

DHS Science and Technology Directorate

Screeners Training & Selection

X-ray scanners enhance our threat detection capabilities, but images are difficult to interpret

The Transportation Security Administration (TSA) relies on highly trained Transportation Security Officers (TSOs) to screen every bag boarding commercial aircraft within the United States. The X-ray image analysis task conducted by TSOs is a challenge for multiple reasons.

X-ray images provide information about the inner structure of a scanned item and depict the object's density. Interpreting an X-ray image is challenging. This is due to the unique perceptual cues needed to interpret images that X-ray scanners create and TSOs cannot rely on real-world visual cues to identify potential threats.

Current methods and tools/technologies used by TSOs at operational screening checkpoints have resulted- in more than 84,876,000 searched items, taking more than 3,536,500 man-hours annually.

To improve TSO training and operations, TSA partnered with the Department of Homeland Security's Science and Technology Directorate (S&T) to research what visual cues and search techniques are shared among Exceptional Performing (EP) screeners and how to transfer these skills to other screeners, as well as select those personnel during the hiring process.

S&T studied EP screeners to enhance X-ray threat detection training and maximize TSOs' efficiency and effectiveness

S&T collected field data by observing EP screeners within their operational environment. S&T collected data on how EP screeners analyzed X-ray images, focusing on how screeners used discrete cues and techniques to identify and distinguish threats from non-threats. S&T conducted field observations of 119 TSOs across nine airports. Each TSO scanned approximately 50 to 60 test bags, verbalizing what they were thinking and doing as they scanned each bag.

Based on findings from these controlled field observations, S&T identified significant performance differences in sensitivity and accuracy. The analysis clearly demonstrated that EP screeners outperformed other TSOs.

Solution for Screener Training & Selection

A protocol analysis of exceptional performing TSOs was conducted to identify cues, techniques, methods and strategies related to X-ray imagery analysis that were consistently used by the highest of these top performers. The resultant training material developed for Improvised Explosive Devices (IEDs) and IED components training was evaluated through a pilot training effectiveness study during a new hire class. Results demonstrated positive effects on certification scores and operational throughput.

Impact

Developing and deploying the training materials based on the best practices of TSA's top screeners will make screening operations more effective and efficient and save TSA money by lowering secondary screening rates at checkpoints and increasing checkpoint throughput.



Transition Plans

- TSA Operational Training Deployment Schedule:
 - Adding improved training material to existing curriculum.
- Transition Barriers:
 - Coordination and logistics involved with accessing airports and various stakeholder organizations across TSA for training validation and implementation.



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To learn more about Advance Screener Training and Selection, contact SandT.rsd@hq.dhs.gov