Transportation Security Administration

Threat Image Projection

Innovation & Technology

Overview | Advanced Technology | Biometrics | BLS (Fido) | CastScope
EDS | ETD | Threat Image Projection | Trace Portals | Whole Body Imaging

In addition to the classroom training, we use on-the-job training to keep our security officers' skills sharp. Through the daily use of a Threat Image Projection (TIP) software program, our security officers are routinely tested on their ability to detect weapons and explosives by x-ray. Potential threats, including guns and explosives, are projected onto x-ray images of carry-on bags so our security officers remain focused and attentive.

These tests allow us to evaluate individual performance and shape our training programs appropriately. Because our x-ray equipment is linked to a vast internal network, every airport and x-ray monitor receives automatic image updates from the technology lab. This link allows us to quickly deploy the latest intelligence on potential and emerging threats to security officers across the nation.

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Trace Portals

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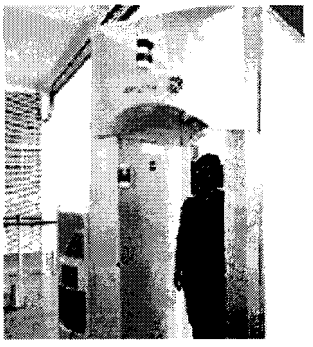
As threats grow in complexity, we need to do more than simply x-ray bags and have travelers go through metal detectors. That's where explosive trace portals come in.



These machines blow puffs of air on a traveler, which it then analyzes for trace amounts of explosives. Even the tiniest amount of explosive is no match for a trace portal. Better yet, these great assets to our work can be instantly updated through our vast information technology network to stay ahead of the curve.

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Explosive Detection System

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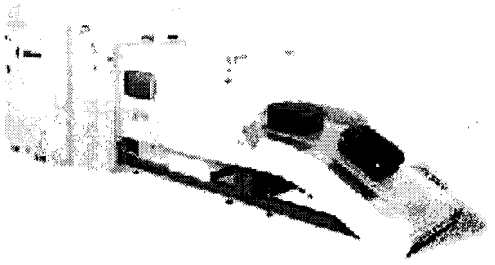

Ever wonder what happens to your bag once you check it with your airline? We screen every bag - 100% - of all bags placed on an airplane, whether taken as carry-on or checked with an airline. With nearly 2 million people flying each day, it's a Herculean task.

We are able to meet this requirement by relying on Explosive Detection System (EDS) machines, which work like the MRI machines in your doctor's office. Through a sophisticated analysis of each checked bag, the EDS machines can quickly determine if a bag contains a potential threat or not. If a weapon or explosive is detected, the machines alert our security officers so they can manage the bag appropriately. In some cases, the alarm is quickly resolved and in others law enforcement and the bomb squad may be called in.

When used in conjunction with an airport's automated baggage handling system, we achieve dramatic improvements in both security and efficiency.

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Explosives Trace Detection

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Explosive Detection Systems are the size of a mini-van and employ technology similar to a medical CAT scan whereas Explosives Trace Detection (ETD) equipment is much smaller - about the size of large suitcase. Screeners working with the portable ETD use a swab on a piece of luggage; the swab is then analyzed for traces of explosives.

New technology is being developed to increase the efficiency and throughput of existing Explosive Detection System machines, and TSA scientists are testing upgraded models of ETD equipment.

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Bottled Liquid Scanners

Innovation & Technology

- Read the press release on bottle liquid scanners being piloted.

Bottled liquids scanners are explosive detection systems that differentiate liquid explosives from common, benign liquids. This technology is capable of analyzing substances within a bottle by aiming sensors at the bottle opening and analyzing the intake of certain vapors.

TSA has piloted two handheld explosive detection systems in the airport environment: the Nomadics, Inc. Fido PaxPoint and the Smiths SABRE. TSA worked with the manufacturers, DHS Science & Technology Directorate, and the national science labs to modify the Fido PaxPoint to scan bottled liquids.

The challenges of screening bottles for concealed explosives or flammable liquids have been explored for a decade plus, but previous technology was not operationally viable due to commonalities in materials and high alarm rates. The challenge has been two-fold: the range of physical properties of liquid explosives and potential flammable liquids, and the broad range of benign, common liquids with which people travel.

Transportation Security Administration | U.S. Department of Homeland Security

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Biometrics

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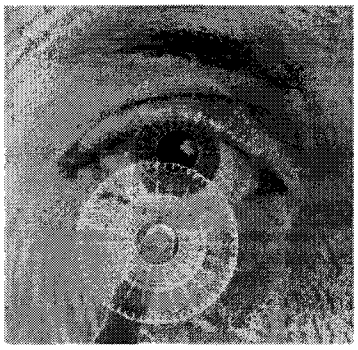

Retinal scans. Fingerprint identification. A few years ago these things seemed like something out of a science fiction movie. Today, they continue to grow as important parts of our risk-based approach to security.

Biometric identification allows us to verify a person is who they say they are by using their own unique set of identifiers - whether fingerprints, iris scans or a combination of the two. We continue to test this technology at airports and harbors across the country, allowing us to control access to important facilities.

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Our Approach

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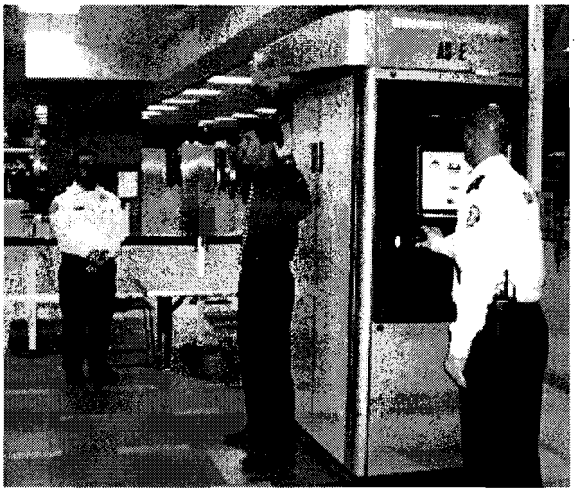
Keep Moving to Stay Ahead



TSA understands that threats to aviation security continue to evolve. They are more sophisticated and more complex than ever before. TSA must use every tool at our disposal to address those threats and develop methods of combating them. The use of new and innovative technology helps us stay ahead of those intent on harming our nation.

TSA is constantly moving forward its technology usage, staying ahead emerging threats. We know there's no silver bullet technology, no cure all, no end-all-be-all; but when used by our highly trained workforce and combined with the other layers of security, technology helps close down vulnerabilities.

Our strategy involves more than just screening of all carry-on and checked baggage. We use careful analysis of intelligence to determine where best to deploy our technology resources at airports, in subways, at ports and on rail. Uses of trace portal machines enable us to detect explosives on a person. Daily vetting of passengers and airport employees against watch lists let us protect the airports. And biometrics help us prevent unauthorized access at our nations' ports. That is only the beginning.

The suite of technology has grown considerably in the years since TSA took over airport security. Everyone remembers the walk through metal detector, which still serves an important function at the checkpoint. You may notice some new and unfamiliar machines at your local airports. This page is your first stop to learning about emerging screening technologies.

- Paperless Boarding Pass: TSA and Continental Airlines Continue to Expand Paperless Boarding Pass Pilot Program
- Advanced Technology: By the end of 2008, 75 percent of security lanes at America's largest airports will use Advanced Technology. This covers about 45 percent of all air passengers.
- Biometrics: Raising the bar on security through biometric technology.
- Bottle Liquid Scanners: By the end of 2008, over 90 percent of all air passengers will be protected by bottle liquid scanners at the checkpoint.
- CastScope: Allows TSA to screen casts and prosthetics.
- Explosive Detection System: New technology that can be used to screen checked or carry on baggage.
- Explosives Trace Detection: Small, flexible, nimble. This technology tests for traces of explosives.
- Threat Image Projection: Constantly training our TSOs with the latest technology.
- Trace Portals: Walk through explosives detection portals.
- Whole Body Imaging: The newest checkpoint technology.

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Whole Body Imaging

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Passenger imaging is an umbrella term used to describe technologies that visually screen travelers, allowing TSA to more thoroughly detect weapons, explosives and other threat items.

TSA will be using two different types of passenger imaging technology during a pilot phase: backscatter and millimeter wave.

TSA has piloted backscatter passenger imaging technology at Phoenix Sky Harbor International Airport (PHX) since February 2007. Testing of millimeter wave technology will begin in PHX in October 2007.

In the current pilot phase at PHX, backscatter is being used during secondary screening, on a voluntary basis, as an altemative to the traditional pat-down. To date, approximately 79 percent of passengers have opted to try backscatter rather than undergo a pat-down. The millimeter wave unit will also be positioned in secondary screening as a voluntary alternative to a pat-down.

TSA plans to expand the passenger imaging pilot in the coming months to JFK and LAX. There will be opportunity for continued public dialogue as we evaluate how the technology performs in the airport setting. During the pilot TSA will assess operational issues, passenger throughput and privacy concerns.

- **Click here** to learn more about Millimeter Wave technology.
- **Click here** to learn more about Backscatter technology.

What are the Privacy Measures of Passenger Imaging?

Images will not be printed, stored or transmitted

To ensure privacy, the passenger imaging technology being tested by TSA has zero storage capability and images will not be printed stored or transmitted. Once the transportation security officer has viewed the image and resolved anomalies, the image is erased from the screen permanently. The officer is unable to print, export, store or transmit the image.

Screener viewing images is remotely located

In addition to not storing, printing or transmitting the image, the transportation security officer will be viewing the image on a stand-alone machine (vs. network) that is located in a remote area from the screening process. The image will not be visible to the public, and the viewing TSO will not be permitted to bring any camera into the viewing area. The transportation security officer attending to the passenger at the machine is unable to see the image being produced. Communications between the attending TSO and viewing TSO are accomplished by a red light/green light system.

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Advanced Technology Checkpoint X-ray

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Watch how each Advanced Technology system works:

- Rapiscan 620DV (wmv, 2.0Mb)
- Smiths Detection HI-SCAN 6040aTIX (wmv, 3.3Mb)

AT is a catch phrase for a group of advanced x-ray technologies that will improve carry-on bag screening and enhance airline passenger security. ATs provide clear, high-definition x-ray images that improve TSA security officers' ability to detect potential threat items. Some AT units also employ multiple x-ray angles (views), provide high-definition zoom and/or have automated detection capabilities that will further enhance the TSOs' effectiveness. By comparison, currently deployed technology depends on a single, top-down x-ray view.

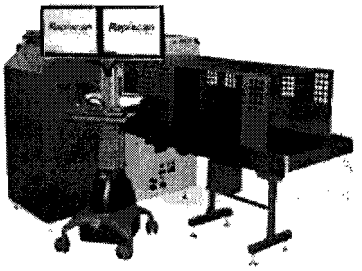
In addition, AT x-ray systems are built to be upgradeable and programmable. As threats emerge and AT's capabilities improve, enhancements to the equipment at airports will generally require only a software upgrade.

AT systems are highly cost-effective and can be widely deployed in a few years. AT training is relatively easy, as the interface is either very similar or identical to current x-ray machines.

TSA is piloting AT systems from three manufacturers at security checkpoints. Contracts have been awarded for Rapiscan's 620DV, L3 Communications' ACX™ 6.4 Automated Checkpoint X-ray System, and Smiths Detection's HI-SCAN 6040aTIX. One each of these three units initially will be pilot-tested at Albuquerque (ABQ), Washington Reagan National (DCA), and New York (JFK) airports to determine operational suitability and effectiveness.

Rapiscan 620DV

Rapiscan 620DV provides both a horizontal and vertical x-ray view of carry-on luggage.

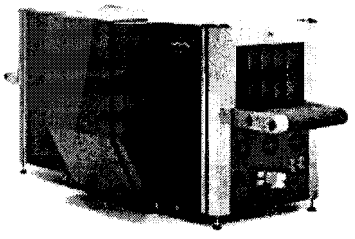


These two perpendicular views provide a complete perspective regardless of their orientation inside the system.

Automated explosives detection software is also applied to scanned images.

Smiths Detection HI-SCAN 6040aTIX

Smiths Detection HI-SCAN 6040aTIX uses several, independent generators, each of which is connected to its own X-ray sensor technology.



The two x-ray views (Dual View) support the quick and reliable evaluation process, and automated explosives detection flags potential threat items on screen.

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CastScope

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TSA Begins Piloting of New CastScope Security System at Airport Checkpoints

TSA will be piloting the new CastScope screening system at four airports over the next several weeks. In an effort to improve the screening of passengers with prosthetic devices, casts, and support braces, TSA awarded a prototype contract to Spectrum San Diego, Inc. The TSA has reviewed CastScope for feasibility, effectiveness, safety, and civil liberty concerns.

The CastScope pilot began on April 25, 2007, at San Jose International Airport, (SJC). TSA will also pilot the technology at Tampa International Airport (TPA), Nashville International Airport (BNA), and Reagan National Airport (DCA) in May and June 2007.

In the pilot phase, passengers with prosthetics, cast, or a brace will participate on a voluntary basis. This new system enables TSA to screen simultaneously and more thoroughly for threats, and is sensitive to passengers with special needs.

To learn more about the CastScope, please see the frequently asked questions below:

Frequently Asked Questions

Q: What is the CastScope X-ray?
A: The CastScope uses backscatter technology to produce an X-ray image of casts, braces, heavy bandages, and/or prostheses, allowing TSA to quickly and non-invasively identify any potential threats.

Q: What is backscatter technology?
A: Backscatter scans a narrow, low-energy X-ray beam over the body surface. The reflection, or backscatter, of the beam is detected, digitized and displayed on a monitor. The high contrast image generated allows TSA to differentiate between articles such as braces, prosthetics, and external medical devices, and prohibited items.

Q: What is the purpose of the CastScope X-ray?
A: The CastScope was designed to supplement the walk-through and hand-held metal detectors for passengers with casts, braces, heavy bandages, or prosthetics that may alarm because of the metallic components of the devices by providing an X-ray image for TSA to assess concealed threats.

Q: How long does it take to be scanned by the CastScope?
A: The scanning cycle lasts approximately 2.5 seconds, and produces a computer-enhanced image of the 6x8-inch examination area almost immediately on the computer screen.

Q: What is the difference between backscatter X-rays and medical X-rays?
A: Backscatter X-rays only penetrate approximately ¼ of an inch before the rays are scattered, whereas medical X-rays transmit completely through the body. For comparison, the CastScope emits less than 10 microRem of radiation per scan and a typical medical X-ray emits 10,000 to 100,000 microRem per scan.

Q: How much radiation exposure is produced from 1 scan of the CastScope? Is it safe?
A: One scan is equivalent to approximately 10 microRem of radiation. This is equivalent to the exposure each person receives in about two minutes of airplane flight at altitude or each person receives every 15 minutes from naturally occurring background radiation.

Q: How is it verified that the CastScope X-ray is in compliance with safety standards?
A: The device was designed to comply with the ANSI/HPS N43-17 standard and recommendations of the National Council on Radiation Protection and Measurement. Both standards detail procedures for measuring the radiation emissions from the source (scanning head). Certified personnel check the radiation emissions periodically per the procedures outlined by the ANSI and NCRP standards and recommendations.

Q: Can the radiation exposure from the CastScope X-ray cause cancer?
A: Exposure to low levels of ionizing radiation not exceeding those from the environment has not been shown to affect human health.

Q: How intrusive is screening using the CastScope?
A: Not at all. It is not necessary to raise or remove any article of clothing that may be covering the cast, brace, or prosthesis to image the area where the prosthetic, cast, or support brace are worn.

Q: Can the CastScope damage an advanced prosthetic (with integrated circuitry)?
A: No, the CastScope will not damage mature or state-of-the-art devices.

Q: Will CastScope screening damage implanted medical devices such as pacemakers, defibrillators, or bone growth simulators?
A: No. The CastScope does not emit a magnetic field and will not cause any adverse medical consequences to implanted medical devices or any other disability-related equipment.

Q: Who manufactures the CastScope?
A: The CastScope was designed by Spectrum San Diego, Inc. located in San Diego, CA.

Q: Are you testing this technology in response to a specific threat?
A: No. We are piloting the CastScope for operational feasibility purposes as we do with all technologies under consideration for use at security checkpoints.

Q: Has TSA consulted with any passengers with disabilities or disability-related organizations during the development or fielding of this technology?
A: Yes. As with all aspects that affect the disability population, TSA continues to work with its Disability Coalition of over 73 disability-related groups and organizations to ensure the CastScope integrates the needs of persons with disabilities. TSA has extended outreach efforts to include: preoperational studies by National Safe Skies Alliance and the Amputee Coalition of America (ACA), an ACA demonstration in Minneapolis, and a pilot demonstration in Reno in coordination with the Veterans of Foreign Wars Conference.