Sandia National Laboratories
Recent Accomplishments within Homeland Security and Defense

Defending Against Chemical and Biological Threats

Sandia applies its proficiency in risk assessment and systems analysis to better understand potential attacks—from conception through response and restoration—so that policymakers can better manage potential risks. Our detailed results are helping national leaders improve protection and response strategies by better allocating existing capabilities and filling crucial gaps, which helps preserve lives and prevent damage. Sandia has led a team from many national laboratories to develop the prototype biological warning and incident characterization (BWIC) system. Assimilating information from a variety of sources—such as BioWatch, public health records, and plume and epidemiological models—BWIC provides key information to help decision makers better respond to attacks. With our help, many critical U.S. Department of Energy sites are now better protected against chemical attacks. Sandia is active in efforts to defend transportation systems. We helped create PROTECT, a network of optical sensors, chemical detectors, and communications capabilities deployed in parts of the Washington, D.C., Metro system.
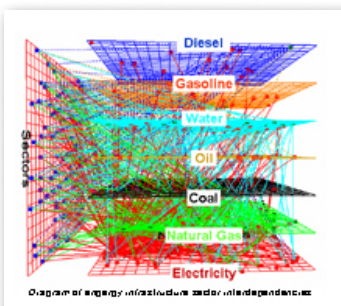

Deterring Explosive Threats

The U.S. needs an agile, proactive approach to anticipating, deterring, and defeating threats from explosive attacks by terrorists. Since the explosive attacks in London in July 2005, Sandia has been actively engaged in providing scientific understanding to Transportation Safety Administration (TSA) decision makers. Examples of our work include evaluating the feasibility of creating explosives from commercially available pre-cursors, characterizing liquid explosives using both experimental and computational approaches, and developing and evaluating detectors for this new class of explosive mixtures. These activities have used interdisciplinary approaches, test capabilities, and modeling and computation to provide technically solid and time-critical results.

Anticipating Pandemic Influenza

The National Infrastructure Simulation and Analysis Center (NISAC), a U.S. Dept. of Homeland Security (DHS) program co-led by Sandia and Los Alamos National Laboratory, completed a two-year examination of potential impacts of pandemic influenza on the nation's population, critical infrastructures, and economy. This work was directed by the White House Homeland Security Council. Results indicated that although absenteeism, mortality, infrastructure service impacts, and demand shocks could cause adjustments to the structure of the U.S economy, effective intervention strategies can contain disease spread, reduce the number of deaths and greatly reduce the long-term economic impacts. As a result, DHS was able to mark "complete" its action item under the Implementation Plan for the National Strategy for Pandemic Influenza to map and model critical infrastructure interdependencies across and within sectors to share critical information with sectors and identify national challenges during a pandemic.

Diagram of energy infrastructure sector interdependencies

Securing our Borders

Physical fences are only one component of a comprehensive border security system, and only one of several areas where Sandia is involved in border security work. Sandia's security capabilities encompass the full spectrum of physical security, including intrusion detection, alarm assessment technologies, performance testing, technology evaluation, vulnerability assessment, design, development, installation, and training. Recently Sandia helped evaluate vehicle barrier performance of fence technologies for borders by conducting a series of successful crash tests to evaluate the design and perform of border fences. Sandia supports the Fence Lab initiative within SBInet, a technology network component of the Secure Border Initiative under DHS Customs and Border Protection.

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NNSA National Nuclear Security Administration

Protecting Key U.S. Assets Beyond Perimeters

Because today's security challenges require facilities to do more than deter adversaries or detect them as they penetrate fences, Sandia developed "beyond-the-perimeter" sensor and assessment defense systems. Virtual Presence and Extended Defense (VPED) systems provide reliable information to responders as early and as quickly as possible to create detection zones and video assessments where none previously existed along such potential avenues of approach as roads, trails, or ravines. VPED was installed as a pilot system to assess detection probabilities, adapting to the environment, and nuisance-alarm rates.
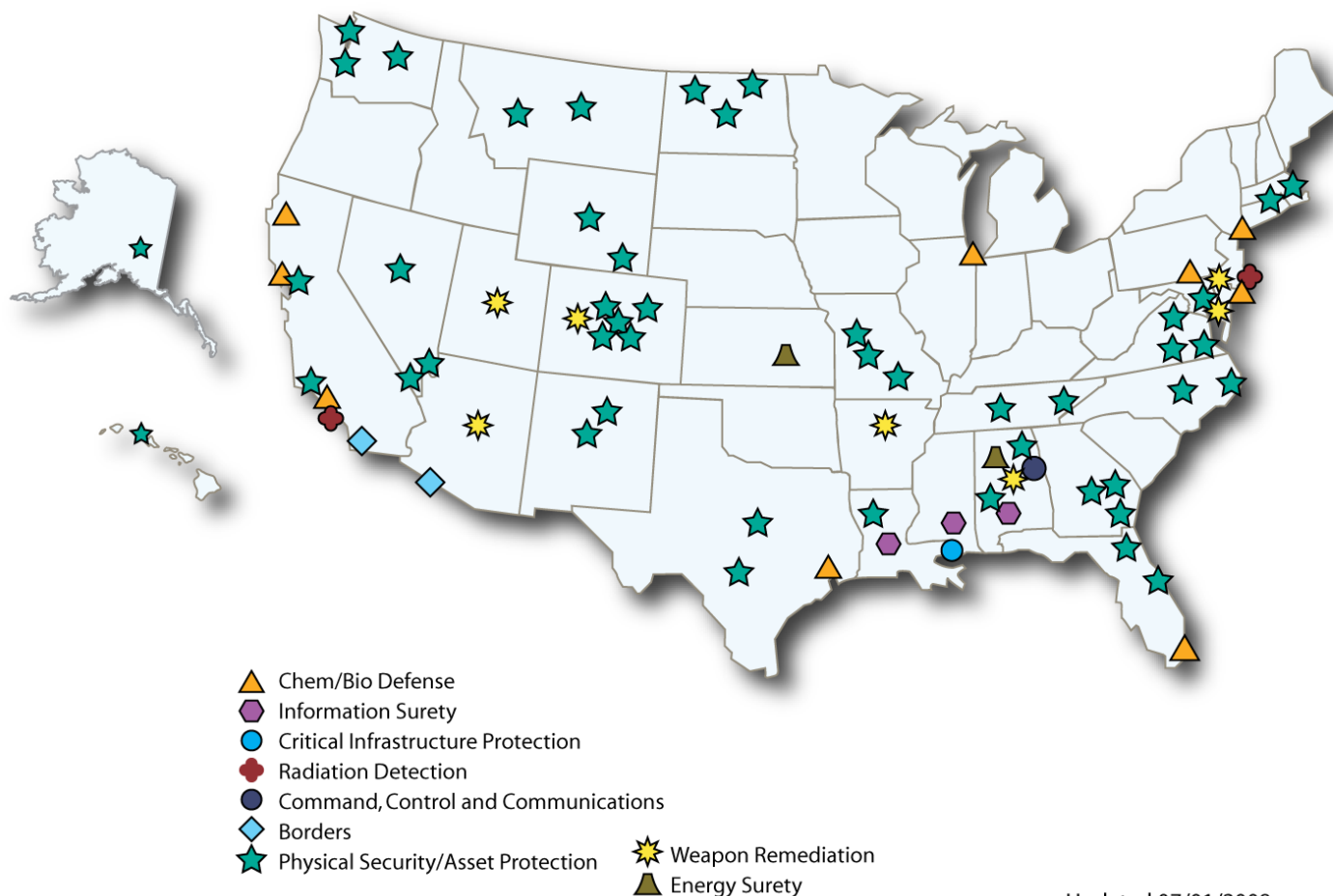
Providing Solutions to Defend Against Domestic Nuclear Threat

Sandia National Laboratories has been supporting the Domestic Nuclear Detection Office (DNDO) of the Department of Homeland Security (DHS) since DNDO's inception in 2005. Sandia provides some level of support for each of the seven main DNDO directorates, from basic research and development in radiation detector materials to 24/7 technical reachback response. Our contributions range from fundamental to applied research and development, to systems analysis and test and evaluation, to day-to-day operational support and forensics and attribution. Sandia applies extensive knowledge and experience and a unique array of laboratories and equipment to contribute to solutions for improved defense against the domestic nuclear threat. For instance, Sandia contributes to forensic activities by performing post-event sampling and analysis of trace elements in nuclear materials, which can provide a fingerprint to identify the material's source. Certain identification of the source of a nuclear weapon or RDD material allows appropriate response, which in turn can help significantly deter future attacks.

Sandia National Laboratories Homeland Security and Defense
Protecting the Public and Critical U.S. Government Assets Include the Following:

- ▲ Chem/Bio Defense
- ⬡ Information Surety
- ● Critical Infrastructure Protection
- ⬢ Radiation Detection
- ● Command, Control and Communications
- ◆ Borders
- ★ Physical Security/Asset Protection
- ✴ Weapon Remediation
- ▲ Energy Surety

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