Homeland Security
Science and Technology

Transportation Security Laboratory

Core Laboratory Capabilities

Simulant Development Laboratory

Mission: The Simulant Development Laboratory is committed to providing non-explosive surrogates for energetic materials to support the development and validation of Explosive Detection Systems (EDS), and the training and testing of EDS operators.

Overview

The Simulant Development lab is focused on the development of "safe-to-handle" explosive simulants for use with explosive detection technologies. The lab studies both the macroscopic bulk physical properties and the microscopic scale properties of explosives in order to develop materials that appear to EDS systems as real explosives. As threats evolve and as EDS technology becomes more discerning of threat signatures, new and more comprehensively representative simulants must be developed. Currently the Simulant Development Laboratory is focused on the analysis and characterization of homemade explosives in order to develop useful simulants.

The Simulant Development lab is equipped to measure a range of density, texture and mechanical properties of explosives, and translate those properties into harmless simulants. The Lab is also equipped to recreate and evaluate a wide range of threat concealment scenarios in order to make policy and operational procedures more robust.

Sample Explosive Simulants

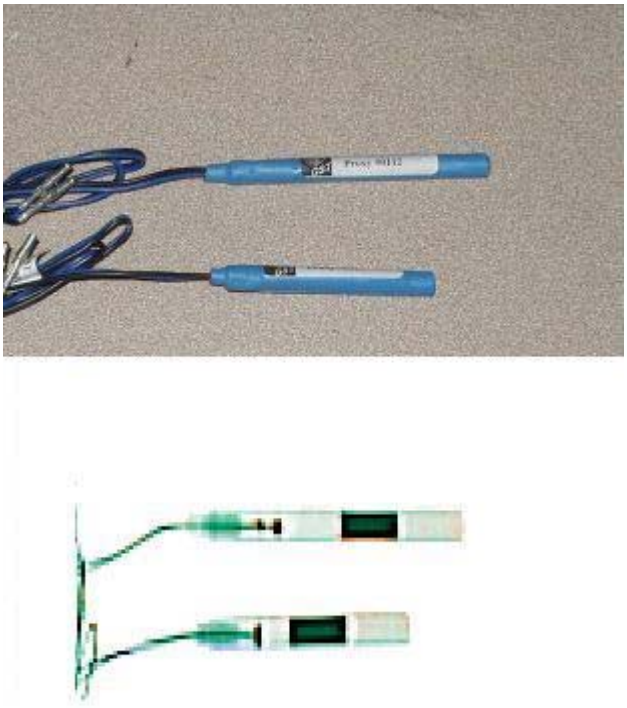
Facilities:

- Dual energy X-ray equipment for the determination of fundamental properties of explosives.
- Computed Tomography systems to determine the x-ray density of explosives and simulants.


Simulants in a range of particle sizes

Focus Areas:

- Micro-Computed Tomography analysis (in conjunction with TSL's Bulk Detection lab)
- Parametric studies to evaluate the performance of EDS with respect to various explosives and non-threat materials.
- Development of High Fidelity Simulants with improved X-ray signatures and better replication of the physical features of target explosives
- Crystal Density Simulants as a basis for modeling the dynamic properties of unconventional home-made explosives.



Simulated detonators (above) in X-ray view (below)

Recent Activities

- Development of MEKP liquid explosive simulant.
- Nitromethane liquid explosive simulant.
- TATP homemade explosive simulants
- Hydrogen peroxide explosive simulants.
- Other conventional and home-made explosives

Transportation Security Laboratory

The mission of the Transportation Security Laboratory (TSL) is to enhance homeland security by developing and validating solutions to detect and mitigate the threat of improvised explosive devices. Established in 1992 at the William J. Hughes Technical Center, Atlantic City International Airport, the TSL's 12 acre secure campus includes specialized explosive storage and handling areas and a multi-laboratory infrastructure designed for research, development, and test and evaluation of technology for explosives and weapon detection and blast mitigation. TSL's team of physicists, chemists, engineers, research psychologists and mathematicians is internationally recognized for its unique ability to advance technology from conception to deployment through applied research, development, prototyping, test and evaluation, assessment, certification, and system qualification. Research areas at the TSL include

- Vehicle and Infrastructure Vulnerability Assessment,
- Automatic Explosive Detection in Checked Bag
- Containerized, Bulk, Palletized and Parcel Cargo Screening,
- Fast Noninvasive Screening of Passengers, and
- Blast Mitigation Technologies and Strategies.

With award-winning R&D and ISO 9001 Certified Independent Test and Evaluation TSL proudly contributes to America's Domestic Security.

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For more information regarding the Simulant Development Laboratory and other capabilities and activities of the Transportation Security Laboratory, send e-mail to TSLinfo@dhs.gov