

# **Capabilities to Support a National R&D Strategy for Regional Stability / Capacity Building**

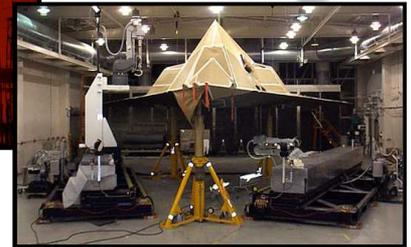
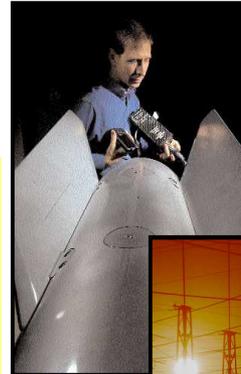
**Arian L. Pregenzer / Second Annual Symposium: Sandia in the Middle East  
Sandia National Laboratories / Albuquerque, New Mexico**

**05 January 2006**

# Sandia National Laboratories: Primary Mission Areas

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



**Problem Driven, Systems Solutions**  
**Supported by Science, Technology, Engineering**

# Technical expertise is critical to meeting stabilization and reconstruction needs.

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## Security

- Counter Insurgency
- Disarmament
- Public Order
- Intelligence
- Territory
- Facilities
- Individuals
- Infrastructure

## Infrastructure

Emergency \* Security \* Planning \* Rebuilding

- Transportation
- Health
- Water
- Energy / Power
- Telecom

## Cross-Cutting

Communications \* Planning \* Data Collection & Analysis \* Training \* Employment \* CBMs



# Selected Capabilities Relevant to Regional Stability / Capacity Building

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- **Security Operational Support**

- Site/transportation security
- Defeat of improvised explosive devices
- Hazardous material security / disposition
- Light-weight body armor
- Modular Distributed Energy

- **Infrastructure simulation and analysis**

- Modeling and simulation of interdependencies, vulnerabilities, complexities
- Economic interdependencies
- Methodologies for asset prioritization

- **International technical cooperation**

- Border security
- Physical security
- Nuclear material security
- Water security and sustainability
- Off-grid energy applications
- Disease surveillance / bio-security
- S&T / business development

## Enabling Tools

- Forums for engagement (CMC @ Albuquerque and Amman)
- Cooperative technology test and evaluation
- Risk assessment methodologies
- Systems dynamics modeling
- Fast Analysis Infrastructure Tool
- Web-based portals for cooperative analysis, data sharing, partnering
- International training courses

# Selected Capabilities to Meet Needs for Regional Stability / Capacity Building

## ● Security Operational Support

- Site/transportation security
- Defeat of improvised explosive devices
- Hazardous material security / disposition
- Light-weight body armor

## ● Infrastructure simulation and analysis

- Modeling and simulation of interdependencies, vulnerabilities, complexities

## ● International technical cooperation

- Border security
- Physical security
- Nuclear material security
- Water security and sustainability
- Off-grid energy applications
- Disease surveillance / bio-security
- S&T / business development

## Core Needs (Draft R&D Strategy)

### Interagency Collaboration

#### Enabling Tools

- Forums for engagement (CMC @ Albuquerque and Annular)
- Cooperative technology test and evaluation
- Risk assessment methodologies
- Systems dynamics modeling
- Fast Analysis Infrastructure Tool
- Web-based portals for cooperative analysis, data sharing, partnering
- International training courses

### Strategic Communication

Cultural Understanding

Assessment and Prediction

Intervention and Prevention

# Security Operational Support



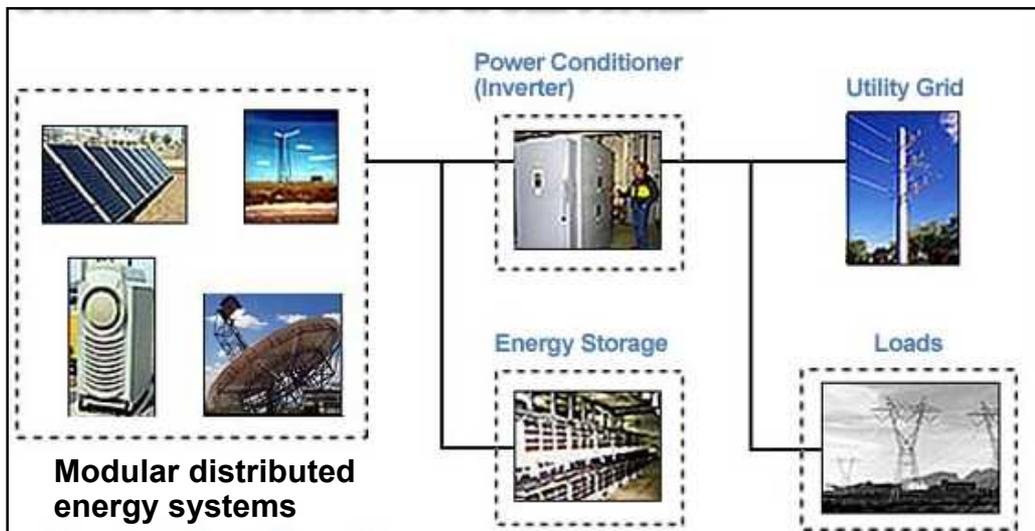
Light-weight body armor for soldiers in Iraq



Site Security



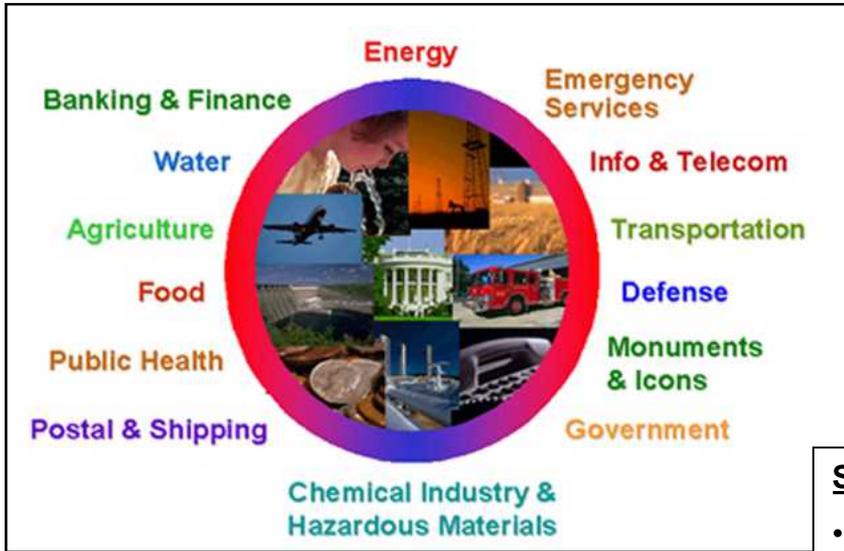
Bomb and IED defeat



Hazardous material disposition

# Infrastructure Simulation and Analysis

Modeling and simulation of infrastructure interdependencies and vulnerabilities



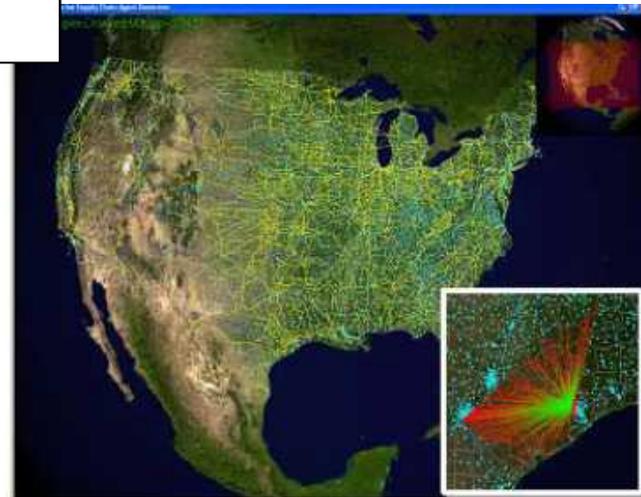
Sponsor

- DHS



International trade and maritime infrastructure

Economic impacts of natural and man-made disasters



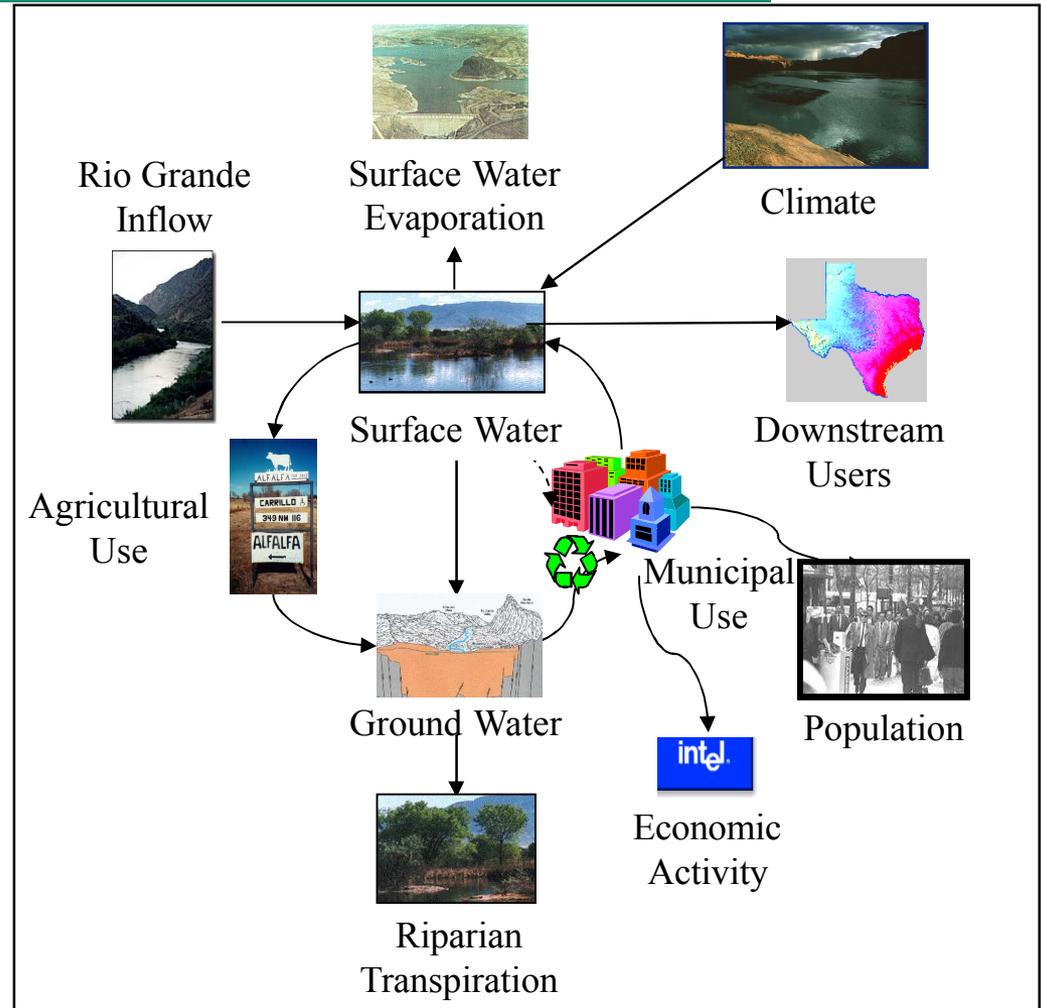
# Selected Tools for Infrastructure Analysis



**Risk Assessment Methodologies**



**Web-accessible user interfaces**



**Systems dynamic modeling**

# International Technical Cooperation

## Border Security



Pak/Afghan



Israel/Jordan

### Sponsor

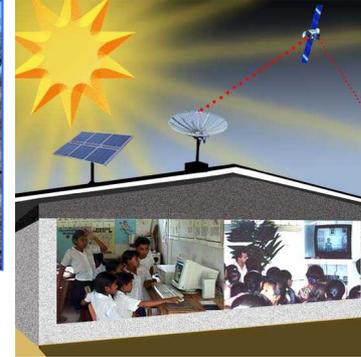
- NNSA

## Off-Grid Energy Applications



Water pumping

Latin America



Distance Learning

**Mexico Renewable Energy Program**

[www.re.sandia.gov](http://www.re.sandia.gov)

### Sponsors

- DOE/EE
- USAID

## S&T Engagement/ Business Development

### Sponsor

- NNSA



Iraq:  
reconstruction  
and strategic  
planning



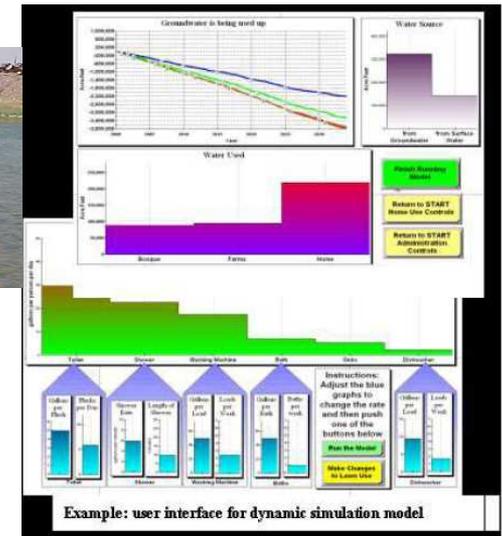
## Water Security and Sustainability



Water Quality Monitoring:  
Central Asia

### Sponsors

- NNSA
- Internal



Example: user interface for dynamic simulation model

Systems Dynamic Modeling: Jordan

# Tools to Enable International Technical Cooperation

## CMC @ Amman: Forum for International Engagement in the Middle East



## Iraqi Border Security workshop



Technology Demonstrations

### Partners

- NNSA
- DoD (NDU, DTRA, CENTCOM)
- State
- USDA
- IAEA

## Cooperative Technology Test and Evaluation



Outdoor Test Facility for Border Monitoring



Physical Security Test Beds

# Capabilities are critical for an effective S&R strategy.

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- **Security Operations Support**
  - Security for military, AID organizations, NGOs essential for S&R
  - Systems approach to counter-insurgency is needed for effective intervention
- **Infrastructure Simulation and Analysis**
  - Tools for planning and prioritizing reconstruction efforts assist interagency and international operations
  - Systems dynamics modeling is a tool for assessment and prediction
  - Web-based collaboration technology enables coordination
- **International Technical Cooperation**
  - Supports cultural understanding and effective communication
  - Builds human capacity and regional expertise for stability and security
  - Creates partnerships with key individuals and organizations
  - Venue for interagency collaboration / training