

## WHAT ARE SIMULANTS AND SURROGATES?

A simulant is a raw material that has been demonstrated to have the same properties of interest as a real threat, such as a flammable liquid or plastic explosive. A simulant should have the same “look and feel” based on a human security officer’s perceptions and tactile senses. When a simulant has been packaged in a specific way for use in training or testing, the Transportation Security Laboratory (TSL) refers to the test object as a “surrogate”, and the TSL may validate surrogates as well as raw simulants.

## TESTING EXPLOSIVES DETECTION EQUIPMENT WITHOUT USING EXPLOSIVES

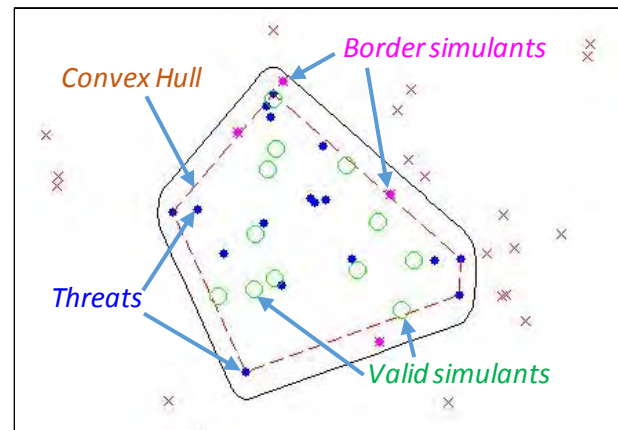
With the specialized expertise of its staff and a wide range of real explosives, TSL is the first stop for performance testing of explosives screening systems. It conducts rigorous tests to make sure a system meets the detection requirements of the end-user. The Simulant Development Laboratory (SDL) at TSL is equipped to measure a range of density, texture, and mechanical properties of explosives. Additionally, the lab can translate those properties into harmless materials that can be shipped to airports or other areas where explosives cannot be used.

## SIMULANT DEVELOPMENT, VALIDATION, AND PRODUCTION

Using threat characterization data, SDL develops simulants that mimic the X-ray and mechanical features of many types of threats, including liquids, semisolids, solids, and powders. SDL evaluates these and commercial simulants for their efficacy for TSL testing or operational testing and training. SDL also packages many simulants to be used as surrogates for anomaly or explosive detection system developmental and qualification testing.

Validation is a key part of surrogate development. Whether testing at TSL, training operators in the field, or performing routine quality control testing, accurate

simulants and custom-packaged surrogates are critically important for several Department of Homeland Security Components.



## VALUE IN SDL PERFORMANCE TESTING

Private industry can provide simulants for detection system manufacturers and law enforcement agencies to check system performance. SDL uses its specialized resources to carry out independent assessments on these “commercial off-the-shelf” products, providing feedback to both the industry simulant manufacturers as well as to the federal, local, and international government end-users. SDL also creates new simulants not yet available commercially, based on our proprietary approach to simulant design and optimization.

## RECENT PROJECTS

- Micro-Computed Tomography texture analysis and development of simulants with texture
- Development of a widely-accepted government program for verification, validation, and accreditation of simulants and surrogates
- Development of high fidelity simulants with identical X-ray signatures and odor

# Simulant Development Laboratory



Homeland  
Security

Science and Technology

- Development of fentanyl simulants for customs and border applications

