



THE IMPORTANCE OF DETECTING AND THWARTING THE USE OF EXPLOSIVES

In the past several years, attempted terrorist attacks such as on Northwest Flight 253 and in New York City's Time Square have underscored the serious need to thwart terrorists' use of explosives by detection and by mitigation capabilities. Trace explosive detection systems are therefore critical. Recently established requirements for 100% testing of cargo and checked baggage places increased demands on trace explosive detection systems needed to perform necessary security screening.

Stopping terrorist from using explosives to destroy lives, property, and our sense of security requires vigilance; expertise of both personnel and bomb sniffing dogs; and reliable equipment and systems. Trace detection systems play a critical role in the security screening of individuals, cargo, and checked baggage. Screeners must be trained safely, and the equipment must be calibrated to detect a wide range of explosives. S&T worked with its partners to develop test materials to meet this challenge.

TRACE EXPLOSIVES DETECTION SYSTEMS

The Department of Homeland Security (DHS) Science and Technology Directorate (S&T) partnered with the National Institute of Standards and Technology (NIST) to develop calibration materials (trace explosive simulants) and methods to improve detector performance for both current and evolving threats. These synthesized materials are designed to simulate trace explosives residues so that technology developers and detector end-users can use them to validate instrument performance and perform routine measurements. Together with NIST, S&T has identified the chemical and physical nature of the threats, as well as training and best practices for screener performance. Many of the methods and standards are evaluated at NIST. The results support the development of standard practices and methods for surface sampling. They are targeted for screening explosives at airports and at other checkpoints.

Meanwhile, the development of calibration processes and test materials allows us to ensure the reliability of trace detectors deployed at security checkpoints. S&T developed an ink-jet printer system to apply known quantities of explosives simulants on various surfaces to facilitate training of screeners and calibration of deployed systems.

MILESTONES/DELIVERABLES/TRANSITIONS

The following test materials, or standard reference materials, have been developed and are currently being used to perform system calibrations:

- Organic and Inorganic Trace Particulate Explosives Test Materials
- Trace Terrorist Explosive Simulants
- ASTM E2520: Standard Practice for Measuring and Scoring Performance of Trace Explosive Chemical Detectors
- ASTM E2677: Standard Test Method for Determining Limits of Detection in Explosive Trace Detectors

RECENT ACCOMPLISHMENTS

- Led pilot studies to develop test materials for an Explosive Trace Detector QA/QC program for TSA
- Developed video training aids on contamination awareness for first responder community

PARTNERS/CUSTOMERS

- National Institute of Standards and Technology
- Transportation Security
- New York Police Department
- Food and Drug Administration
- United States Secret Service

