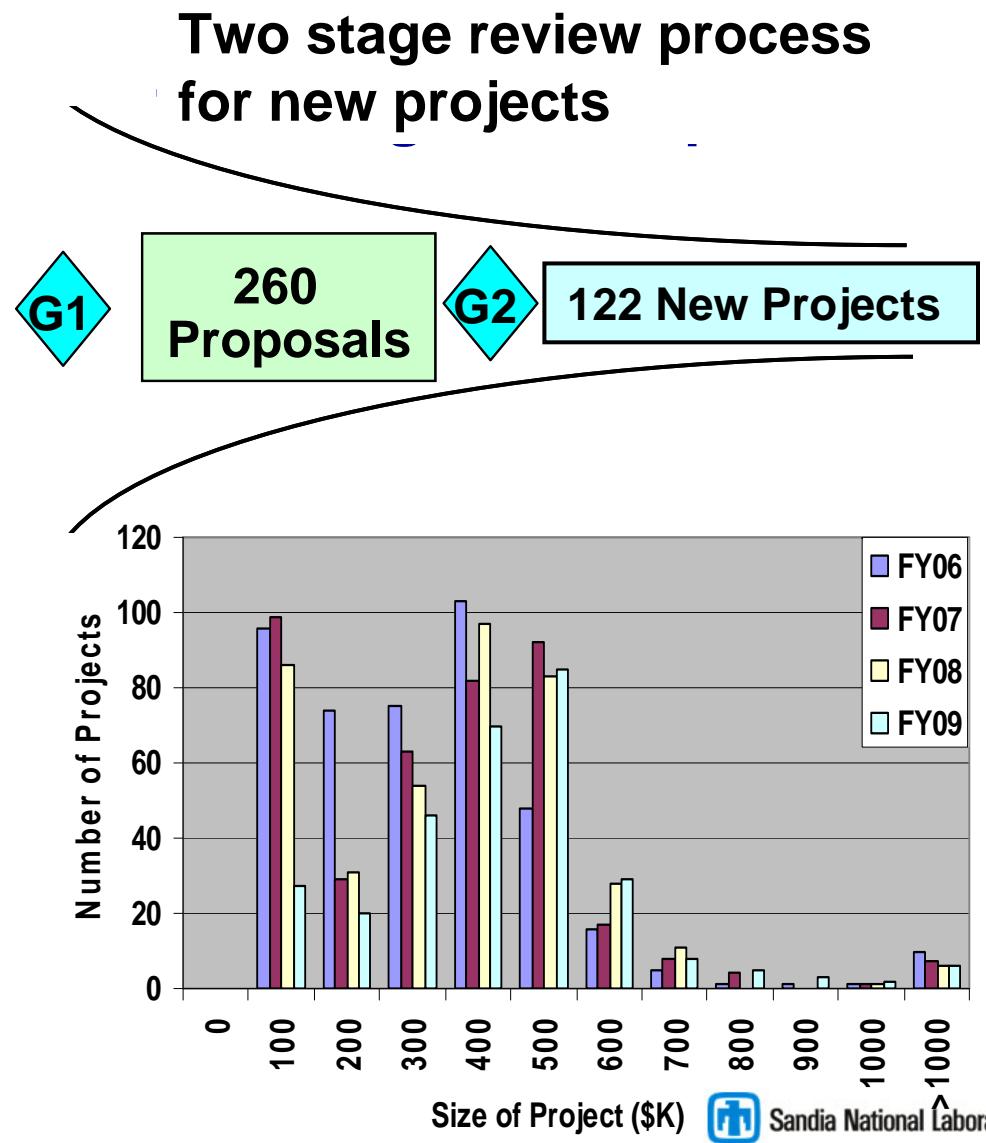
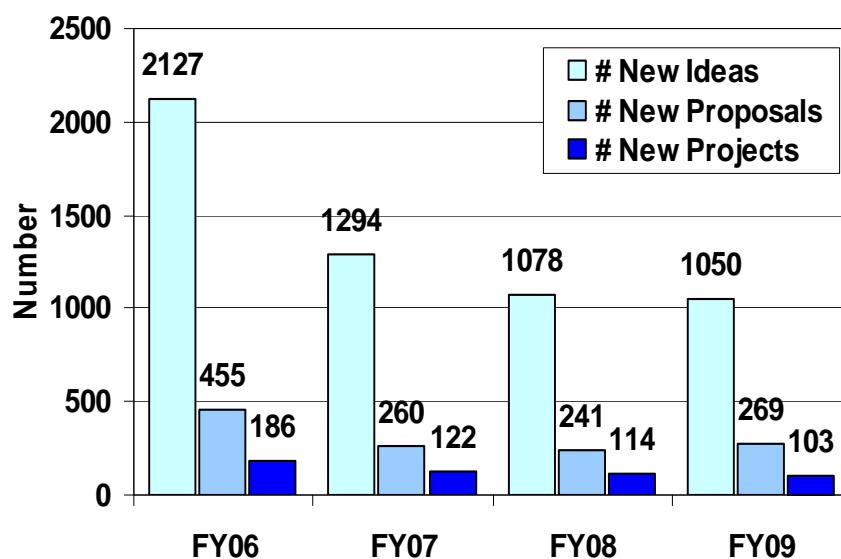
STE



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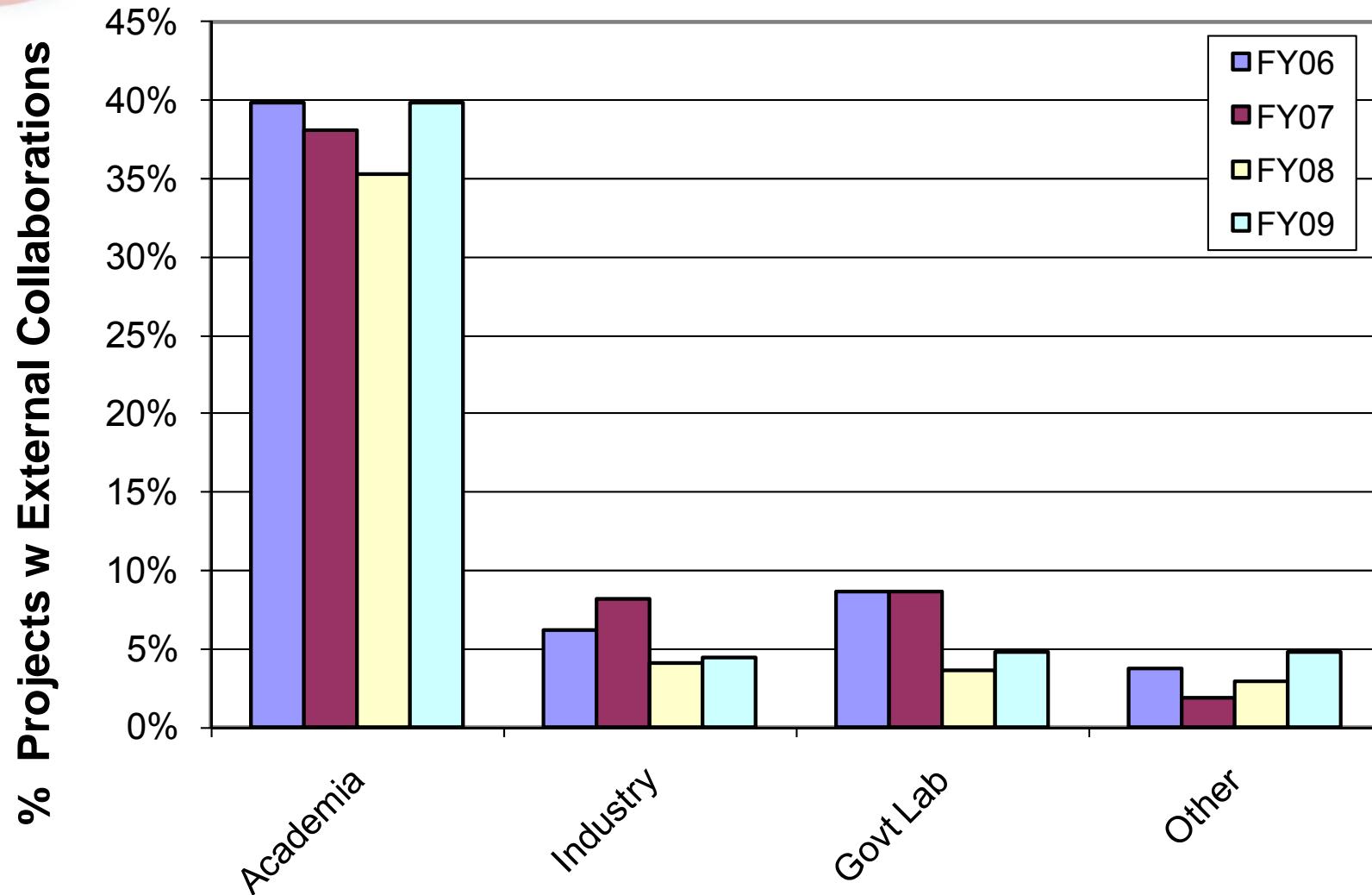


LDRD project selection is a two stage, bottom-up and top-down process





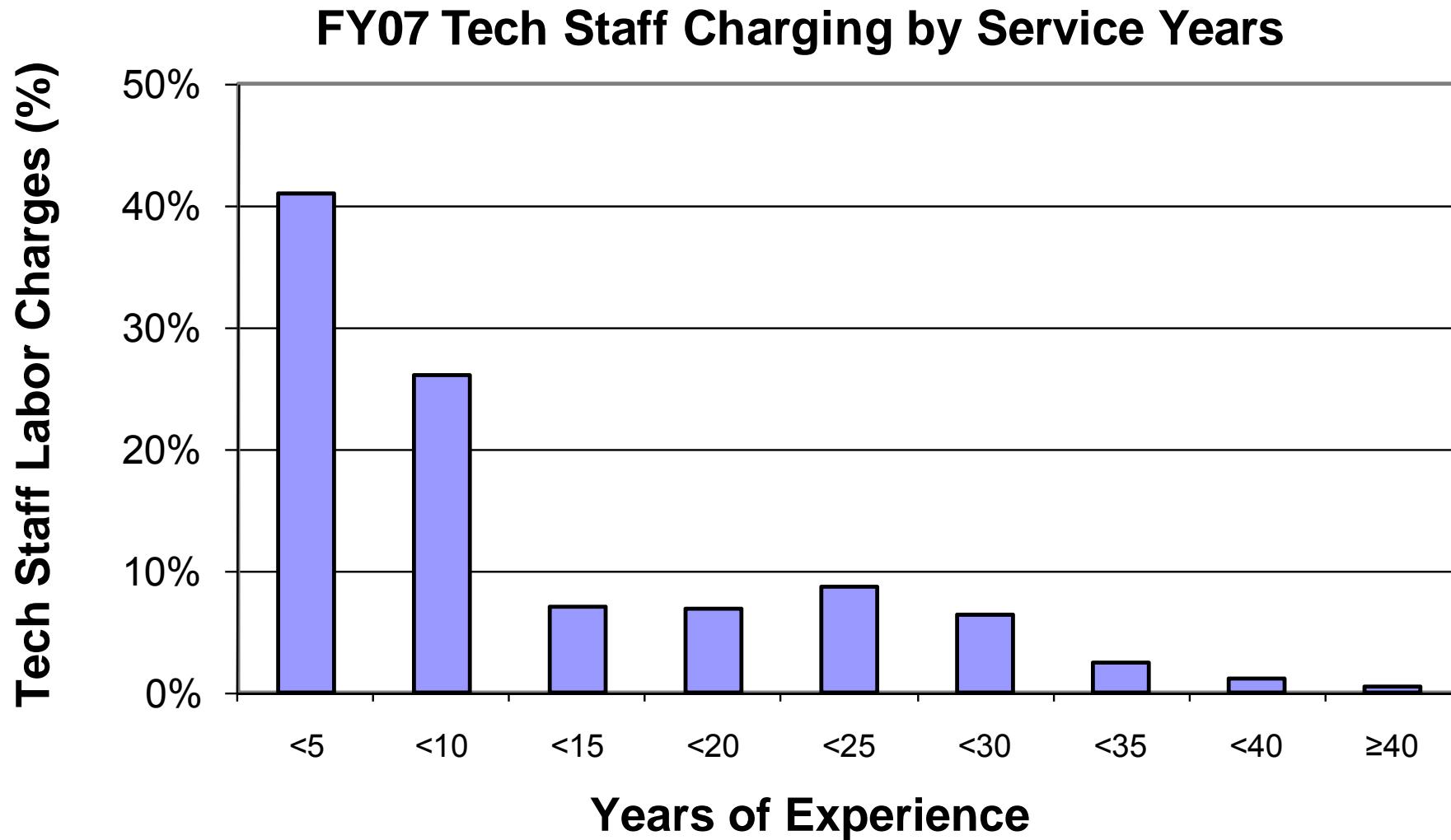
Most LDRD projects collaborate externally



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



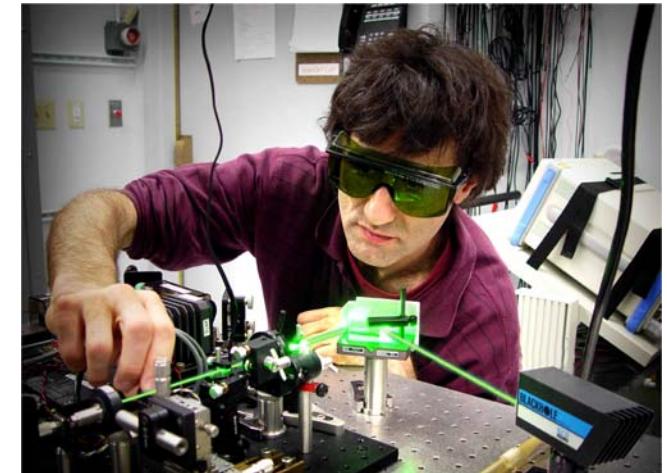
LDRD supports many early career staff





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.



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