Meeting the Border Challenge

Issue

The figures underscore the magnitude of the border challenge: every year, nearly 500 million people, 5.7 million cargo containers, 2.5 million rail cars, 125 million vehicles, and 16 million trucks cross thousands of miles of U.S. maritime, air, and land borders.

Ideally, security measures would foster this immense flow of legitimate traffic and commerce while preventing illegal entry of people and materials. Further, the border protection system would be designed to defend hundreds of official air, sea, and land ports of entry (POE), thousands of miles of unprotected border (non-POE), and even locations far beyond our borders where threats may originate.

Solution

Sandia National Laboratories is proud to be among the numerous organizations working to secure our vast and diverse system of borders. Long responsible for helping ensure security of the nuclear stockpile, Sandia applies more than 50 years of relevant engineering and analysis experience to help elucidate the complexities of the border challenge and develop efficient and effective solutions. We've contributed at every point in the border system, as highlighted by the examples below.

Protecting Our Borders Outward

Ensuring that materials never approach our borders is a key element of border security. To this end, Sandia has been active in cooperative threat reduction programs, such as the National Nuclear Security Administration's (NNSA's) Materials Protection, Control, and Accounting Program to improve the security of Russian Federation fissile material and nuclear warheads. We're also involved in the Department of Energy/NNSA Second Line of Defense program to prevent nuclear smuggling across the borders of participating countries. In addition, Sandia played a key role in Megaports, a federal program that evaluates the vulnerability of foreign seaports to illegal nuclear material shipments and deploys detection equipment to screen U.S.-bound cargo.

Further, Sandia helps build understanding of the international border system. For example, at the request of the Domestic Nuclear Detection Office (DNDO), Sandia developed high-level architecture options for detecting radiological and nuclear material in land, sea, and air cargo—throughout the entire transportation supply chain.

Securing U.S. Ports of Entry

Sandia's numerous contributions to protect our nation's POE system are typified by our work for Operation Safe Commerce—a federal program that explored business processes and technology solutions for protecting commercial shipments from terrorism, illegal immigration, and contraband. Managing the program for the Ports of Long Beach and Los Angeles, Sandia analyzed specific trade lanes for vulnerabilities, identified security improvements throughout the supply chain, and field tested and recommended potential solutions.

Sandia was selected to manage all three phases of Operation Safe Commerce for the Ports of Los Angeles and Long Beach.

Sandia also headed the maritime work of the Countermeasures Test Bed (CMBT) program, run by the Department of Homeland Security to test and evaluate radiation detectors, including Sandia's Sensor for Measurement and Analysis of Radiation Transients (SMART) detection system. Tests were performed in actual traffic at working shipping facilities to understand how systems would operate in the real world, as well as in controlled test beds, to evaluate performance in all kinds of weather. Ongoing work is testing advanced spectroscopic portals developed by commercial companies.

In addition, Sandia dedicated three years of internally funded research to create a suite of simulation tools for evaluating different security options at land, sea, and air POE. Findings help border officials evaluate technical and economic tradeoffs when selecting and implementing security measures.

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Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Sandia was instrumental in the Countermeasures Test Bed program to evaluate radiation portals in real traffic at operating shipping facilities.

Hands-on Assistance at the Southern and Northern Borders

Sandia works hand-in-hand with U.S. border personnel to test solutions at the borders—and ensure they perform as expected. Activities at the southern border have included selection and field evaluation of border monitoring sensors to support DHS's Arizona Border Control Initiative, as well as helping the New Mexico National Guard evaluate several commercial sensors. At the northern border, we've supported the Integrated Border Enforcement Teams—a joint effort between the United States and Canada—in their search for enhanced sensor systems. Sandia has also helped the DHS Homeland Security Advanced Research Projects Agency in numerous projects, including testing technologies at various maturity levels.

Sandia also provides technical assistance to federal, state, and local border security teams through the Border Research and Technology Center, operated with the National Institute of Justice. And through the Border Technology Development Center, Sandia and New Mexico State University test and deploy technologies for land border crossings.

These and other hands-on activities draw extensively on our work at the Outdoor Test Facility, run by Sandia to evaluate border security technologies—such as sensors, communication links, display technologies, and integrated systems—in the field. Our hands-on work also builds on our deep experience developing technologies for border protection and physical security, including the following:

- An innovative chemical preconcentrator used in sensors—including a Sandia-developed walk-through portal being used in airports—to sniff out trace amounts of explosives and drugs.
- Sandia's SMART radiation detection system, which incorporates our proprietary software for isotope identification.
- Near-surface geophysical characterization, which has been applied for tunnel detection.
- Miniaturized, extremely rapid systems for detecting chemical and biological agents.
- A 3D sensor and facial recognition technology based on a scannerless laser radar.

Sandia assists in numerous field tests, including this installation and evaluation of fiber optic sensors.

Conclusion

Sandia has made major contributions to border security issues at numerous levels and locations. Incorporating our systems analysis legacy, thorough understanding of weapon and countermeasure technologies, and track record in creating physical security systems for high-risk sites and assets, Sandia will continue to present security solutions that address the unique complexities of the border challenge.

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

Partnering with State and Local Leaders for a More Secure Future

Sandia National Laboratories has a strong track record of helping regional, state, and local entities prepare for a more secure future. Below is a sampling of the work we've undertaken to achieve important homeland security goals.

Safer Airports

- A project with **San Francisco International Airport** resulted in guidelines—created by Sandia and Lawrence Berkeley National Laboratory—for minimizing exposure in case of a biological incident. These guidelines are being distributed to airport authorities by the Transportation Security Administration.

Safer Subways

- The **Washington, D.C. Metro** is safer, thanks to PROTECT, a network of optical sensors, chemical detectors, and communications developed by Sandia and other national laboratories.
- **New York City** engaged Sandia to perform an in-depth study of subway system vulnerabilities and defenses. This work will result in a strategy for deploying a network of bio-agent detectors. Sandia's technical assistance also helped the city secure a Department of Homeland Security (DHS) grant to fund this project.

Safer Public Events

- SNIFFER, a rapidly deployable network of air-monitoring sensors for detecting toxic chemicals, was developed by Sandia for DHS as a detect-to-warn system for special events. SNIFFER was operationally deployed for the first time at the **2007 Rose Bowl**. Owned by DHS, the system is suitable for sports arenas and large facilities, both indoors and outdoors.

Safer Borders

- The Border Research and Technology Center, operated by Sandia in partnership with the Navy SPAWAR System Center, San Diego, evaluates border control technologies for **federal, state, and local law agencies**. This assistance is often available at no cost.
- Sandia also works hand-in-hand with the **Border Patrol** on specific issues. For example, Sandia cooperates with several northern border sectors, and provides technical support for Integrated Border Enforcement Teams. We have also evaluated several commercial sensor systems for the New Mexico National Guard.

Sandia helped develop a system to warn the Washington, D.C. Metro of chemical attacks.

In its first offical deployment, SNIFFER was part of the security system used at the Rose Bowl.

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Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Sandia's Hound device can detect trace amounts of explosives or other chemicals—alerting law and border enforcement personnel of possible malfeasance.

Safer Cities

- Should an attack or incident occur, cities need to know how to respond quickly and effectively. Focusing on **San Diego** as the pilot location, Sandia's BioNet program is improving communication between civilian and military public health staff to ensure a faster unified response, as well as developing guidelines for managing attack consequences.

- A prototype chemical detector developed by Sandia helped the **South Texas Specialized Crime and Narcotics Task Force** detect narcotics shipments at vehicle checkpoints, locate drugs in middle and high schools, and seize drug money going south into Mexico. The detector, called Hound, can also sense the minute amounts of explosives on people and items that may be the only clue of criminal or terrorist activity.

Safer Ports

- Sandia served as program manager for the **Ports of Long Beach and Los Angeles** in implementing Operation Safe Commerce—a federal program to explore business processes and technologies for protecting commercial shipments from terrorism, illegal immigration, and contraband. Sandia identified security improvements throughout the international supply chain, tested an array of security technologies, and made recommendations.

- Sandia is working with the **Port Authority of New York and New Jersey** to test advanced radiation detection equipment developed by three commercial companies under a DHS project. This test effort builds on another project to test and develop concepts at busy seaports.

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