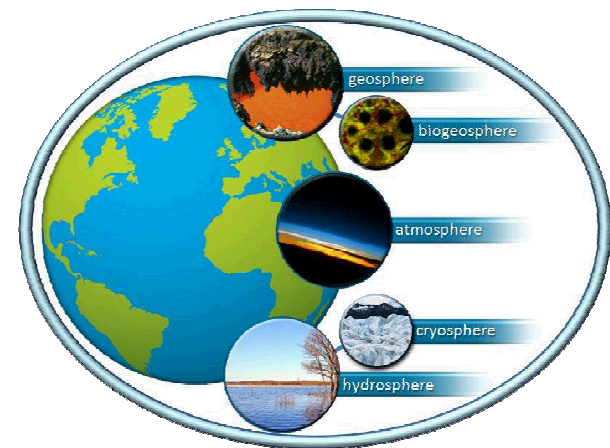


Geoscience Research Foundation Strategy

Marianne C. Walck
October 3, 2012



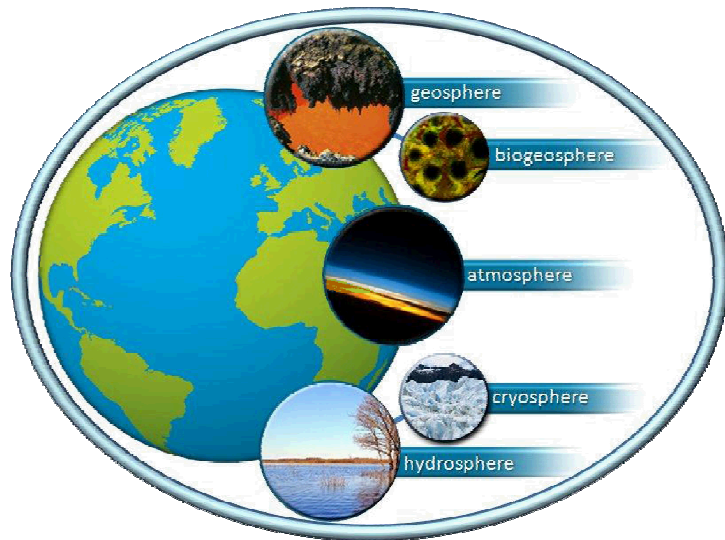
*Exceptional
service
in the
national
interest*



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.

Geoscience Research Foundation

*Where national security comes down to earth:
apply deep geoscience expertise to explore and solve
problems at the intersection of the earth and
engineered environments*



NATIONAL SECURITY PROBLEMS RELATED TO GEOSCIENCE

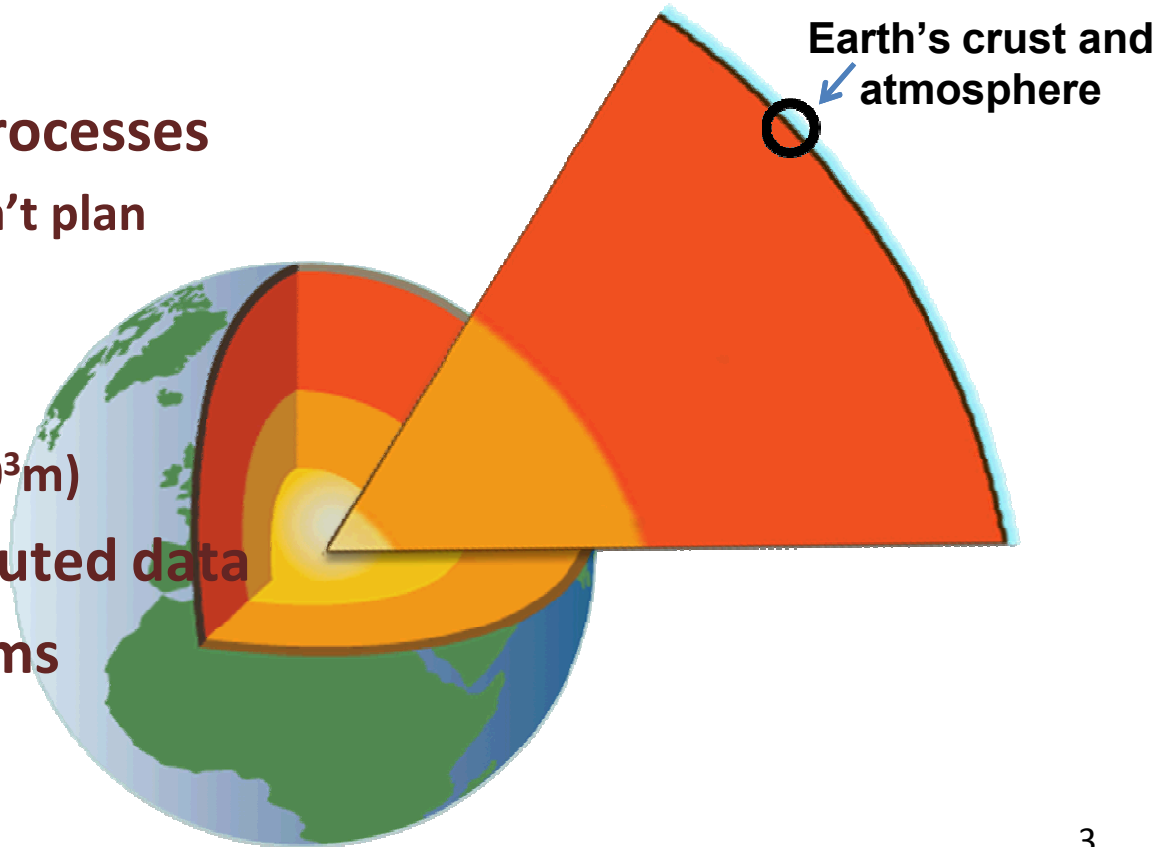
- Detecting, Monitoring, and Defeating Subsurface Facilities
- Monitoring and Verifying Treaties
- Testing Weapons Underground
- Using the Subsurface for Safe and Secure Material Storage
- Maintaining Secure Energy Supply
- Maintaining a Healthy Geosphere
- Preparing for and Responding to Natural Disasters
- Preparing for and Adapting to Climate Change

What is the RF scope?

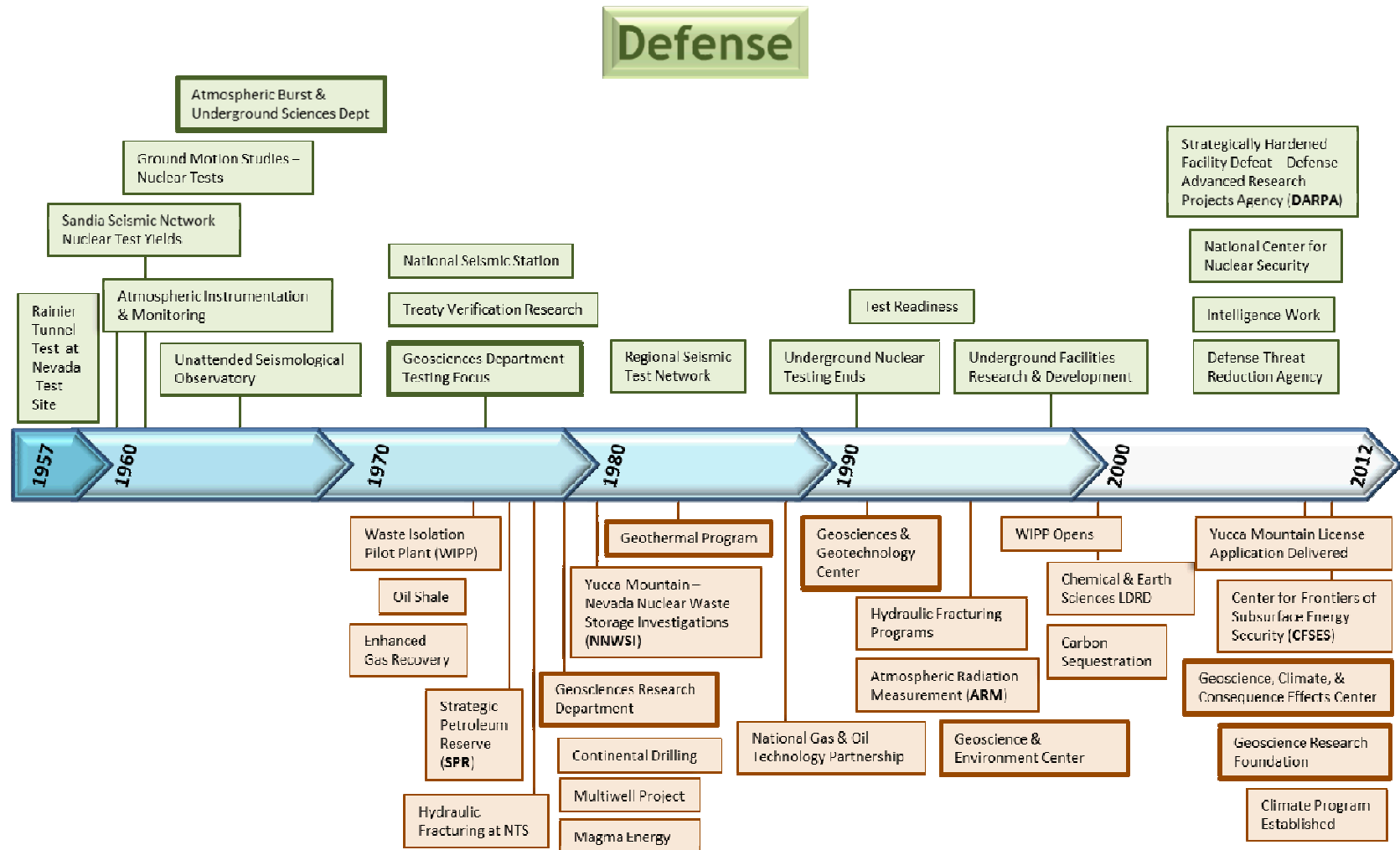
- Earth's surface \pm ~100K feet (30 km)
- Subsurface, surface, atmosphere
- National Security Drivers

Attributes

- Natural materials and processes
 - experiments that you can't plan
- "Multi-physics"
- Multiple scales
 - -nano (10^{-9}m) to field (10^3m)
- Sparse, unevenly distributed data
- Ill-posed inverse problems

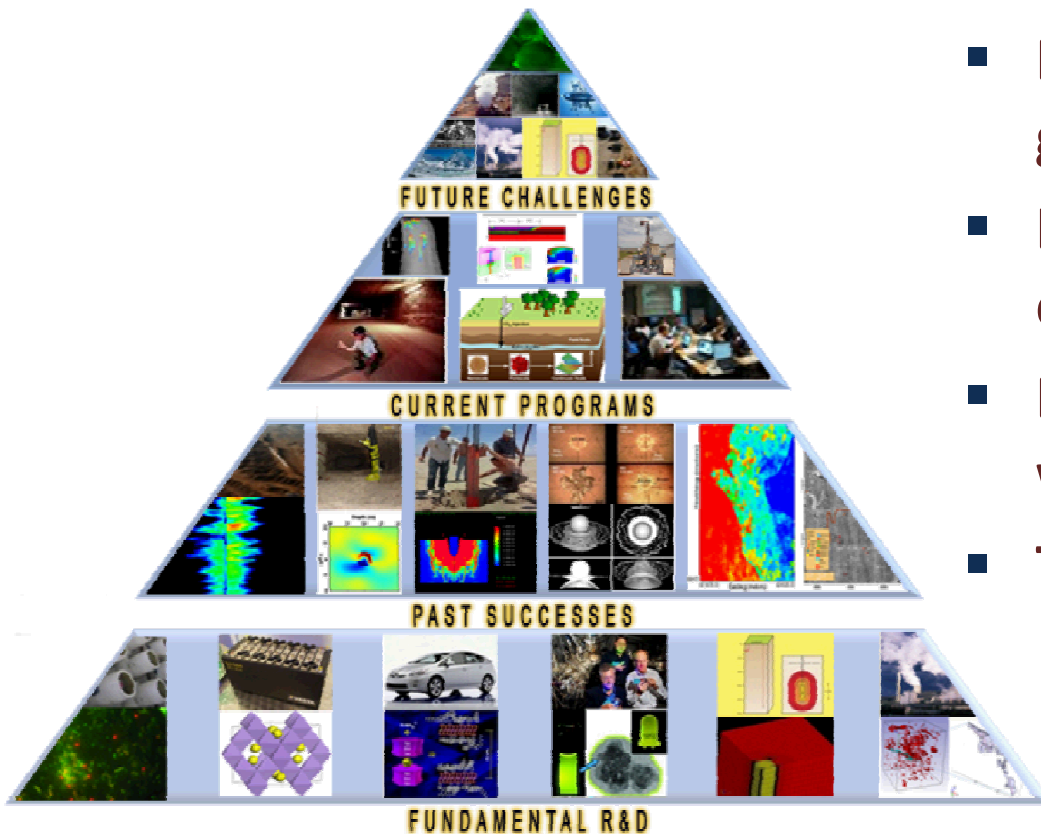


A bit of SNL Geoscience History...



Energy, Research, and Climate

Summary of Current State



- Research to Development to Application spectrum
- Driven by mission – capability grew through mission need
- Leverage overall laboratory capabilities
- Broad set of projects/programs with many sponsors
- The new research foundation
 - Provides management focus
 - Enables internal coordination
 - Provides LDRD resources
 - Focuses on external visibility
 - Drives strategy development

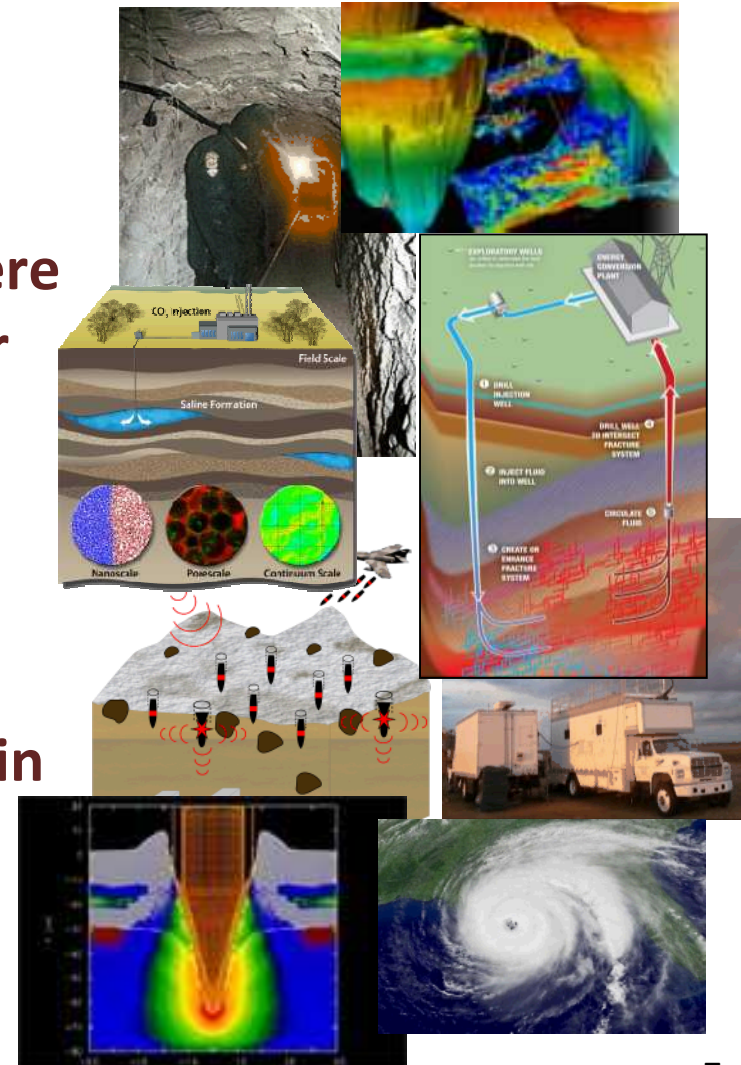
Envisioned End State

- **External End State: SNL is the premier lab for Earth Engineering solutions to national security problems**
 - Nationally recognized solutions to tough problems combining the earth and engineered environments
 - Leadership, recognition, and service in the professional community
- **Internal End State: Community, Interaction, Infrastructure**
 - Well-established internal Geoscience Community – energized workforce
 - Healthy and vigorous relationship with all Research Foundations; impact to all business units
 - Healthy infrastructure

Research Focus

With a keen focus on mission-driven national security applications,

- **Spanning Scales of the Earth-Atmosphere System: Predict Multi-Physics Behavior**
- **Earth System Engineering and Sensing: Achieve Unprecedented Innovation, Speed and Resolution**
- **From Subsurface to the Atmosphere: Characterize and Predict Geomaterials in Extreme Environments**



Why Sandia?

- **Interdisciplinary expertise**
 - Earth and Atmospheric Science
 - Engineering Science
 - Algorithms /Computer Science
 - Drilling
 - Materials Science
- **Unique facilities – related to the research objectives**
 - Geomechanics Laboratory – unique within the DOE laboratory community
 - Facility for Acceptance, Calibration and Testing (FACT Site)
 - Drilling Research – field and lab – for harsh environments
 - Arctic facility in Barrow, AK
 - Institutional Computing
- **Focus on National Security**

Path to the End State - External

- **Build external recognition of our research**
 - Clear leadership expectation and support
 - Reinforce recognition in the three focus areas
- **Develop the Sandia 'brand' for geoscience**
 - Focusing on the interface between the earth and engineered environments for national security applications
 - Plan for external professional engagements
- **Focus on a few key partnerships**
 - University, industry, NGO
 - Plan for developing larger impact programs through key partners
- **Monitor progress through metrics**

Path to the End State - Internal

- **Integrate Geoscience throughout SNL**
 - research foundation entanglement
 - build broader relationships with business units
- **Build the sense of community for Geoscience within SNL**
 - Community-wide events
 - Continued management commitment and action
 - Continue and improve investment in facilities and staff support
- **Monitor progress through metrics**

Discussion