

*Exceptional service in the national interest*



# Sandia National Laboratories

A vibrant multimission engineering national laboratory

Jill Hruby, Laboratories Director

August 12, 2016



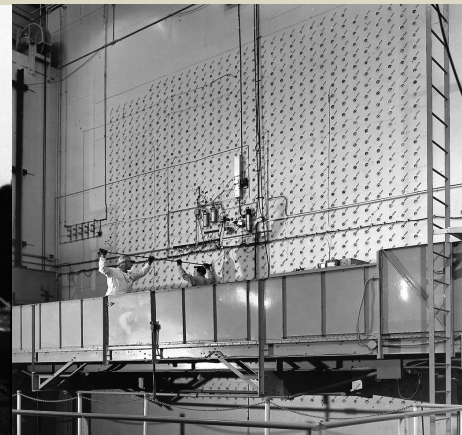
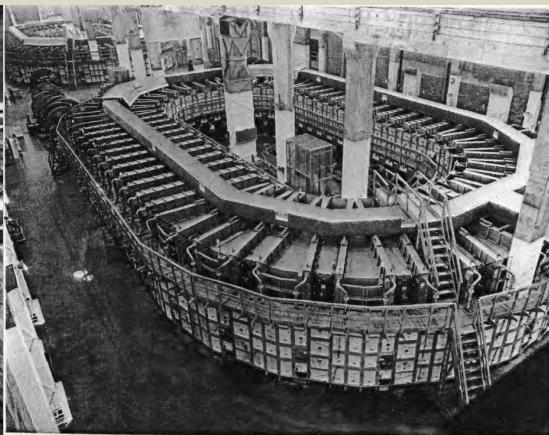
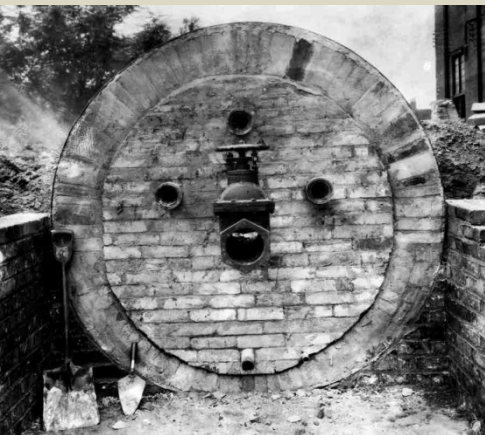
Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

A vibrant  
multimission  
engineering  
*national laboratory*

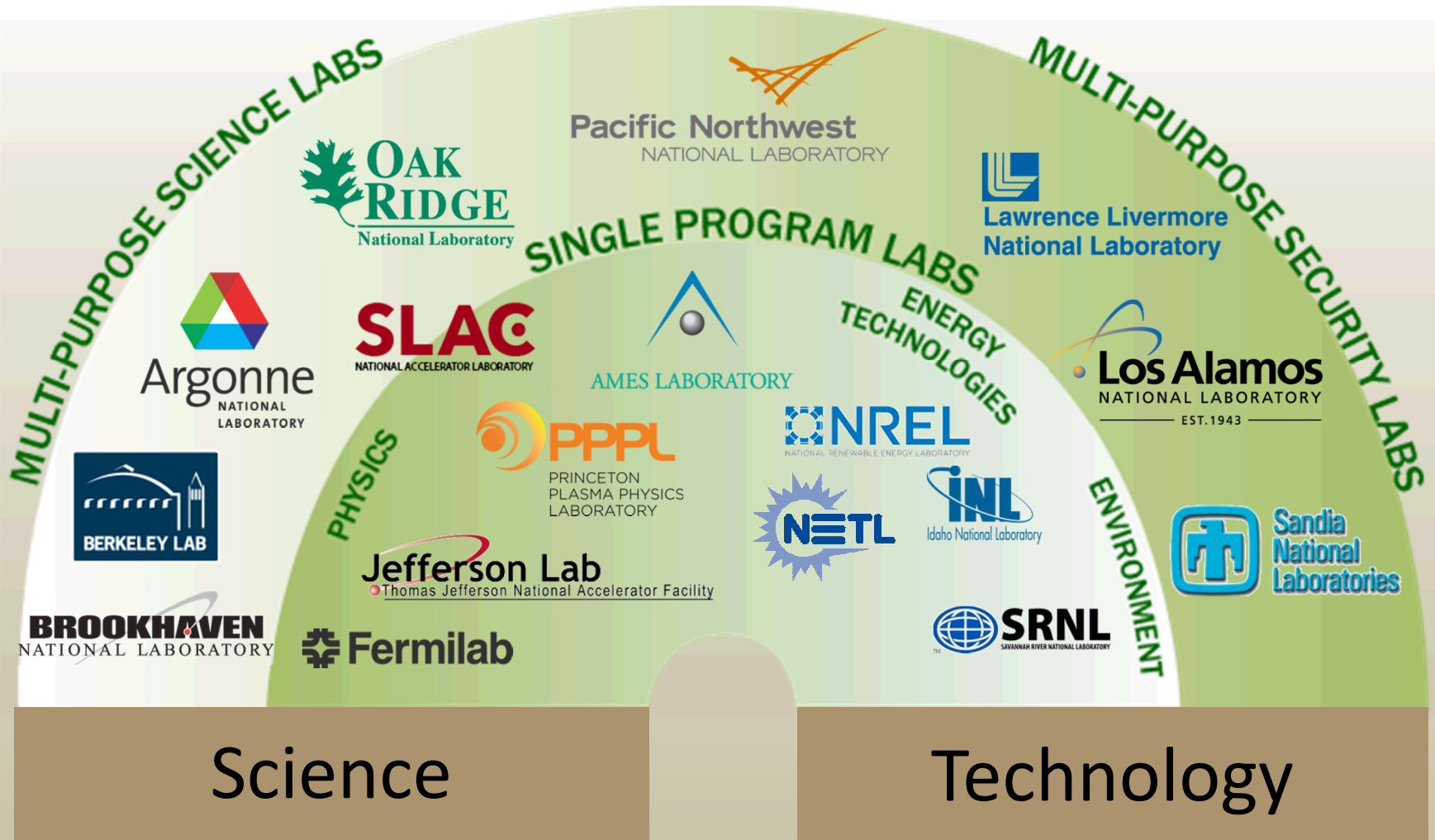


# History of the national labs

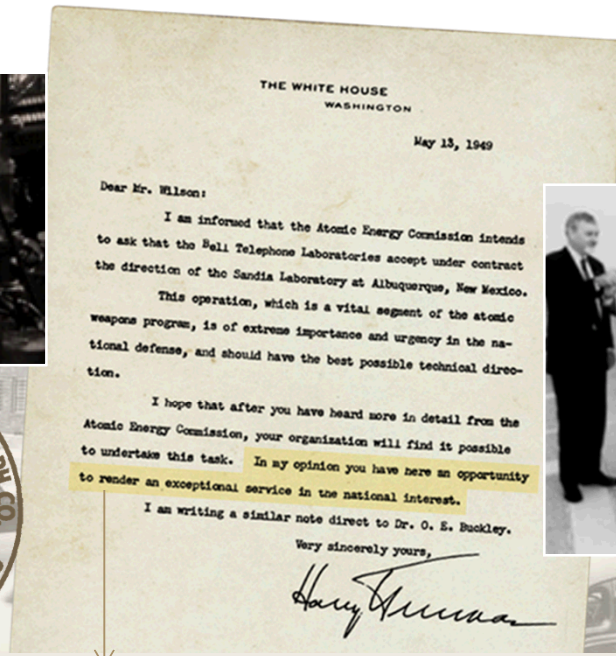
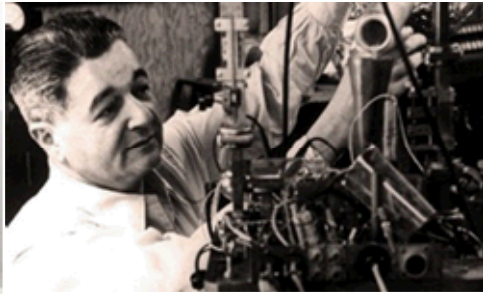
- Government investment in scientific research
  - Started before World War II
  - Increased during the Manhattan Project and later
- National labs established as federally funded partnerships (FFRDC, GOCO)
- Structured as a system promoting both collaboration and competition
  - Science and engineering solutions for national priorities
  - Worldwide scientific impact



# The U.S. Department of Energy executes its missions through diverse national labs



# Sandia: Nearly seven decades of service

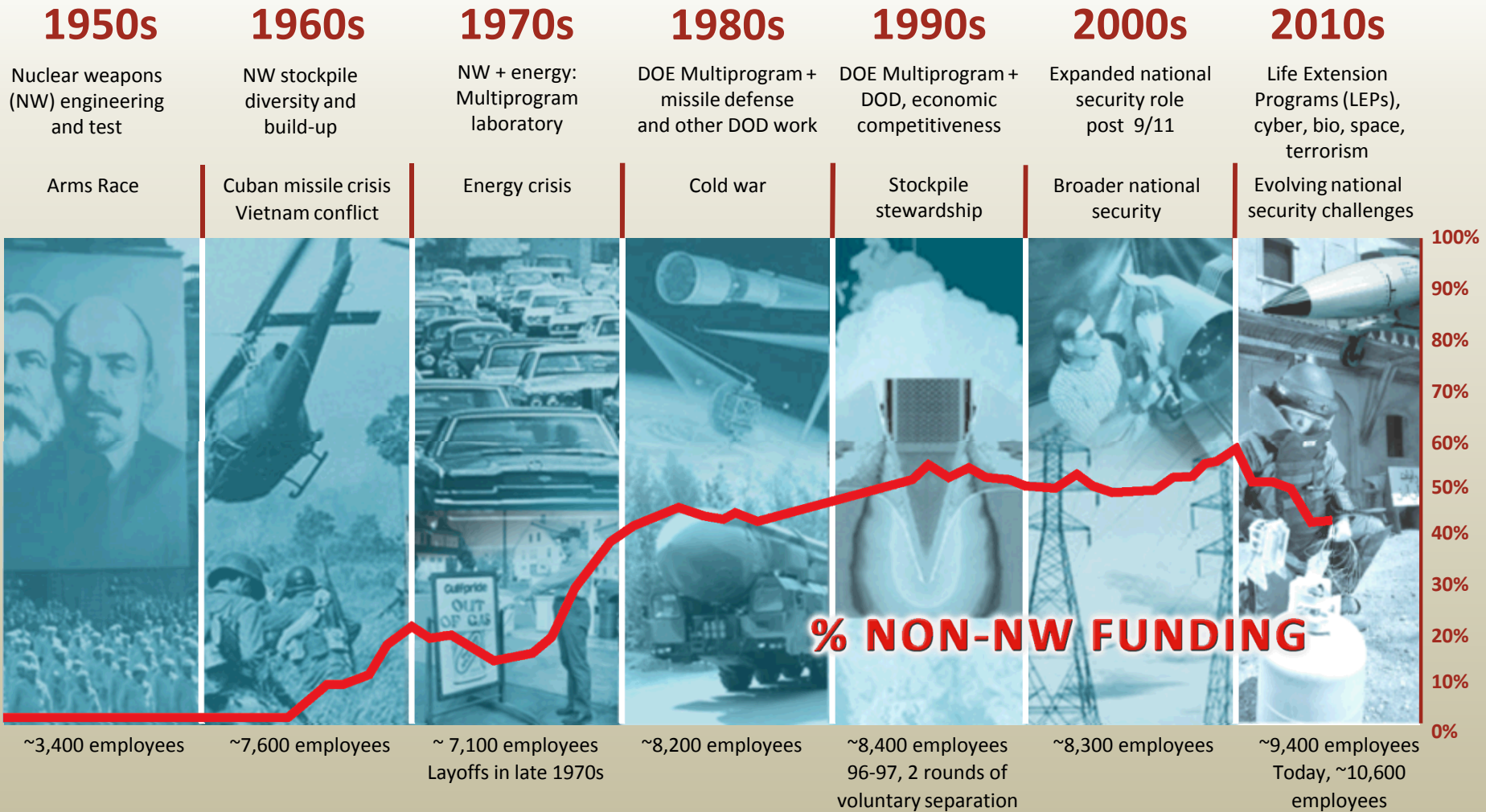


In my opinion you have here an opportunity to render an exceptional service in the national interest.

## Significant dates

- **July 1945:** Los Alamos creates Z Division at Sandia Base
- **November 1, 1949:** Sandia Laboratory is established and managed by AT&T
- **March 8, 1956:** Sandia's California site is established
- **July 26, 1993:** Martin Marietta wins first Sandia Corporation contract competition
- **April 30, 2017:** The current Lockheed Martin contract is due to expire

# Sandia's mission work has evolved to meet national security challenges



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What does it mean to be an engineering lab and what role do we play in national security?

- **First priority:** Deliver a safe, reliable, secure, and efficient stockpile
- Engineering evolves rapidly in the public and private sectors worldwide
- We continue being involved with the national and international engineering community



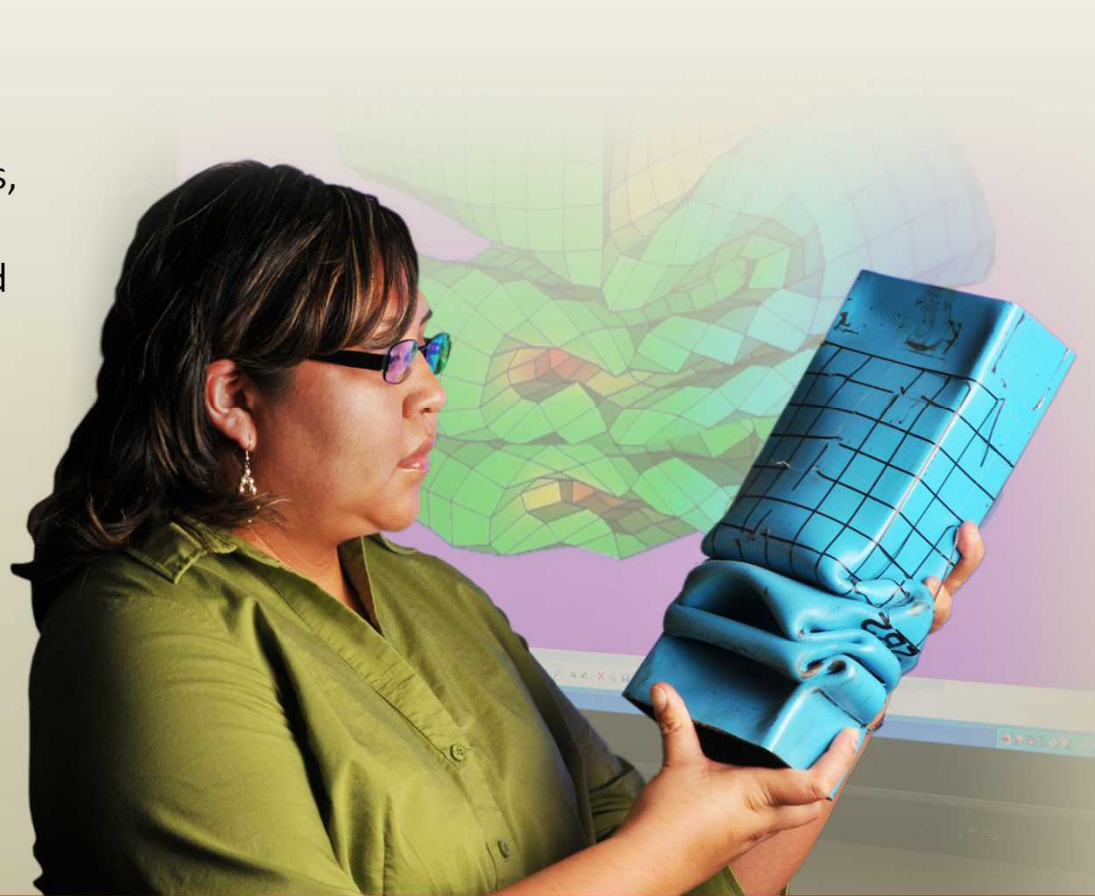
## Our people are at the heart of our work

- The most qualified staff are key to the mission
- They interact with the engineering community worldwide
- They apply the knowledge acquired to our national security mission



## Partnerships with universities and industry are essential to our business model

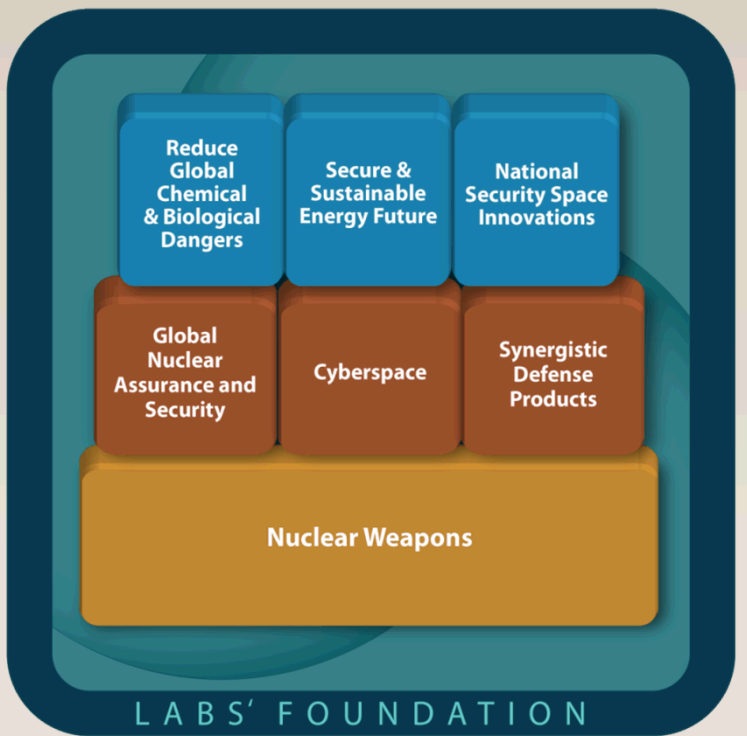
- The Academic Alliance Program formalizes long-term Sandia's collaborations with the University of New Mexico, University of Texas, University of Illinois at Urbana-Champaign, Purdue University, and Georgia Tech
- In the 1990s, when technology transfer became a part of our mission, a CRADA approach was established
- Partnerships stimulate our engineering excellence and prepare us for future challenges



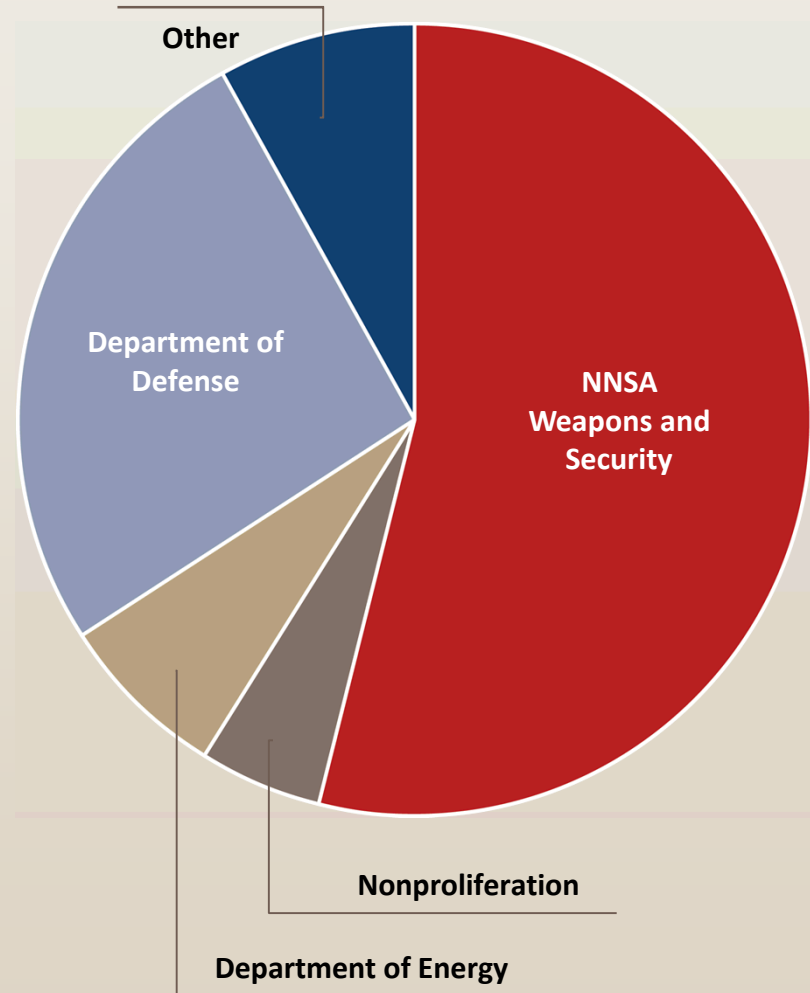
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# Mission area framework and funding

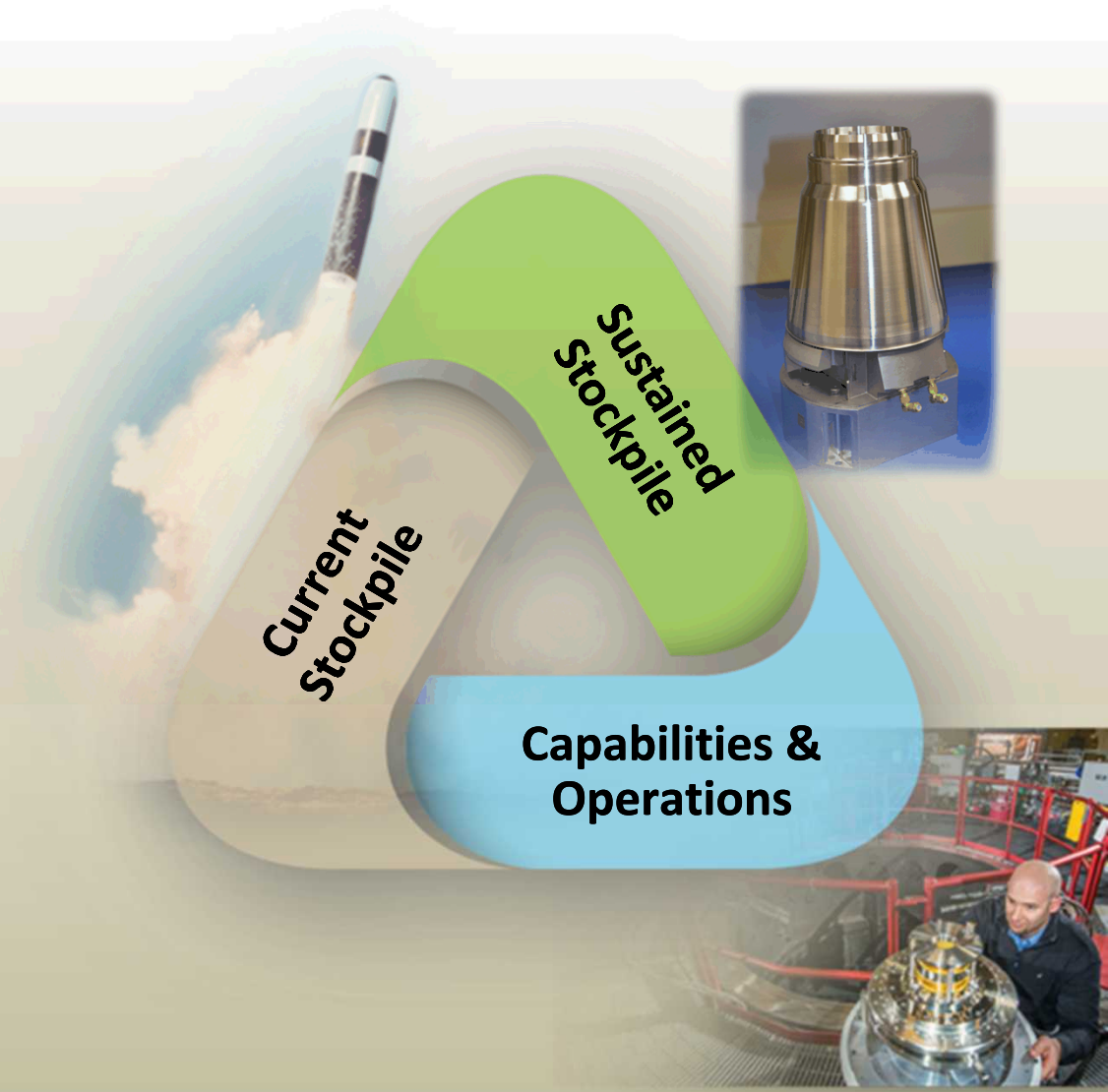


FY 2015 Total Budget: \$2.8 billion



# Our nuclear weapons mission

- Maintain the current U.S. nuclear weapons stockpile
- Sustain the stockpile into the future
- Steward the long-term vitality of our capabilities, infrastructure and operations



# Experience in nuclear weapons enables our significant contributions to nonproliferation efforts

**Nuclear Security**

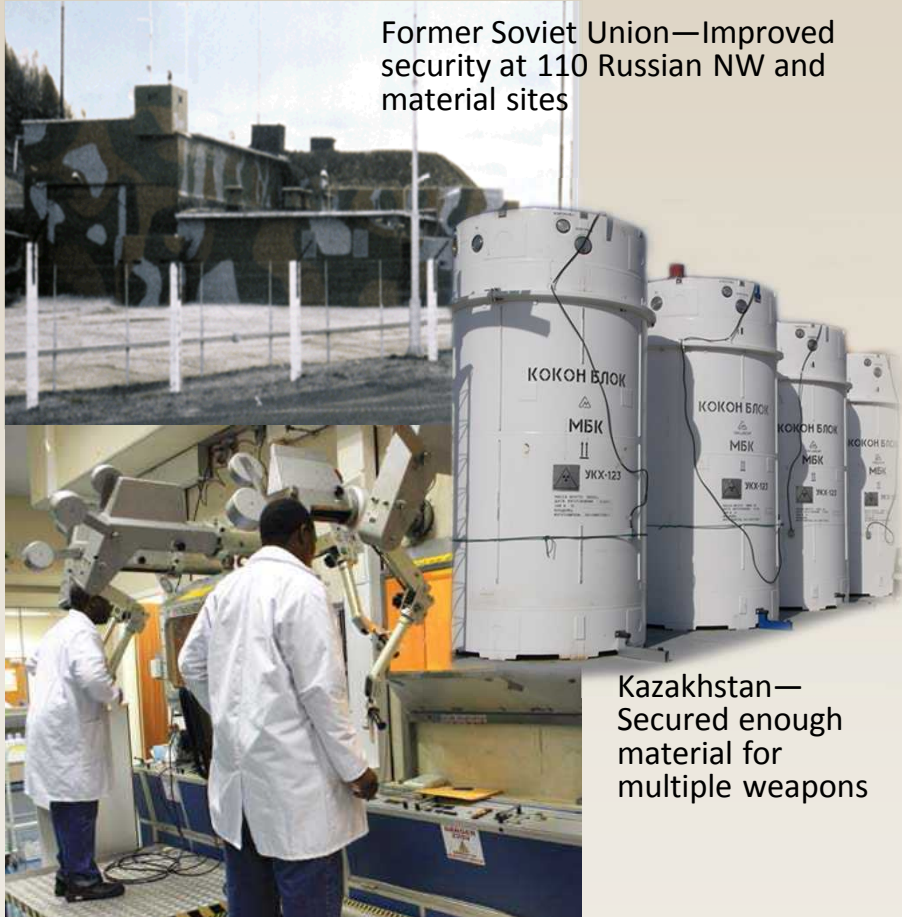
**Arms Control Treaties  
and Agreements**



**International Threat Reduction**

# Our nuclear security expertise enables us to help reduce international threats

For over 25 years, Sandia has supported securing weapons-grade materials



Former Soviet Union—Improved security at 110 Russian NW and material sites

Kazakhstan—Secured enough material for multiple weapons

South Africa—Physical security for quarter-ton of HEU

We also support securing civilian source material around the world



Egypt

South America

# We seek a safe, secure world through global technical engagement



## International Atomic Energy Agency

- We have worked with IAEA departments of Safeguards, Nuclear Energy, and Nuclear Safety and Security since the 1970s
- Sandia conducts the main IAEA course in Physical Protection of Nuclear Materials and Nuclear Facilities

## Comprehensive Nuclear-Test-Ban Treaty Organization

- Sandia supports the CTBTO's data center computing infrastructure, new seismic monitoring approaches, international exercises



CTBTO  
PREPARATORY COMMISSION



# We have a growing portfolio of projects dedicated to the responsible expansion of civilian nuclear power

Systems engineering, education, and training in nuclear power safeguards and security

- Physical and cyber
- Regulatory framework
- Response requirements
- Waste disposition

Physical protection systems



Gulf Nuclear Energy Infrastructure Institute (GNEII),  
United Arab Emirates



China Center of Excellence

# Sandia addresses energy challenges

## 1970s

NW + energy:  
Multiprogram laboratory

Energy crisis

## 1980s

DOE Multiprogram +  
missile defense and other  
DOD work

Cold war

## 1990s

DOE Multiprogram + DOD,  
economic competitiveness

Stockpile stewardship

## 2000s

Expanded national  
security role post 9/11

Broader national  
security

## 2010s

LEPs  
Cyber, bio, space, terrorism

Evolving national security  
challenges

- Solar
- Nuclear
- Fossil
- Wind
- Combustion
- Nuclear waste



- Atmospheric monitoring
  - Water & energy
    - Grid
    - Biomass
    - Energy cyber

# Differentiating facilities that support our energy program

National Solar Thermal Test Facility



Atmospheric Radiation Measurement (ARM) Facility

*Oliktok Point, on the northern coast of Alaska*



Joint BioEnergy Institute



Center for Integrated Nanotechnologies



Combustion Research Facility

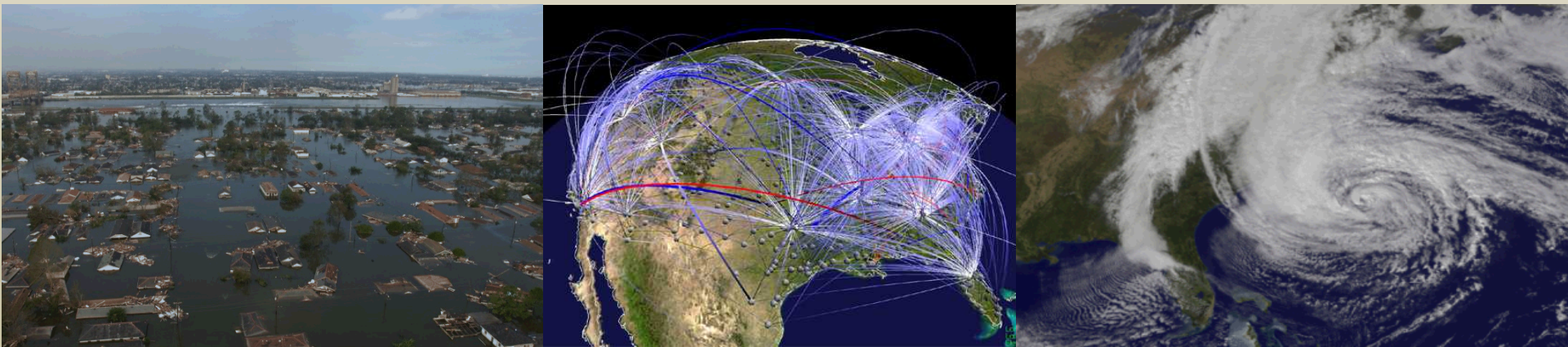


Scaled Wind Farm Technology



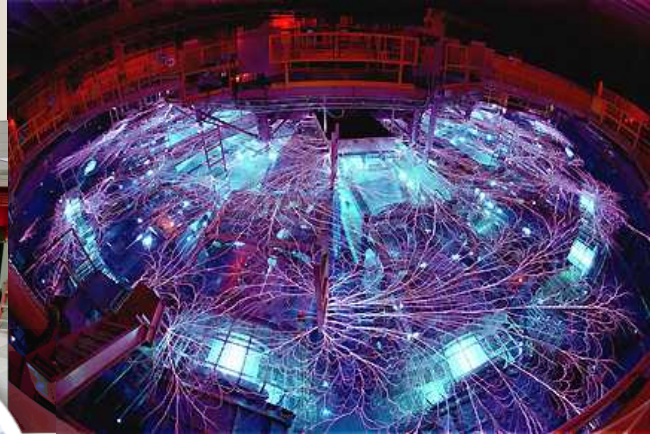
# Helping cities become more resilient to physical, social, and economic challenges

- Leverages Sandia's expertise in resiliency science and infrastructure analysis to help city planners understand the impacts of resilience investments in order to develop budget priorities
- In collaboration with the Rockefeller Foundation, Sandia's Resilient Cities work includes:
  - Analysis of the effects of rising sea levels in Norfolk, Virginia
  - Disaster response analysis for the American Red Cross in Los Angeles, California
  - Grid Modernization Laboratory Consortium (GMLC) work begun in New Orleans, Louisiana



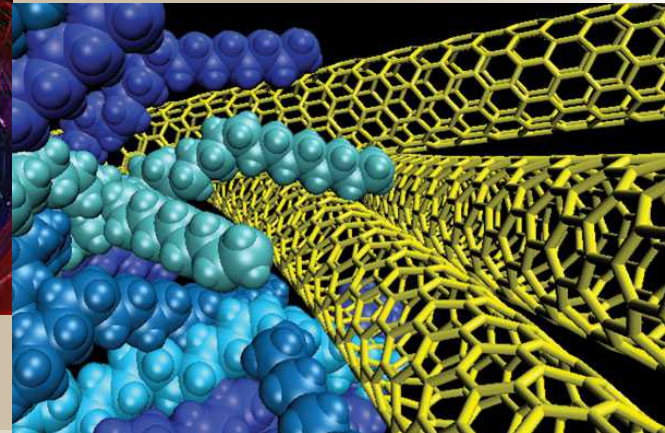
# Our research foundation supports our missions

Computing &  
Information Sciences

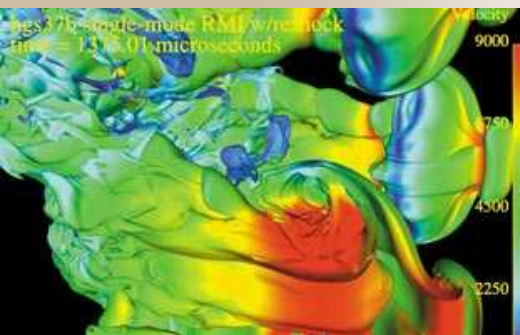


Radiation Effects &  
High Energy Density Science

Materials Sciences

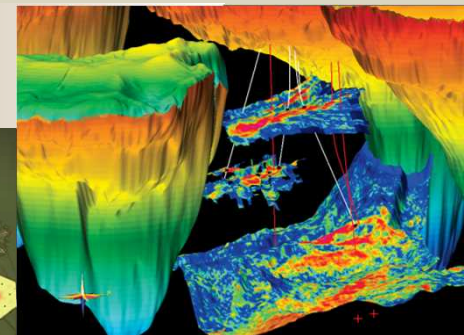
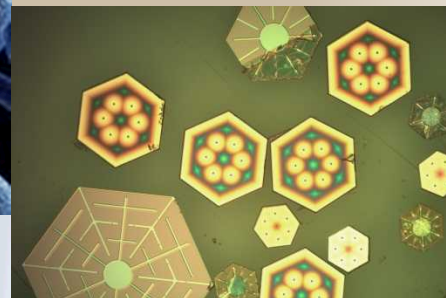


Engineering Sciences



Bioscience

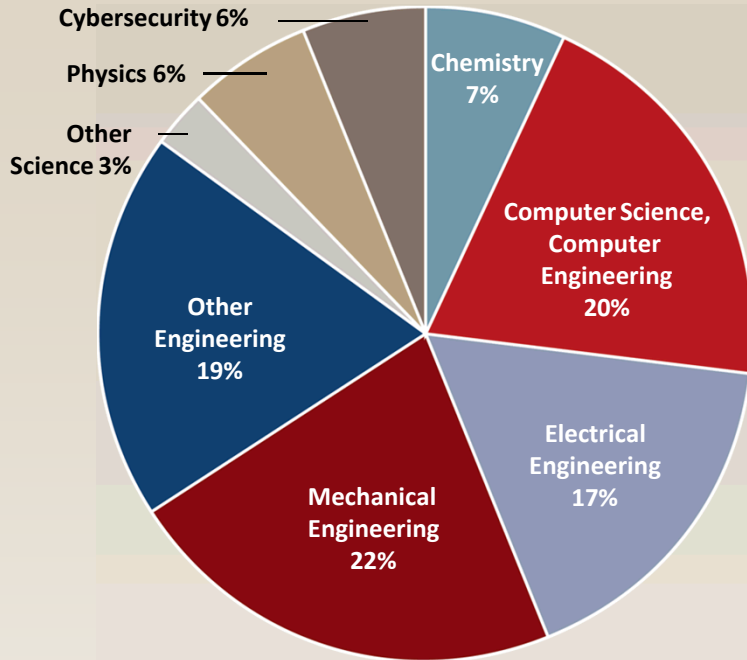
Nanodevices &  
Microsystems



Geoscience

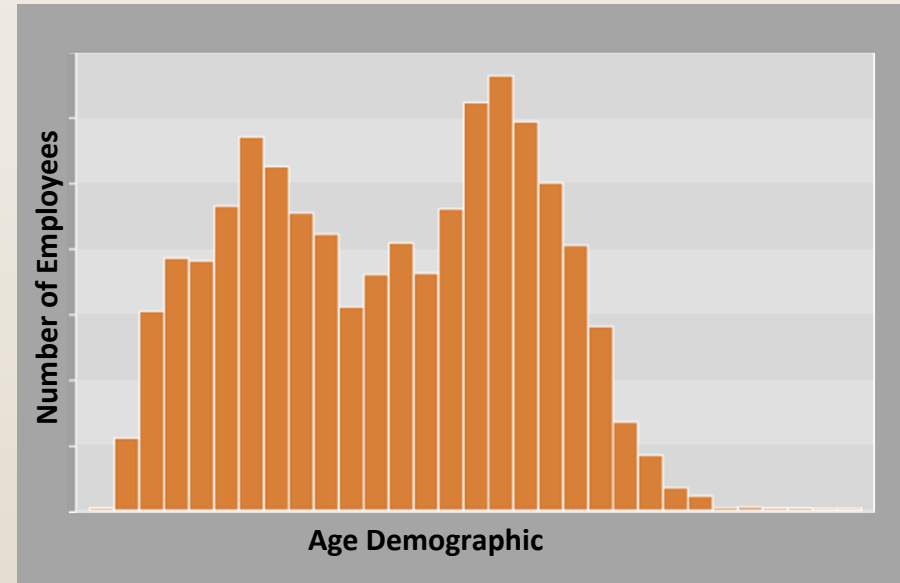
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## R&D Staff (~4160)

- Onsite workforce: ~11,600
- Regular employees: ~10,600



## Today's demographic makeup

- 33% of the R&D staff hired since FY10 holds PhD degrees
- ~3,300 with less than 5 years of service
- 363 of the 1,969 people hired in FY15 graduated from a New Mexico university

# Technology transfer: Sandia's publicly funded R&D results deployed for the U.S. public good

- 38% increase in commercial licenses from FY14 to FY15; an increase of 130% in commercial licenses since FY12
- 360 small businesses in New Mexico received over \$4.7M of assistance from Sandia and Los Alamos national laboratories in 2015
- 7 small businesses were selected to partner with Sandia to improve renewable energy technology and advanced manufacturing as part of the DOE EERE Small Business Voucher pilot program
- 3 technology showcases that highlighted 19 different Sandia technologies available for licensing and commercialization were hosted by Sandia in FY15

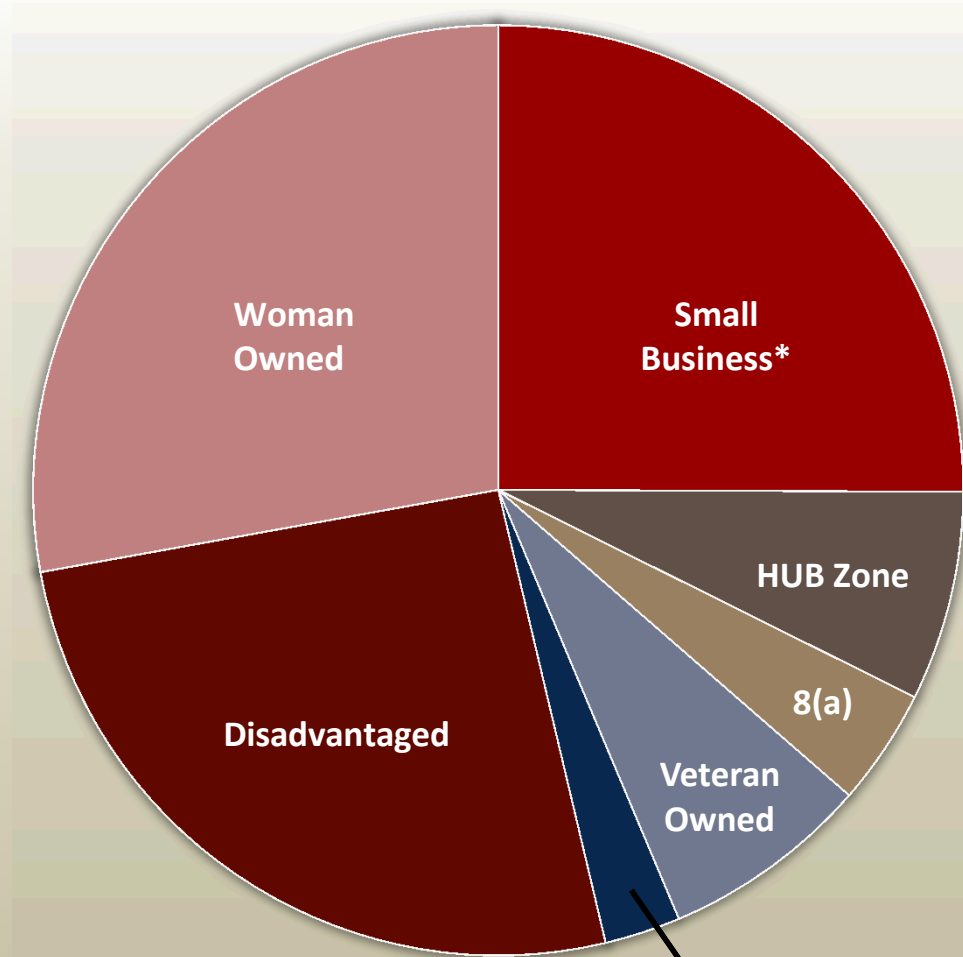


Sandia technology used in developing the BaDx anthrax detector



Assisted with battery software for electric-powered drones

## Contract-related payments to New Mexico small businesses \$258,970,000



*\*Nonminority, nonwoman, nonveteran owned*

**Service Disabled Veteran Owned**

# Making a difference in our communities

- Sandians volunteered over 92,000 hours to local schools and community organizations and contributed more than \$6.9 million to United Way in 2015




I give because it's about giving back.

*Rachel Richmond*

Rachel Richmond  
Manager,  
Export/Import Compliance  
Security

United Way Contributor  
for 13 years



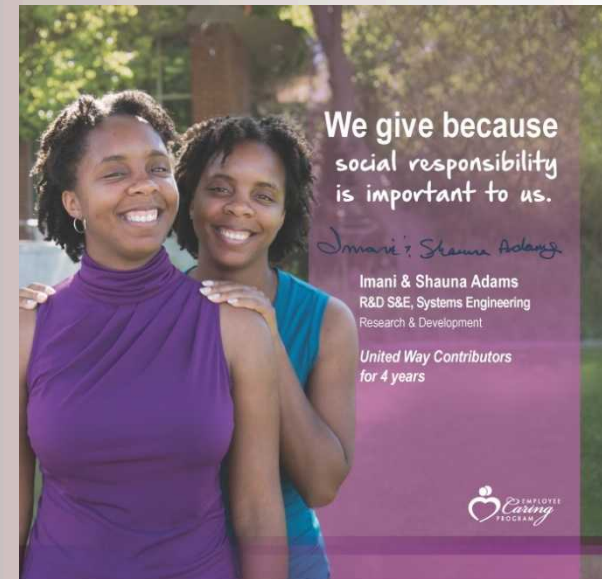
We give because dreams should be within reach.

*DAVID & SARAH BURWELL*

David Burwell  
Business Management  
Professional  
General Business Management

Sarah Burwell  
Project Controller  
Project Management

United Way Contributors  
for 4 years




We give because social responsibility is important to us.

*Imani & Shauna Adams*

Imani & Shauna Adams  
R&D S&E, Systems Engineering  
Research & Development

United Way Contributors  
for 4 years



Sandians have different reasons to donate, but we are united in our mission to give.



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*Thank you !*

Q&A

