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Focusing public attention on emerging privacy and civil liberties issues

Whole Body Imaging Technology ("Backscatter" X-Ray and Millimeter Wave Screening)

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Top News

- **UPDATE - EPIC Posts TSA Documents on Body Scanners:** EPIC has posted more than 250

pages of documents it obtained in a Freedom of Information Act [lawsuit](#) concerning body scanners. The documents, released by the Department of Homeland Security, reveal that Whole Body Imaging machines can record, store, and transmit digital strip search images of Americans. This contradicts [assurances](#) made by the TSA. The documents include [TSA Procurement Specifications](#), [TSA Operational Requirements](#), [TSA contract with L3](#), [TSA contract with Rapiscan \(1\)](#), and [TSA contract with Rapiscan \(2\)](#). The DHS has withheld other documents that EPIC is seeking. For more information, see [EPIC: Whole Body Imaging Technology](#) and [EPIC: Open Government](#). (Jan. 11, 2010)

- **EPIC Obtains Documents about Body Scanners:** As a result of a Freedom of Information Act lawsuit, EPIC has obtained the TSA technical specifications and the vendor contracts for Whole Body Imaging devices, commonly called "body scanners." The documents reveal that TSA mandated that the devices have hard disk storage, USB access, and ethernet connectivity. The documents obtained by EPIC also detail a "Level Z" authority for TSA that allows the security agency to disable privacy filters and to export raw image files. The documents will be posted later today. EPIC is pursuing other information from the agency, including policy guidance. For more information, see [EPIC's Whole Body Imaging page](#). (Jan. 11, 2010)
- **President Obama Cites Intelligence Failure in Christmas Day Plot:** Today President Obama [discussed](#) the airplane attack on Christmas Day. The President pledged to investigate and address intelligence failures that allowed an Al Qaeda operative to board a plane with an explosive device. President Obama stated "this was not a failure to collect intelligence, it was a failure to integrate and understand the intelligence we already had." The President said that steps would be taken to improve watch lists. The President also recommended "smarter screening" at the nation's airports, but did not endorse an expansion of whole body imaging devices. For more information, see [EPIC: Whole Body Imaging Technology](#), [EPIC's Spotlight on Surveillance](#), and [FB Group: Stop Airport Strip Searches](#). (Jan. 5, 2010)
- **Attempted Bombing on U.S. Flight Prompts Renewed Debate Over Body Scanners:** On December 25, 2009, Umar Farouk Abdul Mutallab, a Nigerian citizen, attempted to detonate explosives hidden in his underwear during a Christmas Day flight. Abdul Metallab was en route from Amsterdam, Netherlands to Detroit, Michigan when he attempted to detonate the device, which resulted in a fire on board the aircraft. In the days following the attack, [some advocated](#) for wider implementation of whole body imaging machines. Privacy organizations and others have continued to [object to these devices](#), citing the invasive nature of the scans, [the ineffectiveness of the machines](#) and the [lack of government transparency](#) concerning privacy safeguards. For more information see [EPIC: Whole Body Imaging Technology](#). (Dec. 26, 2009)
- **EPIC Files Lawsuit for Information about "Digital Strip Search" Devices:** On December 17, 2009, EPIC filed a [lawsuit](#) against the Department of Justice concerning the use of devices that capture images of individuals stripped naked. The Transportation Security Administration has [confirmed](#) the Whole Body Imaging machines are being used in at least one Virginia federal court by the US Marshall Service. EPIC submitted a FOIA request for information about these devices including the contracts with the manufacturer of the machines, and information about technical specifications and training materials. The Marshall Service failed to respond adequately to the request. EPIC filed suit, said that the agency had not performed a sufficient search and

should disclose the documents requested. For more information, see [EPIC's Open Government Page](#) and [Whole Body Imaging Page](#). (Dec. 18, 2009)

- **DHS Announces "Global Entry" Biometric Identification System for U.S. Airports:** Today, the Department of Homeland Security [proposed](#) to make permanent Global Entry, a program the agency says will “streamline the international arrivals and admission process at airports for trusted travelers through biometric identification.” Under the [proposed system](#), pre-registered international travelers can bypass conventional security lines by scanning their passports and fingerprints at a kiosk, answering customs declaration questions, and then presenting a receipt to Customs officials. The DHS announcement follows the recent news that Clear, a Registered Traveler program, had entered bankruptcy, raising questions about the possible sale of the biometric database that was created. In 2005, EPIC [testified before Congress](#) that the absence of Privacy Act safeguards for Registered Traveler programs would jeopardize air traveler privacy and security. The agency is [taking comments](#) on the proposal. For more information, see [EPIC Air Travel Privacy](#), [EPIC Biometric Identifiers](#), [EPIC Automated Targeting System](#), and [EPIC Whole Body Imaging](#). (Nov. 19, 2009)
- **Congressional Committee Investigating Privacy Office at Homeland Security, Acknowledges Privacy Coalition Letter:** [House Homeland Security Committee](#) Chairman Bennie Thompson has [responded](#) to the Privacy Coalition [letter](#) regarding the Chief Privacy Officer of the Department of Homeland Security. Chairman Thompson said that "the Committee is in the process of reviewing the programs outlined" in the letter, and thanked the Coalition for bringing the issues to the attention of the committee. He further stated that the Committee "will continue to examine the Department's programs and policies and vigorously address privacy concerns and issues." For more information, see [EPIC DHS Privacy Office](#) and [Privacy Coalition](#). (Nov. 12, 2009)
- **EPIC Sues Homeland Security for Information About Digital Strip Search Devices:** EPIC filed a Freedom of Information Act [lawsuit](#) challenging the Department of Homeland Security's failure to make public details about the agency's [Whole Body Imaging](#) program. The [devices](#) capture detailed naked images of air travelers in the United States. After the agency announced that the body scanners would become the primary screening device in US airports, EPIC [demanded](#) that the agency disclose records that describe the scanners' capacity to save and transmit images. In June, EPIC sent a [letter](#) to the Secretary of Homeland Security Janet Napolitano [urging her to suspend](#) the digital strip searches. For more, see [EPIC Backscatter X-ray, Whole Body Imaging](#) and [EPIC Air Travel Privacy](#). (Nov. 9, 2009)
- **Privacy Coalition Seeks Investigation of DHS Chief Privacy Office:** EPIC joined the Privacy Coalition [letter](#) sent to the [House Committee on Homeland Security](#) urging them to investigate the Department of Homeland Security's (DHS) Chief Privacy Office. DHS is [unrivaled](#) in its authority to develop and deploy new systems of surveillance. The letter cited DHS use of Fusion Center, Whole Body Imaging, funding of CCTV Surveillance, and Suspicionless Electronic Border Searches as examples of where the agency is eroding privacy protections. [EPIC Fusion Centers](#), [EPIC Whole Body Imaging](#), and [EPIC CCTV](#). (Oct. 23, 2009)
- **TSA Expands Passenger Electronic Strip Search Program:** The [Transportation Security](#)

[Administration \(TSA\)](#) has [plans](#) to greatly expand its use of whole body imaging machines at airports around the country. The x-ray machines, which each cost over \$100,000, capture detailed, graphic images of passengers' naked bodies. In June, the House of Representatives overwhelmingly passed a [measure](#) that would restrict TSA's use of these machines. The measure is pending in the Senate. The Privacy Coalition has [urged](#) the Department of Homeland Security to suspend the program until privacy and security risks can be fully evaluated. EPIC has also filed Freedom of Information Act [requests](#) for the contracts with the vendor Rapiscan. For more information, see [EPIC Whole Body Imaging Technology](#) and [EPIC Spotlight on Surveillance](#). (Oct. 6, 2009)

- **TSA Broadens Use of 'Backscatter X-Ray' Machines That Conduct 'Virtual Strip Searches':** The Transportation Security Administration is expanding the use of "backscatter X-ray" systems for passenger screening. The \$100,000 refrigerator-size machines use "backscatter" technology, which bounces low-radiation X-rays off of a passenger to produce photo-quality images of travelers as if they were undressed. Computer processing partially obscures the image that is available to operators. TSA states that the agency will delete the raw images, but there is no law or regulation that prevents the agency from saving the original, detailed images. Until there is such a prohibition, EPIC believes funding for the program should be suspended. See EPIC's Spotlight on Surveillance and page on Backscatter X-ray. (October 11, 2007)
- **Field Tests Begin in Arizona on Backscatter X-Ray Machines:** An X-ray machine aimed at detecting weapons and explosives hidden on passengers is scheduled to make its debut Friday at Phoenix's Sky Harbor International Airport. The "backscatter" will be in operation at Security Checkpoint B in Terminal 4. While any Terminal 4 ticketed passenger can pass through any checkpoint, the B concourse is primarily used by travelers on Tempe-based US Airways. (February 21, 2007)
- **Phoenix Airport to Use 'Backscatter' X-Ray on Travelers:** Sky Harbor International Airport here will test a new federal screening system that takes X-rays of passenger's bodies to detect concealed explosives and other weapons. The technology, called backscatter, has been around for several years but has not been widely used in the U.S. as an anti-terrorism tool because of privacy concerns. (December 1, 2006)

Background

Post-September 11, airline travel security has invoked the increased use of technology and better training of security personnel as a means of improving travel security. Some of these proposals, such as improved training for airport screeners, checking all bags for bombs, strengthening cockpit doors, and placing air marshals on flights, do not implicate privacy interests and are sound security measures. Others, however, present privacy and security risks to air travelers because they might create data files directly linked to the identity of air travelers. These files if retained could provide the basis for a database of air traveler profiles. The Transportation Security Administration utilizes two technologies to capture naked images of air travelers - backscatter x-ray technology and millimeter wave technology.

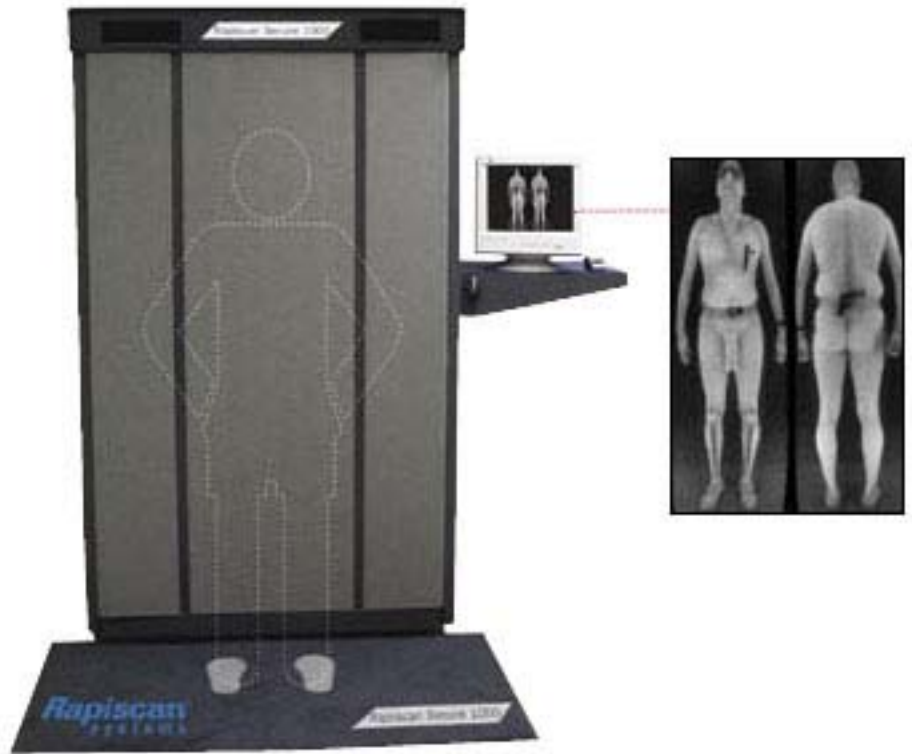
In 1895 x-rays¹ were discovered by [Wilhelm Röntgen](#).² This discovery of how to look through an object

to observe details beneath has advanced to include new techniques. One such technique called "backscatter" X-Ray is based on "the emergence of radiation from that surface of a material through which it entered. Also used to denote the actual backscattered radiation."³

The application of this new x-ray technology to airport screening uses high energy x-rays that are more likely to scatter than penetrate materials as compared to lower-energy x-rays used in medical applications. Although this type of x-ray is said to be harmless it can move through other materials, such as clothing.

A passenger is scanned by rastering or moving a single high energy x-ray beam rapidly over their form. The signal strength of detected backscattered x-rays from a known position then allows a highly realistic image to be reconstructed. Since only

Compton scattered x-rays⁴ are used, the registered image is mainly that of the surface of the object/person being imaged. In the case of airline passenger screening it is her nude form. The image resolution of the technology is high, so details of the human form of airline passengers present privacy challenges.



Airport security has undergone significant changes since the terrorist attacks of Sept. 11, 2001. Recently, the Transportation Security Administration (TSA) announced a proposal to purchase and deploy "Whole Body Imaging" X-ray machines to search air travelers at all airports. TSA said it believes that use of the machines is less invasive than pat-down searches. However, these machines, which show detailed images of a person's naked body, are equivalent to a "virtual strip search" for all air travelers. This proposal, along with the agency's controversial plan to profile air travelers, shows extraordinary disregard for the privacy rights of air travelers. The Department of Homeland Security is requesting \$72 million to invest in detection systems, which includes funding for the backscatter machines, which cost between \$100,000 and \$200,000 each.

The backscatter machines use high-energy X-rays that are more likely to scatter than penetrate materials as compared to lower-energy X-rays used in medical applications. Although this type of X-ray is said to be harmless, it can move through other materials, such as clothing. When being screened, a passenger is scanned by high-energy X-ray beam moving rapidly over her body. The signal strength of detected backscattered X-rays from a known position then allows a highly realistic image to be reconstructed. In

the case of airline-passenger screening, the image is of the traveler's nude form. The image resolution of the technology is high, so the picture of the body presented to screeners is detailed enough to show genitalia. These images are not necessarily temporary - screeners can save the body images to the system's hard disk or floppy disk for subsequent viewing on either "the system monitor or on any IBM compatible personal computer with color graphics."

Backscatter X-Rays and Transportation Screening

The Transportation Security Administration claims that it is not storing detailed images of passengers screened by the system. The agency also states that it is providing a screening option for passengers who object to screening by the technology. However, the technology is designed to accomplish what has been described on this page, and until the process of assuring that the claims of the agency are enforced-- questions will remain about the use of the technology. EPIC will make available on this page aviation security and privacy -related documents it obtains from the government under the Freedom of Information Act law about the adoption of "backscatter" x-ray technology intended for use in screening air travelers.



The stated goal of these new proposals is to rely on technology to reduce the "hassle factor" in airports and to reduce security threats. The core idea is to focus security resources on suspicious travelers, while ensuring that most people are not inconvenienced by heightened security. Terrorists, however, have been known to go to great lengths to look like most people. Will a technology that will capture detailed images of potentially all airline travel passengers lead to greater safety? Current technology can successfully detect dangerous substances, firearms and other weapons without backscatter x-ray imaging of passengers. Can the goal of safe air travel be reached without reproducing a digital image of a passenger's body? It has long been recognized by security experts that it is impossible to eliminate all threats to airline travel.

Is the application of "backscatter" x-ray technology a deterrent and not a solution to perfect airline travel safety? If this is true, then is the trade off in passenger privacy worth the effort to deter terrorists? The application of security technology and increased passenger screening has also resulted in an increased detection of non-violent criminal offenses. Is the application of "backscatter" x-ray technology to screen airline passengers more than just a means of detecting terrorists?

In 2009, the TSA announced that Whole Body Imaging would replace metal detectors at airport security check points. This is a marked departure from the earlier promises by the agency that the technology would only be used for secondary screening of air travel passengers.

Airports Currently Using Whole Body Imaging Technology

- Albuquerque International Sunport Airport
- Hartsfield-Jackson Atlanta International Airport
- Baltimore/Washington International Thurgood Marshall Airport

- Ronald Reagan Washington National Airport
- Denver International Airport
- Dallas/Fort Worth International Airport
- Detroit Metro Airport
- Indianapolis International Airport
- Jacksonville International Airport
- McCarran International Airport
- Los Angeles International Airport
- Miami International Airport
- Phoenix Sky Harbor International Airport
- Raleigh-Durham International Airport
- Richmond International Airport
- San Francisco International Airport
- Salt Lake City International Airport
- Tampa International Airport
- Tulsa International Airport

Latest News

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- EPIC's [Face Recognition](#) Web page.
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Profiling

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Other Documents

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- National Academy of Sciences report "[Airline Passenger Security Screening: New Technologies and Implementation Issues](#)".

Analysis

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- HotWired article "[Fear of Flying](#)" on proposals. (September 11, 1996).

Other Airline Passenger Screening Resources

- **FAA Proposes Profiling Regulations.** The Federal Aviation Administration published [proposed regulations](#) on April 19, 1999, governing "Security of Checked Baggage on Flights Within the United States." The draft rules detail the use of computer profiling techniques to identify suspicious passengers.
- **Airline Passenger Profiling Goes Into Effect.** The Computer Assisted Passenger Screening System was scheduled to be phased in nationwide beginning on January 1. Under the system, passengers who "fit the profile" will be selected for heightened security measures, which can include a thorough search of their luggage, intrusive personal questioning, tagging of luggage with orange tape, and a physical escort from the check-in counter to the airport gate by security personnel. The ACLU is providing an [online complaint form](#) for passengers targeted by the profiling system.
- Microsoft Chief Architect Charles Simonyi tells what happens when you "[fit the profile](#)" (from *Slate*).
- Proposed FAA [rule](#) for collecting personal information including name, address, Social Security Number, Date of birth and next of kin for every domestic passenger.

- General Account Office report, [Aviation Safety and Security: Challenges to Implementing the Recommendations of the White House Commission on Aviation Safety and Security](#) (Testimony, 03/05/97, GAO/T-RCED-97-90).
- The Gore Commission has released its [final report](#) recommending passenger profiling. A coalition of 17 groups has sent a [letter](#) to Gore opposing ID checks, profiling, new x-ray technologies and excessive secrecy by the FAA in making decisions.

Legislative History

[HR 1271. FAA Research, Engineering, and Development Authorization Act of 1997](#). Funds FAA projects for new surveillance technologies such as advanced x-ray systems for individuals. Introduced on 4/10/97 by Morella (R-Md). Referred to the House Committee on Science. Approved by Committee 4/16/97. Reported to the House H. Rept. 105-61 (CR H1714) on 4/21/97. Measure adopted on 4/29/97, RC #95 (414-7), (CR H1995). Referred to Senate Committee on Commerce, Science and Transportation (CR S3843) on 4/30/97.

Bill Passed the Senate: 11/13/1997

Mr. Sensenbrenner moved that the House suspend the rules and agree to the Senate amendments: 2/3/1998

Bill Passed the House by a voice vote: 2/3/1998 3:07pm:

Bill Signed into Law by President Clinton: 2/11/1998

Became Public Law No: [105-155](#).

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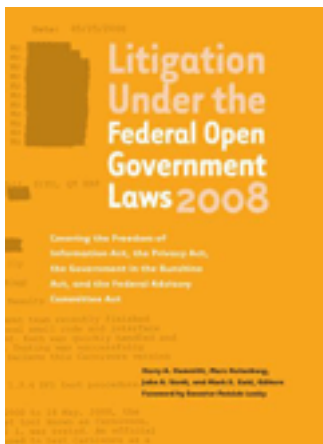


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