



HOMELAND SECURITY AND DEFENSE: MITIGATING RISKS, ENHANCING RESPONSE, ACCELERATING RECOVERY

The complex issues of homeland security and defense are difficult and challenging. Given the magnitude of our nation's vulnerabilities and the diversity of threats, our leaders are calling for an integrated approach focused on mitigating the most likely risks and responding and recovering effectively should a catastrophic event occur.

Sandia National Laboratories is proud to be among those helping the nation achieve these critical goals. Sandia's many strengths provide a solid basis for addressing homeland security and defense challenges:

- **Relevant expertise:** In fulfilling its primary mission of securing the nuclear stockpile for more than 50 years, Sandia has developed a range of resources, including facilities, staff, and expertise in science, technology, and engineering
- **A focus on the real-world:** As the engineers behind the nuclear stockpile safeguards, we have a long track record of delivering solutions that must work for real people under the most stringent real-world constraints.
- **A legacy of creating complete responses:** We first analyze complex problems as complete systems—and then design solutions that address all aspects of the problem.
- **Resources to advance tomorrow's solutions:** As a national laboratory, we address the intractable problems facing the nation that require fundamental scientific investigation and advanced engineering innovation.

As we apply these strengths, the nation gains near-term solutions to its most urgent problems in the form of cost-effective systems that fit seamlessly into existing infrastructure and procedures. And by initiating the long-term work needed to address anticipated problems, we're helping to ensure that the United States will have optimum solutions in place—well before they are needed.

Mitigating Risks

A scientific basis for understanding risk

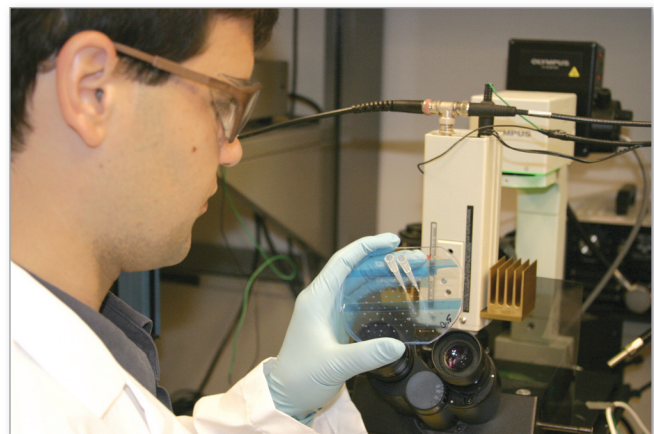
Allocating precious resources toward mitigating the most probable and high-consequence risks requires a scientific quantification of threats, vulnerabilities, and consequences. Sandia's long-held expertise in this area is captured in our risk assessment methodology (RAM) tools, which have helped government agencies, communities, and owners of critical infrastructure understand their risks and develop strategies to strengthen weaknesses.

Sandia also serves the nation through the National Infrastructure Simulation and Analysis Center (NISAC)—operated jointly by Sandia and Los Alamos National Laboratory for the Department of Homeland Security (DHS). NISAC provides advanced modeling and simulation capabilities for analyzing critical infrastructures and their interdependencies, vulnerabilities, and complexities to help the nation protect these assets. The value of NISAC's capabilities was underscored in the days since Hurricane Katrina, when NISAC performed a series of rapid-turnaround studies to help DHS plan and respond. In other work, NISAC is evaluating the potential impacts of an influenza pandemic, as well as how these impacts propagate to infrastructures and business, as a basis for evaluating mitigation strategies.

In other work, Sandia analysts have explored what might happen if specific U.S. sites were attacked with specific biological and chemical weapons, helping national leaders improve protection and response strategies. In addition, we've contributed to a risk-based strategy for defending the nation against radiological or nuclear terrorism and are leading follow-on efforts to implement this strategy.

Addressing Vulnerabilities

Once risk is understood, Sandia can offer numerous resources for hardening vulnerabilities against threats—from physical security systems to technologies for detecting explosives and weapons of mass destruction.



Often in collaboration with academia, industry, and other national laboratories, Sandia seeks the basic science and technology to address the nation's most difficult problems.



Physical security

Sandia is an acknowledged authority in designing systems to protect critical facilities by preventing, detecting, and delaying potential intruders and preventing threats of many types. Applying a systems engineering approach to ensure robust and cost-effective results, we design, implement, and support such systems for Department of Energy sites, including sites within the nuclear weapons complex, other government agencies, and military assets.

Cyber security

We're also adept at helping customers protect cyber assets. Our tools can identify and correct vulnerabilities in existing systems and detect and contain threats. In addition, our red teaming experts offer customers independent assessments that focus on how adversaries might exploit weaknesses. These assessments lead to blueprints for bolstering security and mitigating damage.

Detection systems

We've also contributed to numerous deployed systems to protect against weapons of mass destruction. Airline passengers across the country are now walking through explosives detection portals developed by Sandia and commercialized by Smiths Detection. In another project, Sandia helped create PROTECT, a network of optical sensors, chemical detectors, and communications that is now operating in parts of the Washington, D.C. Metro system.



A walk-through portal, developed by Sandia and commercialized by Smiths Detection, is being placed in airports across the country by the Transportation Security Administration to detect trace explosives.

Field tests have confirmed the value of Sandia's SMART radiation detection system, which can detect and identify radiological isotopes within shipping containers. And ongoing Sandia research into advanced concepts holds promise for creating better, less expensive, and smaller radiological detection devices.

Drawing on world-class microfluidics expertise, Sandia has also created handheld devices for detecting and identifying chemical and biological weapons. We're working with an industry team to integrate this technology into a system for automatic protection of water supplies and are seeking partners to commercialize handheld units for first responders.

Enhancing Response and Recovery

Should a catastrophic event take place, effective and speedy response and recovery is critical to saving lives and stemming psychological and economic damage. Much of Sandia's work therefore focuses on helping local, regional, and national leaders ensure that they react efficiently to urgent situations.

For example, BioDAC, a sophisticated Sandia interactive "gaming" environment, simulates biological attacks to help policymakers both understand how attacks unfold and shape responses more likely to preserve lives and prevent damage. Sandia has also helped create guidelines for responding to dirty bombs—formally known as radiological dispersal devices (RDDs)—in ways that help injured victims and minimize the overall radiation dose to the public.

Hoping to improve the costly and time-consuming problem of decontaminating buildings after a bioterror attack, Sandia has developed BROOM, a software-based tool for managing the collection, visualization, and analysis of environmental sampling data. Complete with aids for every step of the process, BROOM improves cleanup efficiency and provides a scientifically defensible basis for reopening a facility.

Sandia's expertise in foam technology has resulted in numerous practical tools for facility remediation. For example, Sandia has developed a foam that renders all typical chemical and biological agents harmless. Now commercially available, the foam was instrumental in cleaning up facilities after the anthrax letter attack.

Ensuring Continued Stewardship

The nation's investments in Sandia's science, technology, and engineering capabilities have yielded effective and practical solutions to preparing for and responding to natural disasters and terrorism. We actively seek partnerships with industry, national laboratories, and universities to continue the important work of safeguarding our nation's people, liberties, and critical assets from threat.

For more information contact

Mike Janes at 925.294.2447
mejanes@sandia.gov

Learn more at
<http://homelandsecurity.sandia.gov>