

National Nuclear Security Administration Terrorism Technologies

Biological Aerosol Sentry Information System (BASIS) Los Alamos National Laboratory/
Lawrence Livermore National Laboratory

Description: BASIS is a portable system of networked sensors and a relocatable laboratory that is used for detecting the release of biological agents, primarily at large public events, both indoor and outdoor. The system provides information on the time, duration, amount and type of biological release for immediate response.

National Infrastructure Simulation and Analysis Center (NISAC) Los Alamos National Laboratory/Sandia National Laboratory

Description: NISAC provides computer modeling and analysis of the nation's at-risk infrastructures. It builds on the labs' years of modeling and simulation capabilities (traffic simulations, air-transport of toxins, electrical grid and natural gas pipelines, other overlapping infrastructures) to provide guidance and prediction to key authorities of the impact of potential natural or terrorist-related disasters, as well as response options to avoid cascading failures among our infrastructures.

DNA Analysis of Pathogens Los Alamos National Laboratory/Lawrence Livermore National Laboratory

Description: The labs have developed bioforensics to track the identity and origins of threatening biological agents. The technology uses microspheres (microscopic particles) and flow cytometry (measuring properties of cells in flow) to detect multiple DNA signatures from multiple organisms, an improvement on the current approach of making an identification based on a single DNA signature. This process can detect agents that cause such things as anthrax, bubonic and pneumonic plague and botulism.

Nuclear Portal Monitor and Palm Pilot Neutron and Gamma Detector Los Alamos National Laboratory

Description: These nuclear detectors are designed to detect the presence of materials on a person, container or even large items such as vehicles. The portal is a stand-alone unit that can be set up in a hallway or driveway. It alarms and signals at the presence of nuclear materials. The Palm Pilot can be held in one hand and uses a Palm Pilot computer as the operator interface to a cadmium-zinc-telluride crystal that detects both neutrons and gamma.

ChemLab/CB™ (Chemical/Biological) and Hound™, Hound II™, Handheld Explosives Preconcentrators Sandia National Laboratory

Description: ChemLab is the handheld equivalent of a fully staffed chemical/biological laboratory. It is fully self-contained, portable and highly sensitive. Currently, the system will detect chemical warfare agents and protein biotoxins. A second generation of research prototypes covering the expanded range of biotoxin and chemical agents will be available in FY '02. During this time, Sandia will also begin development of methods necessary to use these instruments to detect specific pathogens. The Hound and Hound II are hand-portable sample collection and preconcentration devices capable of detecting vanishingly faint odors (parts per trillion) of explosives, drugs, and other chemicals. These portable devices use a miniaturized version of the technology first used in the explosives-detecting personnel portal developed by Sandia for the Federal Aviation Administration.

Rapid Syndrome Validation Project (RSVP) Sandia National Laboratory/Los Alamos National Laboratory

Description: RSVP is a collection and response system that enables doctors and health workers to easily report suspicious illnesses to a central point, thereby forming a detection system for outbreaks of disease or chemical agents. It is an internet-based reporting system that allows busy clinicians to enter patient data in less than a minute. A graphical user interface, icons and other visual assistance minimize time and effort associated with using the system. RSVP automatically notifies public health officials of time-critical disease syndromes and provides instant feedback to diagnosing physicians on six common syndromes in their community and region.

Decontamination Foam Sandia National Laboratory

Description: Decontamination foam includes ordinary household substances such as those found in hair conditioner and toothpaste and neutralizes both chemical and biological agents in minutes. It can be applied to a contaminated surface as a liquid spray, mist, fog or foam. Federal authorities have been using the foam to rid Capitol Hill buildings of anthrax. Sandia licensed rights to commercialize the chem/bio formulation to Modec Inc. of Denver, Colo., and EnviroFoam Technologies of Huntsville, Ala.

Handheld Advanced Nucleic Acid Analyzer (HANAA) Lawrence Livermore National Laboratory

Description: The current HANAA prototype is a portable biodetection instrument that analyzes biological samples for the presence of specific DNA sequences that serve as fingerprints of specific pathogens. It can simultaneously test four samples of two different DNA sequences each and report the results in about 15 minutes.

Autonomous Pathogen Detection System (APDS) Lawrence Livermore National Laboratory

Description: The APDS is a stand-alone instrument that can provide automated continuous monitoring for many potential biological agents at special events or in high-threat locations such as subways. It is a compact, autonomously operated instrument capable of simultaneously detecting multiple pathogens and/or toxins.

Nuclear Emergency Search Team (NEST) DOE/National Nuclear Security Administration Laboratories

Description: NEST responds immediately to any credible report that a terrorist group may have planted a nuclear device somewhere in the United States. It employs an interagency team of more than 1,000 men and women, many of whom are scientists who help build America's nuclear arsenal. NEST has served as a model for threats posed by chemical and biological terrorism.

Portable Isotopic Neutron Spectroscopy (PINS) Idaho National Engineering & Environmental Laboratory

Description: PINS is a mobile, readily fieldable system for the identification of the contents of unmarked or unknown objects. The U.S. Army has integrated PINS with other technologies into a complete system to identify or verify the contents of chemical weapons that are being prepared for destruction. The system has also been used numerous times throughout the U.S. to identify the contents of unknown objects uncovered at construction or demolition sites or at industrial plants. PINS involves bombarding an object with neutrons. The gamma rays escaping from the

object are measured by a spectrometer and the gamma ray spectrum identifies those chemical elements inside the object and their relative abundance. Specially developed software then compares the spectrometer measurements against a database of substances whose chemical makeup are known and provides the operator of the system with an identification of the contents of the object.

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