

Homeland Security S&T Summit (South Central)

SAND2010-0589C

Arkansas-Louisiana-New Mexico-Oklahoma-Texas

Topic: S&T in the South Central Region: Lab Perspective

Title: Overview of Sandia National Laboratories'
Homeland Security Programs

Speaker: Jill Hruby
Director, Homeland Security Programs
Sandia National Laboratories

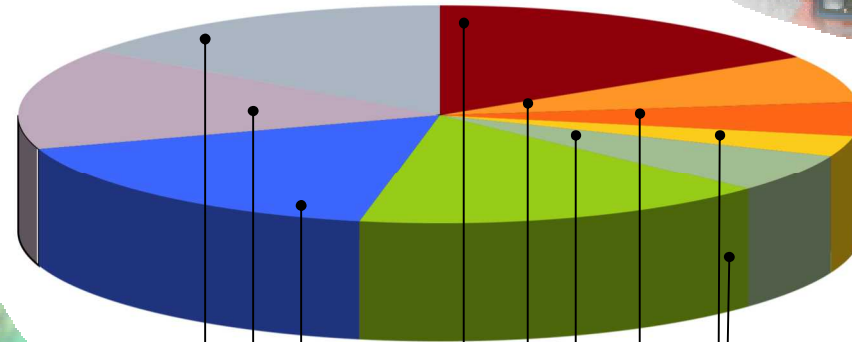
Date: February 9, 2010



**Homeland
Security**

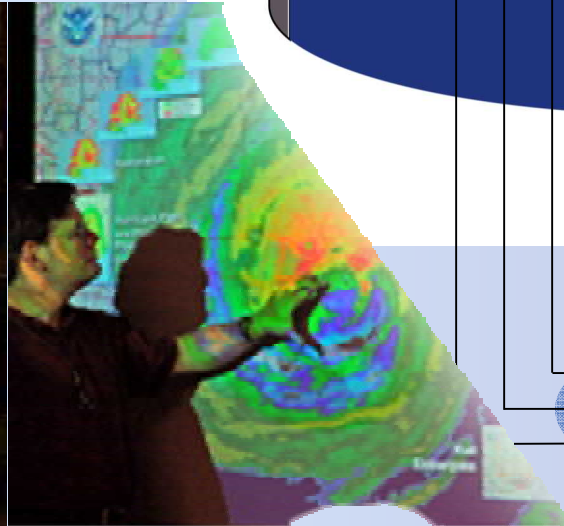
Sandia has four mission areas, over 8000 employees, and an annual revenue of \$2.4B...

- Nuclear Weapons
- Defense Systems and Assessments
- Energy, Resources and Nonproliferation
- Homeland Security and Defense



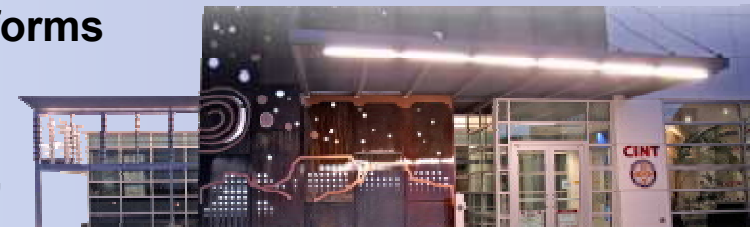
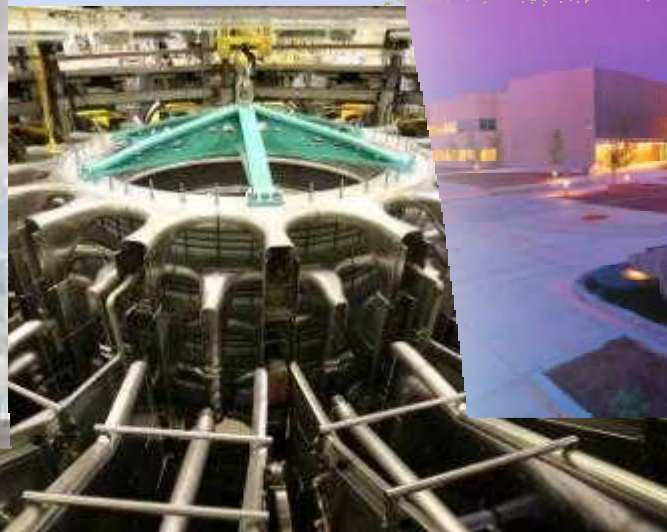
- Electrical Engineering 19%
- Mechanical Engineering 16%
- Other Engineering 15%

- Computing 16%
- Math 2%
- Chemistry 4%
- Physics 6%
- Other Science 4%
- Other Fields 17%



...with unique facilities and test capabilities

- Environmental and operational test ranges
- High performance compute platforms and world class modeling and simulation
- Micro and nano systems design, fabrication, and test
- Radiation effects



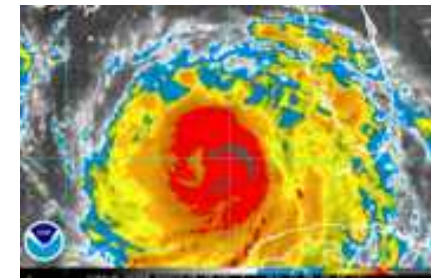
Our Homeland Security and Defense programs address the full spectrum of threats using tailored approaches



- **Counter-WMD**
 - Chemical, biological, radiological, nuclear
- **Explosives security**



- **Cyber-security and secure data sharing**
- **Infrastructure protection and emergency preparedness**
- **Intruder security systems and technologies**
- **Border security**



Chemical and biological security activities include systems analysis, systems engineering, deployments and reachback...

• **Systems analysis**

- Responsive studies
- Architecture recommendations and/or independent validation
- Gap analyses

• **Systems engineering, demonstrations & deployments**

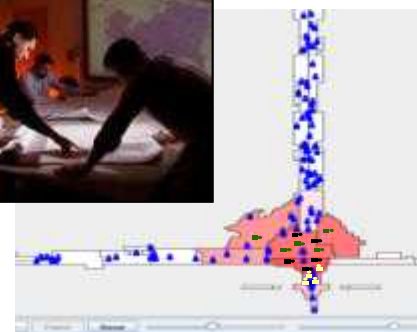
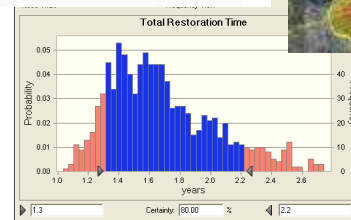
- System designs
- Detection and response technologies and operations
- Concept of operations & playbooks

• **Decision support systems and technical reachback**

- Train and aid decision makers through simulations
- Provide analysis reachback support

• Strong partnership with other labs

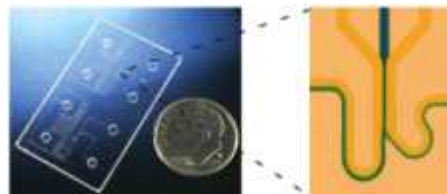
Posters: BioWatch reachback (both LANL and Sandia)



... as well as deep technical programs in chem/bio detection, forensics, restoration, and biosecurity

- **Advanced detection systems**

- Microfluidic platforms for environmental and human fluid samples
- Stand-off detection systems
- Single cell studies

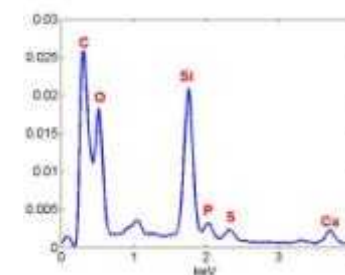
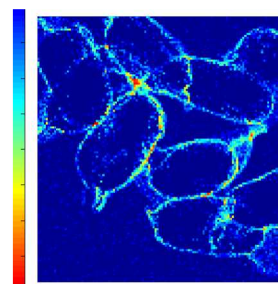


- **Forensics and attribution**

- Physical and chemical analyses

- **Response and Recovery**

- Decontamination S&T
- Site evaluation technologies



- **Biosecurity (mostly for State Dept)**

- Agent risk approach
- Facility specific bio-safety and –security assessments
- Transport safety and security
- Pathogen and disease surveillance



Sandia tour: Restoration technology demo

Radiological and nuclear security activities include systems analysis, systems engineering, and deployments ...

• **Systems analysis**

- Understanding threats for both INDs and RDDs
- Analyzing & recommending non-port-of-entry architectures
 - Land, sea, and air
 - Working closely with CBP, TSA, others

Nuclide	Quantity needed for RDD	Quantity in typical application	Number of application	Ease of dispersal	Theft Risk
A	40 Ci	1000s Ci	Hundreds	Very easy	Medium
B	11 Ci	1000s Ci	Hundreds	Not easy	Medium
C	25 Ci	10-20 Ci	Thousands	Very easy	High
D	110 Ci	100 Ci	Thousands	Not easy	High
E	431 Ci	100,000 Ci	Hundreds	Easy	Medium
F	29 Ci	100,000 Ci	Few	Easy	Low

• **Systems engineering**

- Protection schemes for delay
- Links to NW protection knowledge

• **Detector system deployments and testing**

- Field test before large-scale procurement

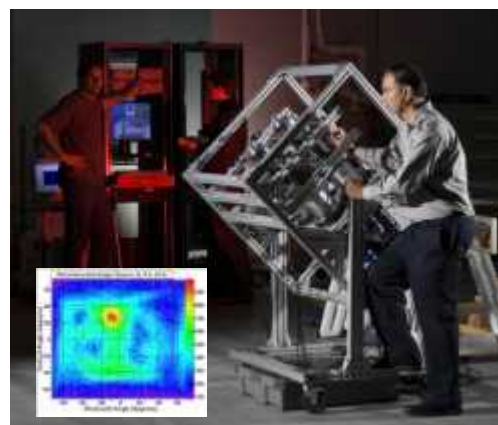
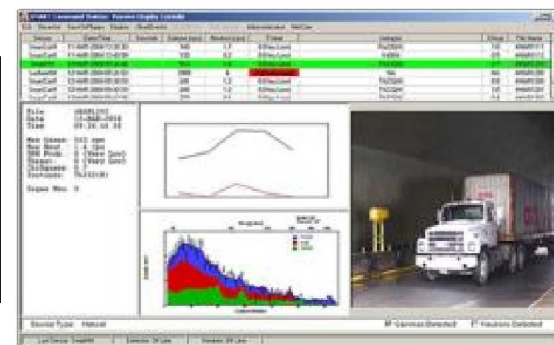
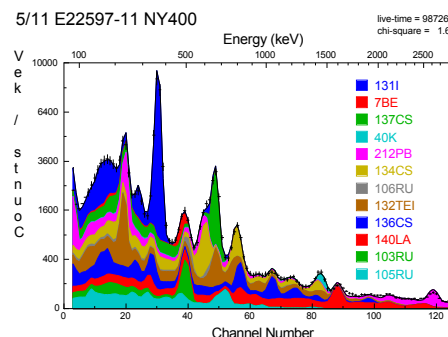
• Strong partnership with other labs



Poster: R/N Systems analysis
Sandia tour: Radiological screening at borders

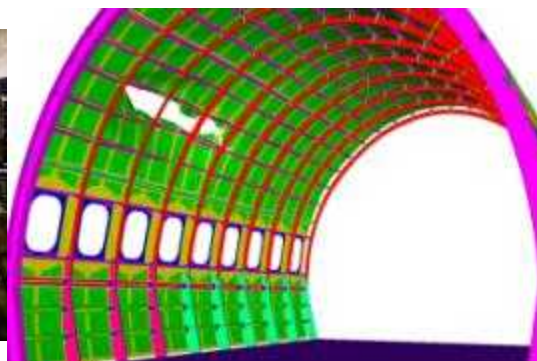
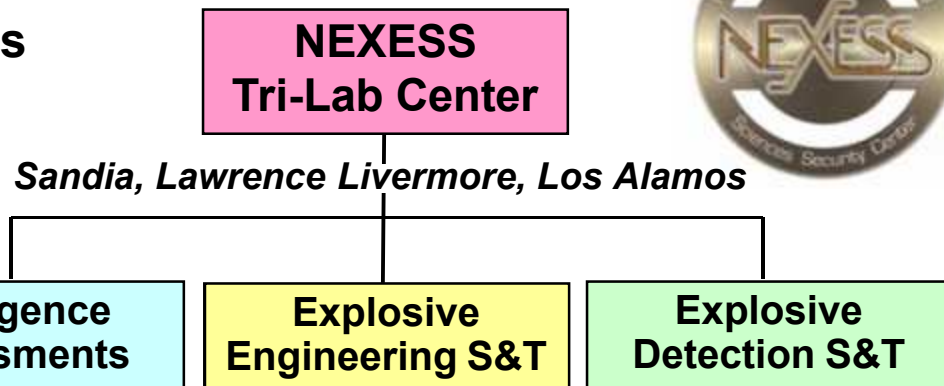
... as well as deep technical programs in modeling & algorithms, advanced detection, and response and attribution

- **Modeling and simulation**
 - Validated and verified source terms
 - Spectroscopic identification codes
 - Secondary reachback analysis
- **Advanced detection R&D**
 - New materials
 - Passive concepts
 - Active concepts
- **Response & recovery**
 - Response teams
 - Technologies
- **Forensics and attribution**



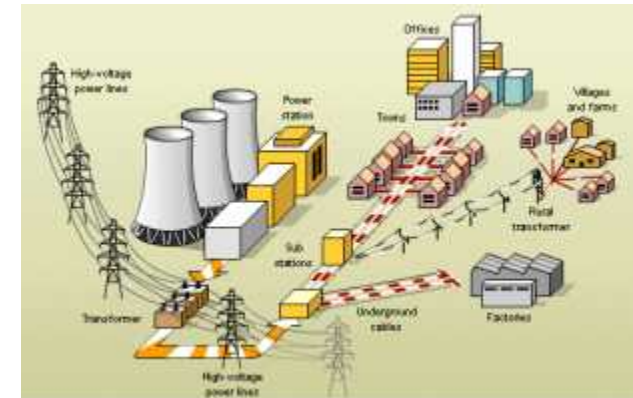
Explosives security program addresses pervasive and dynamic challenges and is evolving since Christmas Day '09

- Conduct risk assessments/ systems studies
- Develop detection systems
- Engineer mitigation systems
- Share with international community
- Strong partnership with other labs



Cyber security and information assurance activities support a broad set of customers

- **SCADA (Supervisory Control And Data Acquisition) system security**
 - Threat emulation, vulnerability analysis, and effects modeling for DoD, DOE, DHS, and other agencies
- **Cryptography and Information Systems Surety**
 - Cryptographic solutions improve confidentiality, integrity, availability, authentication, and non-repudiation
- **Protecting wireless networks**
 - Identifying vulnerabilities; developing mitigation techniques
- **Establishing a node on DoD IO Range**
 - Will participate in large scale testing of new capabilities
- **DHS/NCSD (National Cyber Security Division)**
 - Prioritize and exercise cyber-vulnerable critical infrastructure equipment and mitigation strategies
 - Develop DHS cyber threat notification system

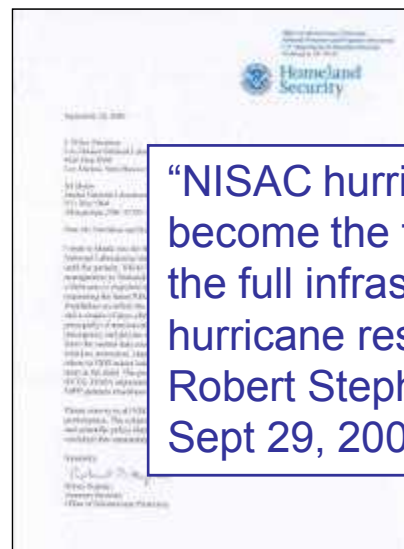
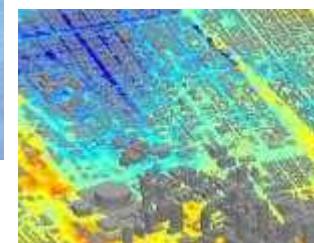


Sandia has a long history in cyber: Nuclear Command and Control, Internal network protection, NWC network protection, Service to the IC, Electronics, Micro-electronics, System engineering

Infrastructure Protection: NISAC **(National Infrastructure Simulation and Analysis Center)**

- **Joint DHS program with LANL**
 - Managed by National Protection and Programs, Infrastructure Protection
- **Developed advanced simulation tools for predictive consequence analysis for infrastructure and interdependencies**
 - Provide a common national view of U.S. infrastructure in response to disruptions
- **Extensive support for DHS to prepare for and respond to real-world events**
 - Support preparedness and response planning (Tier 1 and Tier 2 priorities)
 - Respond quickly to urgent infrastructure protection issues
 - Stand-up 24/7 for events and training

NISAC will be featured in today's poster session and tomorrow's Sandia tour

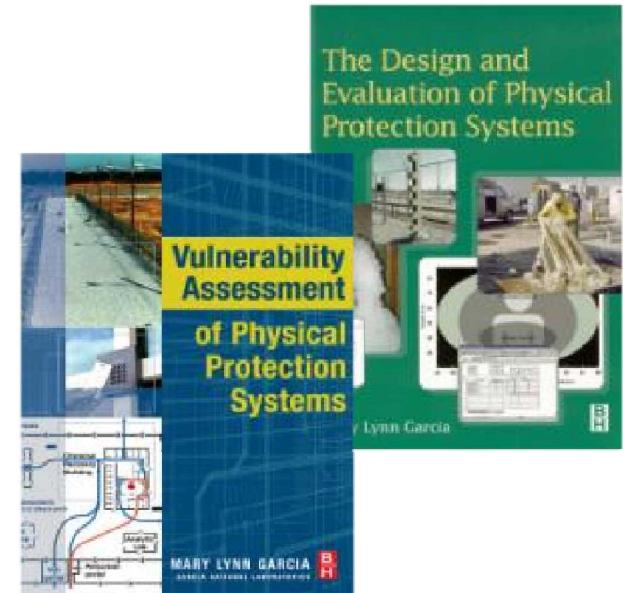


“NISAC hurricane analyses have become the foundation on which the full infrastructure protection hurricane response is built.”
 Robert Stephan, Assist Sec OIP,
 Sept 29, 2008

Intruder security programs have a long and successful history with defense customers

- **DOE/NNSA lead lab for physical security**
 - 36 years in this role (established after 1972 Munich Olympics)
 - Over \$1B investment in the last decade
 - Analysis, design, testing, installation, sustainment, and R&D
 - Unique test/lab facilities (test fields, live-fire, climatic, etc.)
- **Security system engineering responsibility for all NW and DoD high-value assets**
 - Over 30 years with DoD
- **Proven track record as government honest broker and partner**
 - All SNL designed systems have been certified /accepted
 - Tested technology and systems

Sandia tour: Sandia's physical security program



DHS borders security activities are focused on T&E for container security

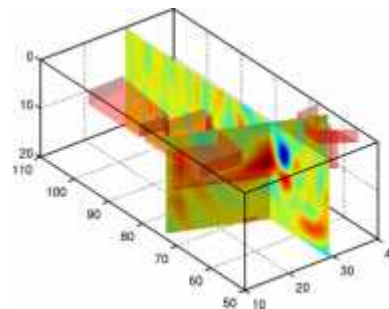
Field Testing

- Outdoor Test Facility (OTF)
- Intrusion Detection Sensor Field
- TEAMS Site



Specialized Facilities

- Environmental Testing Complex
- Port of Albuquerque/
Livermore Container Terminal



Relevant capabilities and expertise

- Systems analysis
- Simulation tools
- Systems modeling
- Red teaming
- Tunnel detection
- Synthetic Aperture Radar (SAR)
- UAVs
- Robotics
- Underwater monitoring



*Posters: Border Security Technology T&E, SAR Technology, Robot Rodeo (joint SNL/LANL)
Sandia tour: Sensors & robotics demo*

Deployment Assessment, Design, Installation, Evaluation, Sustainability



Russian MPC&A



Radiological
Source Security



Second Line of Defense
Russia

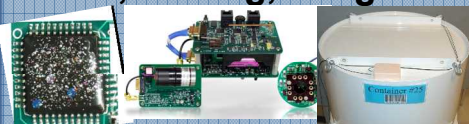


Megaports



HEU Monitoring

Technology Development R&D, Testing, Integration



Tags, Sensors, Data Security,
Sensor Platforms



Testing and System Integration



Cooperative Technology
Development & Evaluation

Global Security Programs are Reducing WMD and Terrorist Threats through International Cooperation

Physical Protection
Material Control
International Safeguards
Export Control
Border Security
Emergency Response
Verification/Transparency
Regional Security

Methodologies, Standards, and Training



DEPO, SAVI



Physical Protection
Training Courses



Biological and Chemical
Safety and Security
Training

Informing Domestic and International Stakeholders Engagement, Assessment, and Analysis



Workshops and Engagement



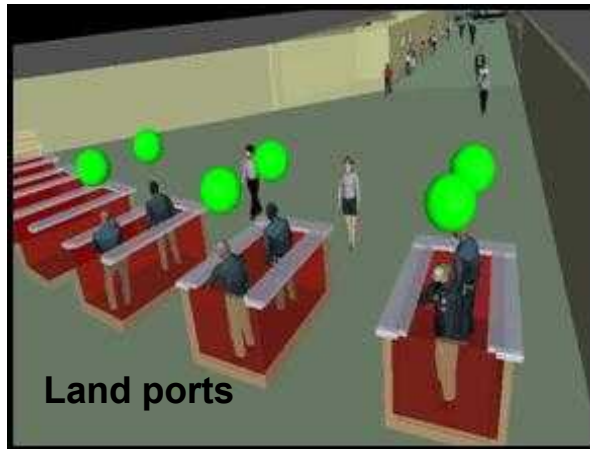
Physical Protection Assessments



Technical Policy Analysis



Complex systems modeling and simulation is embedded in our approach to thinking about and solving problems

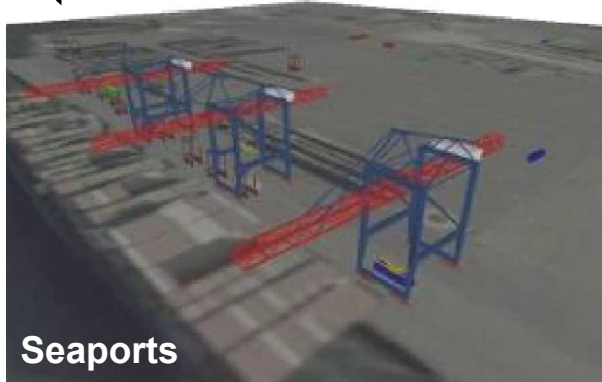


Land ports



Airports

Integrated System-of-Systems Models and Analysis



Seaports



Economic Models



Posters: SUMMIT integrated all-hazard simulations, Restoration analysis and prioritization tools, Electronic playbooks- optimized indoor sampling

Sandia is honored to support the homeland security mission

Our objectives:

- Maintain and evolve our counter-terrorism expertise to protect the Nation over the long run
- Use capabilities to contribute to broader homeland threats
 - Infrastructure protection, emergency preparedness, border security,...
- Apply our systems engineering and integration capabilities and unique facilities to this national security need
 - Understand stakeholder and end-user needs
 - Integrate countermeasures with concepts of operation
 - Identify and develop technology solutions
 - Test and evaluate solutions in realistic environments
- Impartially inform national architecture and investment decisions
- Partner with stakeholders, universities, industry, other labs, and the international community to bring the best solutions to the country

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Take-Aways:

- Sandia is honored to support the homeland security of our nation
- We deliver science-based systems solutions that help our nation anticipate threats, mitigate risks, and respond to & recover from incidents
- Partnership between stakeholders, universities, industry, labs, and the international community is key to our collective success

Questions? *Jill Hruby, Director,
Homeland Security Programs*

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**Homeland
Security**