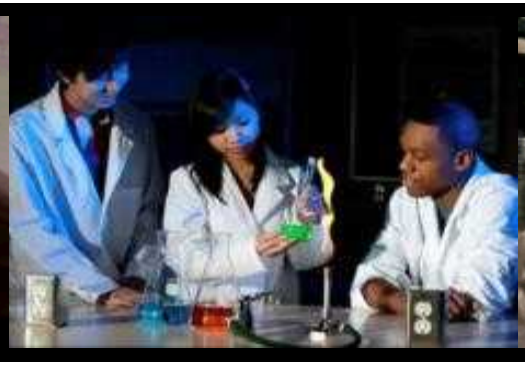
SAND2015-2004PE

Exceptional service in the national interest

Sandia National Laboratories


Sandia National Laboratories

Mission Overview

Paul Hommert, President and Laboratories Director

March 26, 2015

U.S. DEPARTMENT OF ENERGY | NNSA National Nuclear Security Administration

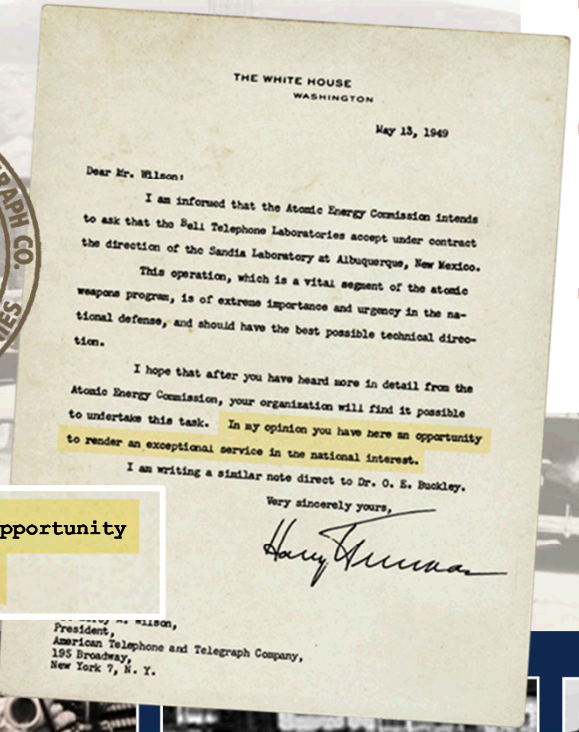
Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Sandia's history

Sandia National Laboratories

Exceptional service in the national interest

- **July 1945:** Los Alamos creates Z Division
- Nonnuclear component engineering
- **November 1, 1949:** Sandia Laboratory established



THE WHITE HOUSE
WASHINGTON

May 13, 1949

Dear Mr. Wilson:

I am informed that the Atomic Energy Commission intends to ask that the Bell Telephone Laboratories accept under contract the direction of the Sandia Laboratory at Albuquerque, New Mexico.

This operation, which is a vital segment of the atomic weapons program, is of extreme importance and urgency in the national defense, and should have the best possible technical direction.

I hope that after you have heard more in detail from the Atomic Energy Commission, your organization will find it possible to undertake this task. In my opinion you have here an opportunity to render an exceptional service in the national interest.

I am writing a similar note direct to Dr. O. E. Buckley.

Very sincerely yours,

Harry Truman

President,
American Telephone and Telegraph Company,
195 Broadway,
New York 7, N. Y.

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

Core essence

- Responsible to ensure the safety and security of nuclear weapons
- Operated as a federally funded research and development center
- Enriched by management and operating entities
- Shaped by the legacy of our Laboratories' pioneers

Sandia's mission work reflects national security challenges

Sandia National Laboratories

1950s	1960s	1970s	1980s	1990s	2000s	2010s
NW production engineering & manufacturing engineering	Development engineering	Multiprogram laboratory	Missile defense work	Post–Cold War transition	Expanded national security role post 9/11	LEPs Cyber, Biosecurity Proliferation
	Vietnam conflict	Energy crisis	Cold War	Stockpile stewardship		Evolving national security challenges

Vision and mission statements

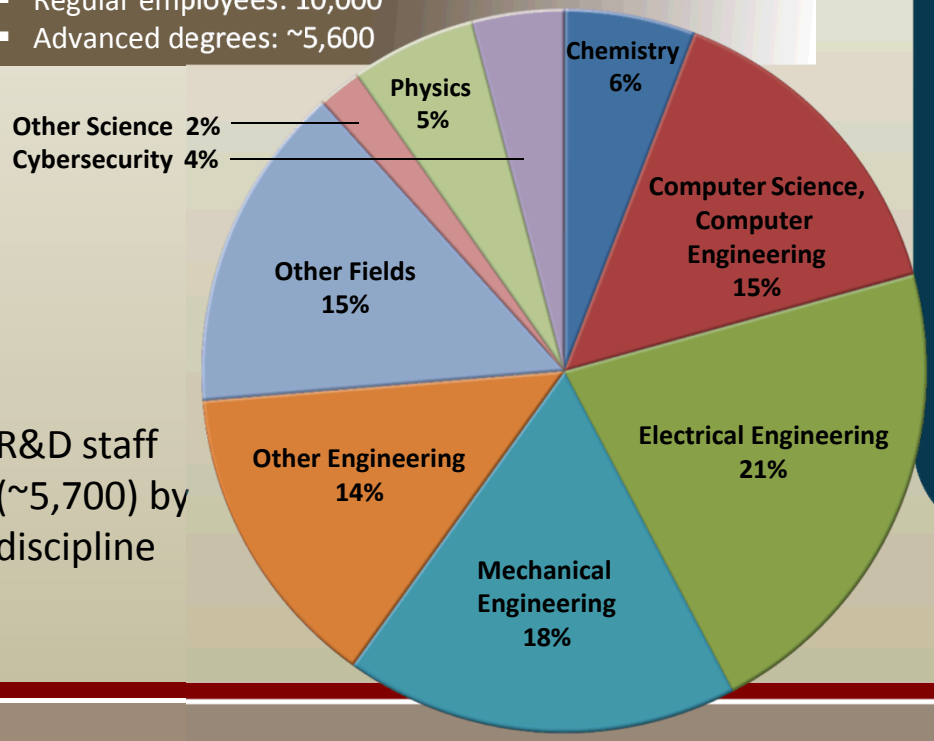
- On behalf of our nation, we anticipate and solve the most challenging problems that threaten security in the 21st century.
- Our unique mission responsibilities in the nuclear weapons program create a foundation from which we leverage capabilities enabling us to solve complex national security problems.

Sandia's people

Exceptional talent

- Highly educated workforce
- Strategically managed workforce of diverse skills and competencies
- Modern business practices and operations in support of our missions

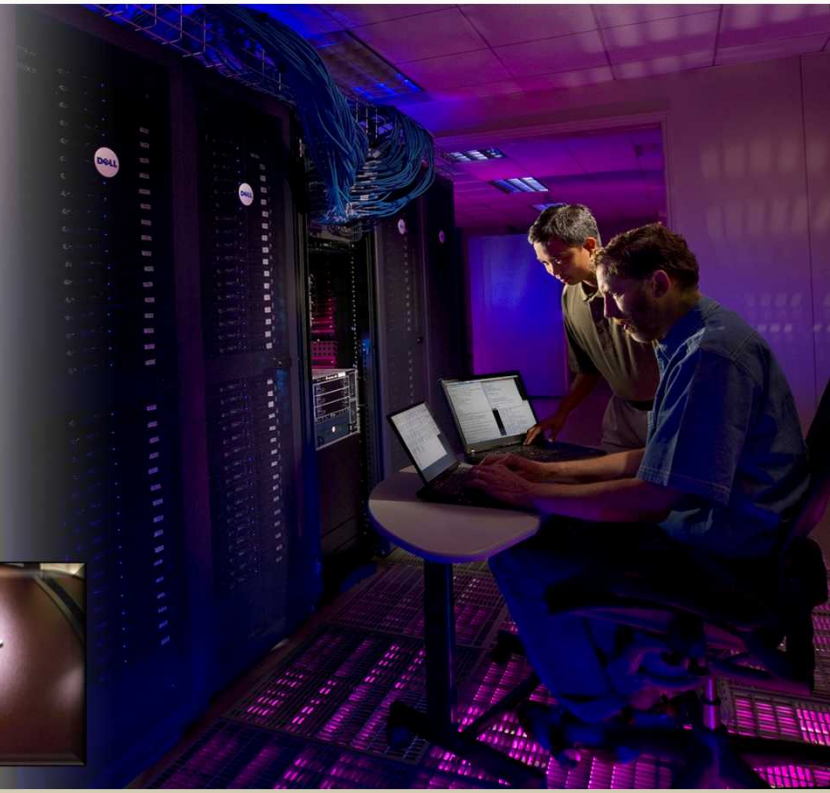
- On-site workforce: 12,000
- Regular employees: 10,000
- Advanced degrees: ~5,600



R&D staff (~5,700) by discipline

Sandia's foundation

In concert, these elements form a solid base supporting our national security missions



Capabilities for solving 21st century national security challenges

- High-reliability engineering
- Sensors and sensing systems
- Cyber technology
- Pathfinders
- Reverse engineering
- Modeling and simulation and experiment
- Natural and engineered materials
- Micro and nano electronics and systems
- Safety, risk, and vulnerability analysis

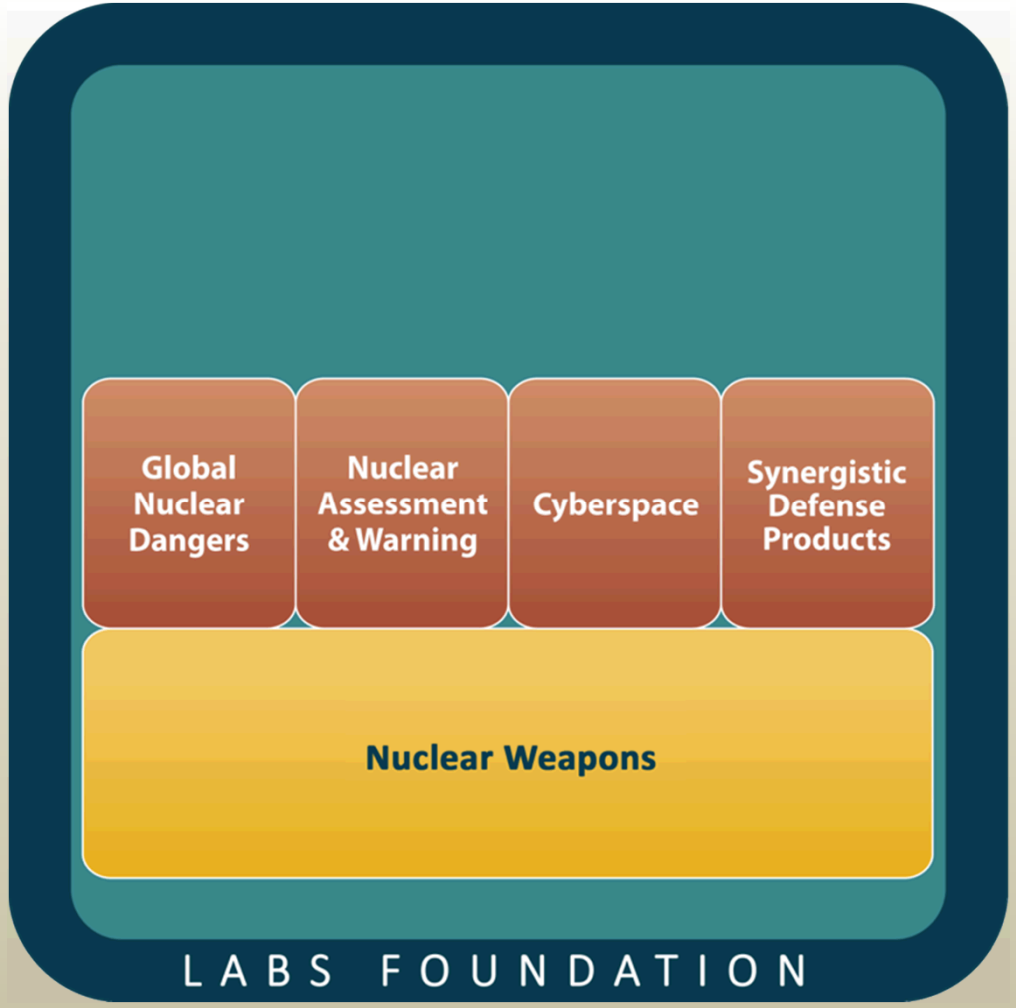
Sandia's nuclear weapons mission

Central to U.S. national security

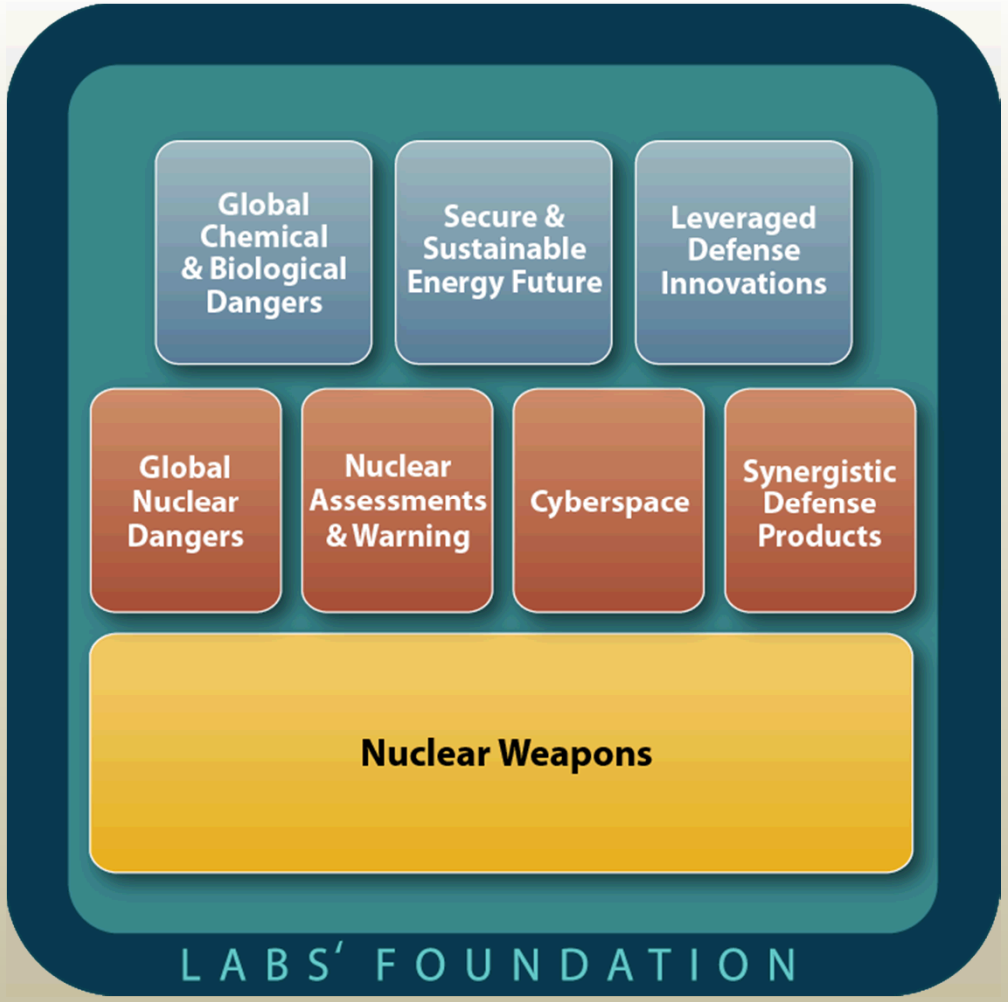
Sandia originated as a single-mission engineering organization for nonnuclear components of nuclear weapons

- 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

Sandia's national security mission areas



Sandia's national security mission areas



Portable anthrax detector (BaDx)

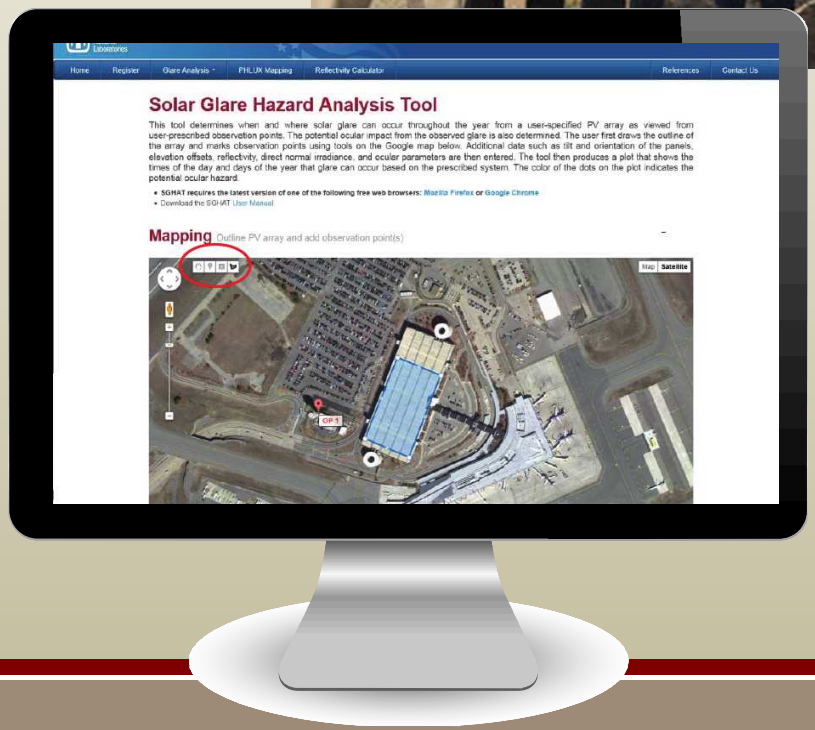
Sandia National Laboratories

- Made for field use
- Works in places with no power or lab equipment
- Requires little training to operate
- Makes testing safer, easier, faster, and cheaper

Credit card-sized BaDx

Analyzing solar glaze hazards

- Free web-based tools predict energy production and the potential for solar glare ocular hazards from solar energy installations
- Used in nearly 40 countries and at dozens of the world's major airports



Ion traps for quantum information sciences

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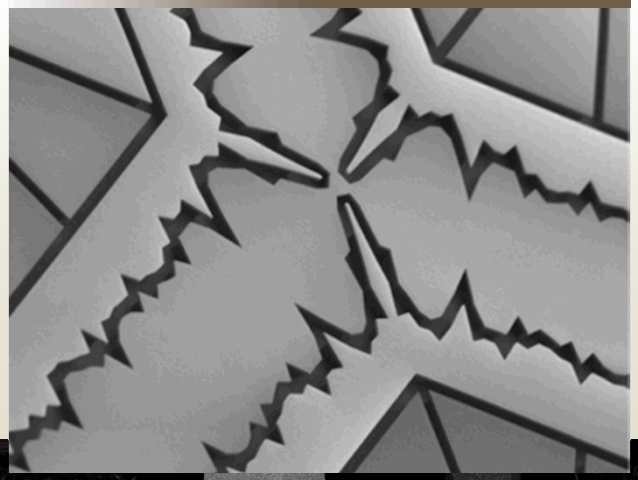
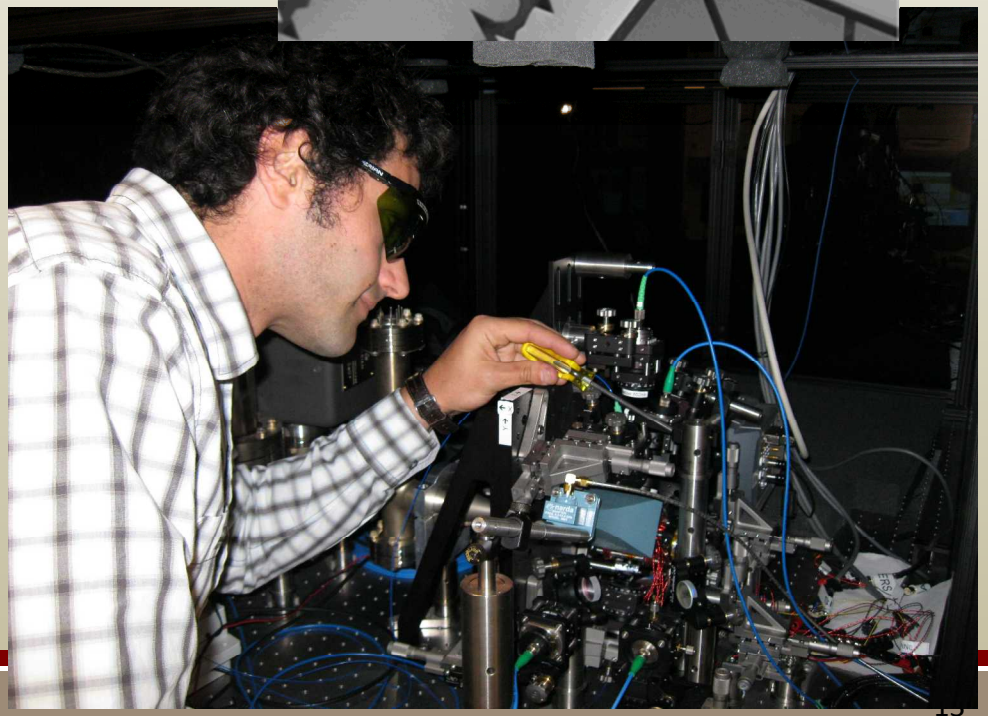
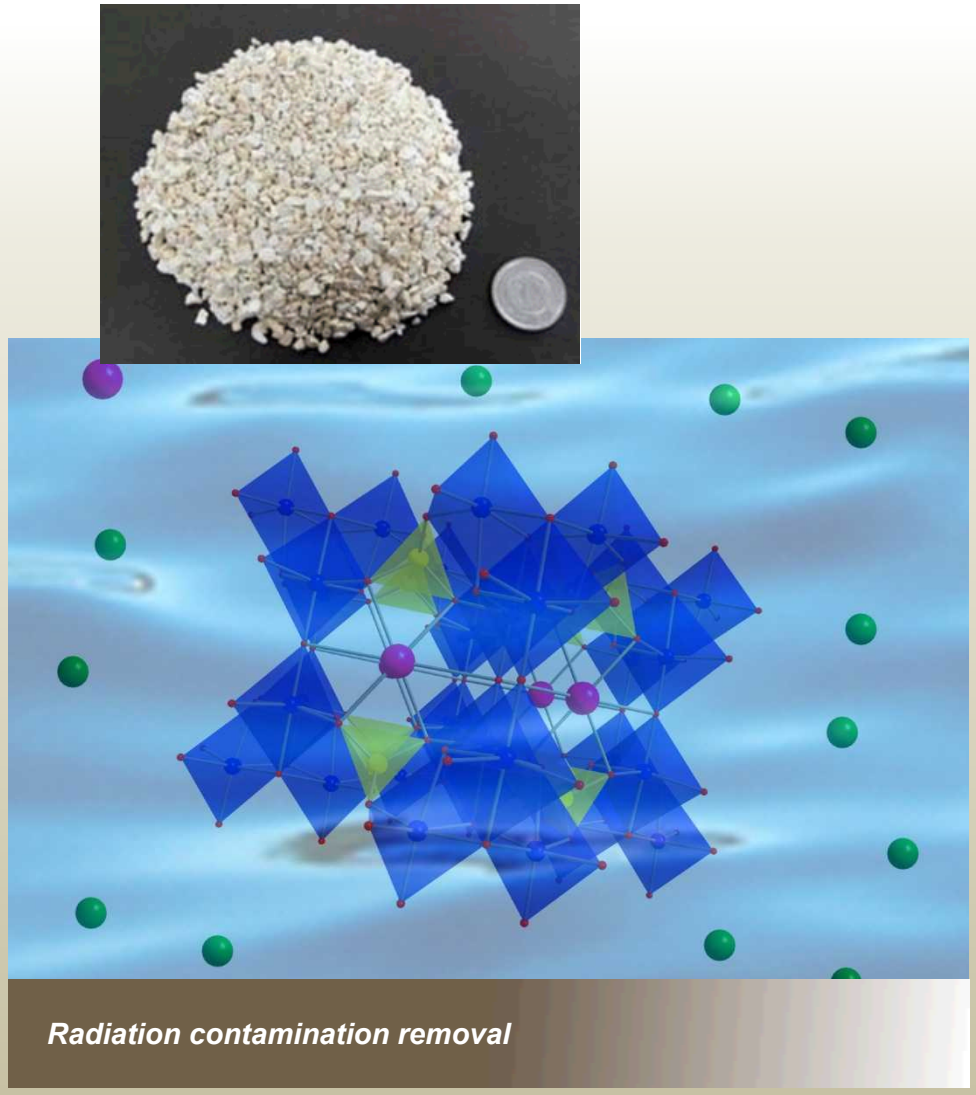
- Enable quantum computing
- Process information stored in an optically-trapped cesium atom
- Potential to revolutionize technologies such as simulation, sensing, energy capture, and nanoscale device fabrication

Micro ion trap junction





Crystalline silicotitanates (CSTs) for removal of radioactive materials



Radiation contamination removal

- Inorganic, molecularly engineered ion exchangers
- As of December 2014, CST materials have removed cesium ions from more than 160 million gallons of contaminated wastewater at the Fukushima Daiichi nuclear power plant

ACME: Accelerated climate modeling for energy

Sandia National Laboratories

- State-of-the-science Earth system model for Department of Energy high-performance computing
- Addresses big science questions that drive climate change
- 14 institutions jointly develop models for the most-accurate climate change predictions yet
- Sandia leads efforts in software engineering and computational performance

Facilities: Nuclear weapons program

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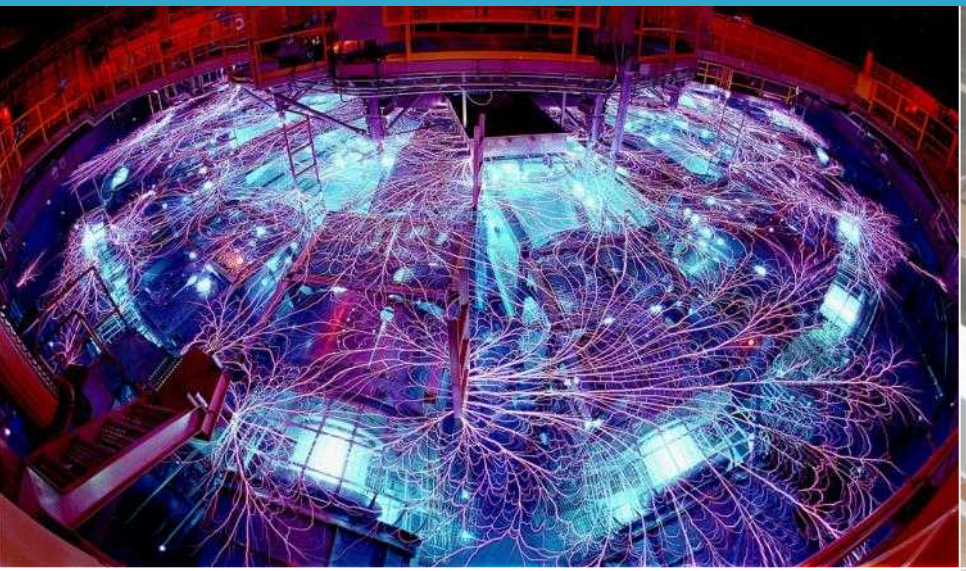
The Z Machine



Z is crucial to ensuring the reliability and safety of our nuclear stockpile as it ages. It allows studying materials under conditions similar to those produced by the detonation of a nuclear weapon. It also produces key data for validating physics models in computer simulations.

Thermal Test Complex (TTC)

At the TTC, component and system performance is demonstrated under many abnormal thermal conditions. This controlled environment is ideal for developing and validating response models. The simulated fire setup allows a “dial-a-fire” approach to thermal testing.

Facilities: Nonproliferation program

Sandia National Laboratories

Integrated Security Facility (ISF)

The ISF is the only facility in the world with the highest rigor nuclear security systems for developing next-generation security systems and for training security engineers and technologists.

Training and Technology Demonstration (TTD) Area

Showcased at the TTD Area are technologies applicable to a suite of monitoring applications in nonproliferation, international security, and arms control across the globe. Training is often conducted with international partners. This area is also used for testing certain technologies in an open environment.