

Exceptional service in the national interest



Sustainability Science and Technology (SS&T) at Sandia National Laboratories

Objective

To fully integrate sustainability as a systems engineering solution into Sandia's core capabilities, and to broaden Sandia's cultural perception of national security

What are the most important long term threats to US national security?

1. Weapons proliferation*
2. Terrorism
3. Sustainability
 - a) Climate
 - b) Water, energy, food, ecosystems
 - c) Natural disasters
 - d) Population growth

Perturbations in human social structure create unrest, resulting in conflict and threats national security

* Modified from "Top Five Threats to National Security in the Coming Decade," National Defense Magazine, which listed biological weapons, nuclear weapons, cyber attacks, climate change, transnational crime. <http://www.nationaldefensemagazine.org/archive/2012/November/Pages/TopFiveThreatstoNationalSecurityintheComingDecade.aspx>

What is Sustainability ?

The condition in which there are sufficient energy, water, and food resources, and ecosystem services, to maintain peaceful and secure social, economic, political, and ecological systems without eroding natural capital.

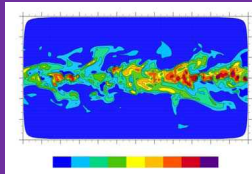
What is SS&T?

S&T that solves problems related to supply, demand and distribution of energy, water, agriculture, and ecosystem services.



Water

- Water Resource Evaluation
- Water Infrastructure Security
- Stakeholder Support



Climate

- Modeling
- Adaptation
- Carbon Management Systems



Energy

- Solid State Lighting
- Renewable Energy
- Batteries and Energy Storage



Policy

- Climate
- Biosurveillance
- Natural Disaster Response

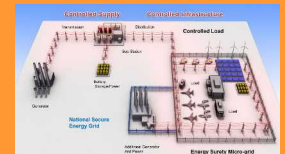
Transportation

- Joint BioEnergy Institute
- Combustion Research Facility
- Hydrogen and Fuel Cells
- Transportation Energy Storage



Infrastructure

- Energy Surety Microgrids
- Energy & Infrastructure Models
- Smart Grids
- Advanced Energy Controls

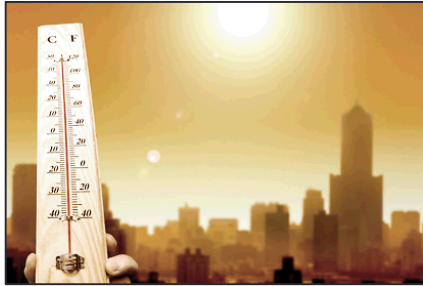


SNL already conducts activities in SS&T (\$182 million in 2012)

SS&T is cross-disciplinary, defined by the problems it addresses rather than by the disciplines it employs.*

Sustainability = Security

Climate change draft report predicts war, heat waves, starvation



Food scarcity: the timebomb setting nation against nation

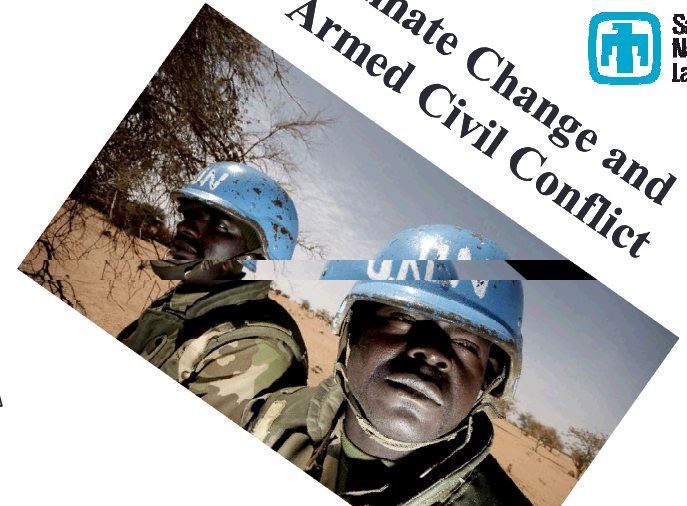
How Could A Drought Spark A Civil War?



Climate strongly affects human conflict and violence worldwide, says study



Wars over water could flood world



Climate Change and Armed Civil Conflict

Moving Sandia into the future

Our Strategic Plan

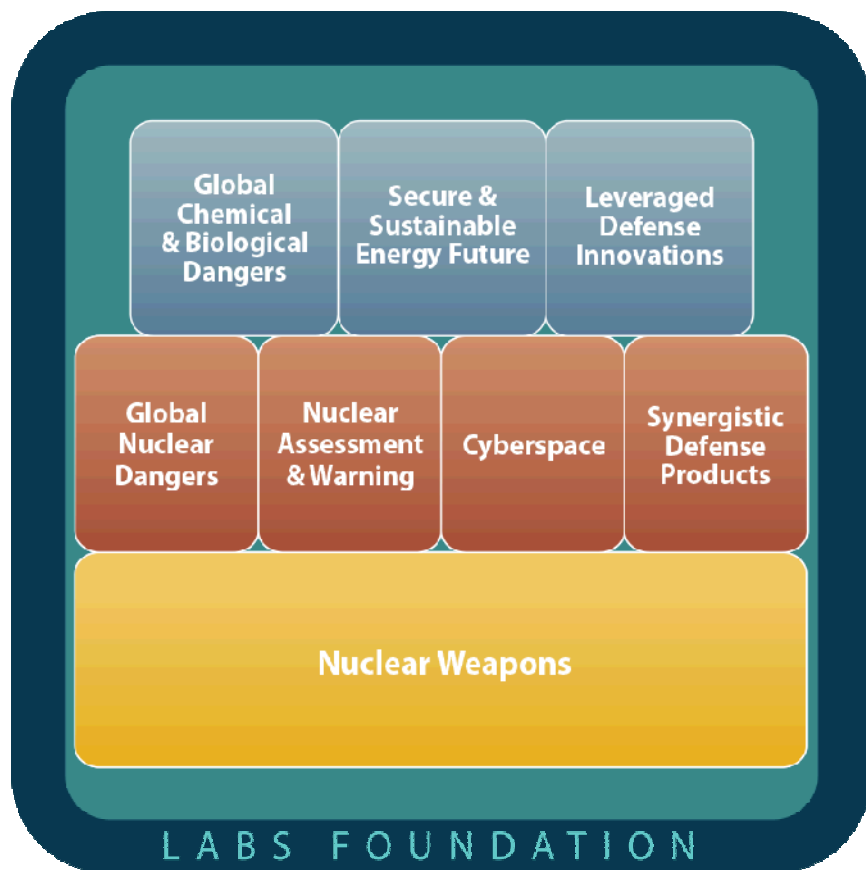


- Deliver with excellence on our commitments to the unique nuclear weapons mission
- **Amplify our national security impact**
- **Lead the Complex as a model 21st century government-owned contractor-operated national laboratory**
- **Excel in the practice of engineering**
- **Commit to a learning, inclusive, and engaging environment for our people**



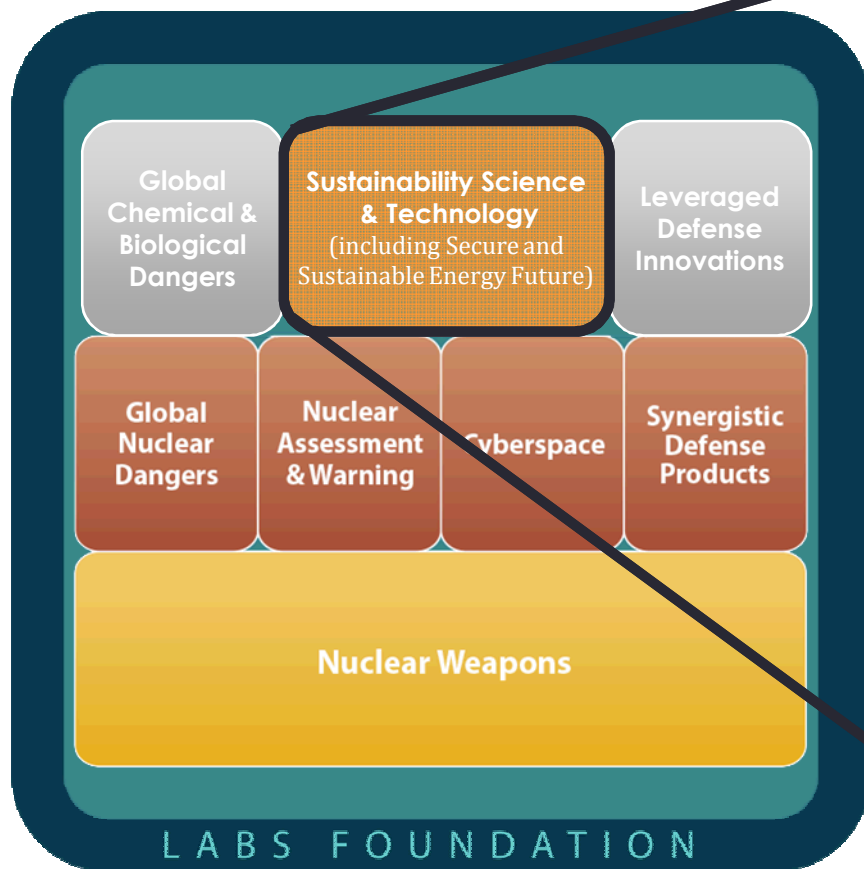
Sandia's national security missions

Leveraging core capabilities to solve 21st century national security challenges



Sandia's national security missions

Leveraging core capabilities to solve 21st century national security challenges



INTEGRATED



SS&T could be called "Human Sustainability and Security"

SNL is uniquely qualified to lead SS&T



- Current SS&T is stove piped, but SNL can define and address SS&T from a grand challenge/systems level.
- Build on SNL's reputation to bring SS&T into the national dialogue on strategic national security.
- SNL should leverage existing SNL Facilities leadership in the Complex.
- SS&T is a booming business area and is the cutting edge of future national security.

Business Opportunities

- DOE – Energy-water-food nexus, energy security, renewables
 - Institutional Transformation (IX) model – current interest from NNSA and others
- DHS – Resource scarcity modeling, responses to scarcity
- DOS – Global resource scarcity and impacts on US interests
- DOD – Sustainable field operations
- DOD/IC -- Conflict prediction/mitigation modeling, human behavioral dynamics
- USDA -- R&D on food, soils, diseases, pests
- Universities -- collaboration on all of the above

What do we want?

Short term:

- Re-brand SMU/Mission Area as SS&T/Human Sustainability and Security

Long term:

- To fully integrate sustainability as a systems engineering solution into Sandia's core capabilities, and to broaden Sandia's cultural perception of national security