Exhibit A

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TRAVEL

TSA modifies pat-downs to exclude breasts

Thursday, December 23, 2004 Posted: 11:17 AM EST (1617 GMT)

story.travel.tue.jpg

The holiday travel season is in full swing at airports across the nation.

WASHINGTON (CNN) -- The Transportation Security Administration announced late Wednesday that it is modifying pat-down procedures at airports -- a decision that comes after hundreds of complaints, most of them from women, that the procedure is too intrusive.

Under the new guidelines, screeners will not be able to pat-down a passenger's breast area unless the handheld metal detector goes off or if there is an irregularity in the passenger's clothing outline, said TSA spokesman Dave Steigman.

Steigman said that under the new policy, passengers will have their sides patted down. Once that is done, there will be a limited torso pat-down from front to back, from a line below the chest area to the waist. Screeners will pat the entire back.

He also said people in wheelchairs will not have to get out of their wheelchairs for the pat-downs. The screening will be done while they are seated, using the wand and explosive trace detection machines, he said.
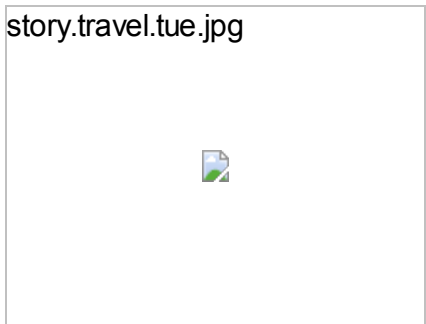
However, he said other passengers who cannot walk through the metal detector, including people with walkers, will have to undergo the full body pat-down.

The new procedures take effect Thursday, Steigman said.

He would not say what prompted the change. He said criticism to the agency of the pat-downs has amounted to a few hundred complaints out of an estimated

50 million passengers who have flown since the procedure was implemented.

The TSA began conducting the full body pat-downs in August after female suicide bombers downed two Russian airliners, killing 89 people.

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The TSA has refused to reveal the regulations allowing passenger pat-downs.
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Many of the complaints about the pat-downs have come from women who said they felt violated by them.

Helen Chenoweth-Hage, a former Republican congresswoman from Idaho, said screeners at the Boise airport refused to reveal the regulations allowing them to pat her down -- angering her so much she drove the more than 300 miles from Boise to Reno, Nevada.

"I was absolutely astounded at the fact that they thought they could violate my Fourth Amendment rights, violate my privacy, violate my body because of some secret law," she said.

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Exhibit B

The New York Times
nytimes.com

June 16, 2005

Airport Device to Ease Need for Pat-Down

By ERIC LIPTON

The number of airline passengers patted down at security checkpoints should drop significantly by the end of the year, after the nation's largest airports are equipped with new explosive detection devices, federal officials announced yesterday.

The walk-through devices - known as puffer machines - can detect trace amounts of explosives, allowing Transportation Security Administration screeners to find nonmetallic bombs without physically inspecting passengers.

The torso pat-downs endured by about 250,000 passengers a day across the nation became much more frequent last year after the bombing in Russia of two planes with explosives carried aboard by passengers.

The security administration has been testing the puffer machines at airports in 14 cities since last summer. Yesterday the agency announced it planned to install 162 machines by the end of the year in the nation's 40 busiest airports, which handle about 80 percent of the daily passenger traffic.

The total number of puffer machines - which cost about $140,000 each - will be far fewer than the inventory of walk-through metal detectors, since only about 15 percent of passengers undergo more intense screening. In those cases, individuals will be asked to walk into the explosive detection device and stand still for a few seconds while several bursts of air are released. The portal automatically collects and analyzes the air for traces of explosives dislodged from the passenger's hair, skin or clothing. Each portal can handle about 180 passengers an hour.

Passengers who set off a walk-through metal detector will be required to be checked with a hand-held metal-detection device. But fewer passengers should have to submit to pat-downs once the puffer machines are in place, said Mark O. Hatfield Jr., an agency spokesman.

The puffer machines are being bought from Smiths Detection of Pine Brook, N.J., and General Electric of Wilmington, Mass. They are the first in a series of new devices that the agency intends to introduce in the next several years to improve security, Mr. Hatfield said.

Requirements for Visitors

WASHINGTON, June 15 (AP) - Visitors from friendly nations will not immediately be asked to show fingerprint or iris scan data when entering the United States, but they may have to in coming years under Bush administration plans announced Wednesday.

The United States requires that by Oct. 26 nations whose citizens enjoy visa-free travel rights to the United States issue passports with tamperproof digitized photos. But one year later, those nations' passports will have to include an integrated circuit chip capable of storing expanded biographical information.

Exhibit C

Airport body scanners useless: German police

(AFP) – Jul 30, 2011   34

BERLIN — Body scanners being tested at Germany's Hamburg airport have had a thumbs down from the police, who say they trigger an alarm unnecessarily in seven out of 10 cases, a newspaper said Saturday.

The weekly Welt am Sonntag, quoting a police report, said 35 percent of the 730,000 passengers checked by the scanners set off the alarm more than once despite being innocent.

The report said the machines were confused by several layers of clothing, boots, zip fasteners and even pleats, while in 10 percent of cases the passenger's posture set them off.

The police called for the scanners to be made less sensitive to movements and certain types of clothing and the software to be improved. They also said the US manufacturer L3 Communications should make them work faster.

In the wake of the 10-month trial which began on September 27 last year, German federal police see no interest in carrying out any more tests with the scanners until new more effective models become available, Welt am Sonntag said.

The European parliament backed on July 6 the deployment of body scanners at airports, but on condition that travellers have the right to refuse to walk through the controversial machines.

Worried about embarrassing intrusion into people's privacy, the parliament said the scanners should only produce images of "stick figures" and that any data must be immediately destroyed.

Concerned about the potential health risks, lawmakers also called for a ban on the use of X-ray scanners that use ionising radiation.

The use of scanners caused an uproar in the United States last year because they produce a graphic image of a person's body, giving rise to the name "naked scanner".

The United States stepped up the deployment of body scanners at airports after a Nigerian man was accused of trying to ignite explosives concealed in his underwear during a Christmas day flight from Amsterdam to Detroit in 2009.

Washington then urged the European Union to follow suit but Europeans decided to first study their impact on health and privacy.

Some EU states, including Britain, France, the Netherlands, Italy and Finland, as well as Germany, have tested body scanners.

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A woman is checked by a full body scanner at Hamburg's Fuhlsbuettel airport in 2010 (AFP/File, Fabian Bimmer)

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Exhibit D

Poll: Majority oppose body scans, nearly half seek alternative to flying

By
Tuesday, November 23, 2010 13:26 EDT

Topics: **body** ♦ **Pat** ♦ **percent**

The use of backscatter x-ray machines to scan travelers' bodies and new pat down procedures at airports will cause 48% of Americans to seek an alternative means of transportation, according to a Zogby International poll.

Of the 2,032 likely voters polled between November 19 and November 22, 61 percent said they oppose the use of body scanners and pat downs.

The findings of the Zogby poll strikingly contradict an **earlier poll of 1,137 adults conducted by *CBS News*** November 7 to November 10. That poll found only 15 percent of respondents were opposed to the use of body scanners at airport security checkpoints, with four out of five saying they're in favor.

A ***Washington Post-ABC News* poll** of 514 adults conducted on November 21 found over half of respondents supported the use of body scanners and 70 percent supported the use of profiling at airports.

Another poll, conducted by ***USA TODAY/Gallup*** and published today, found that most travelers are bothered or angered by pat downs.

A growing number of people are concerned about invasions of privacy and possible health effects of new body scanners being used by the Transportation Security Agency (TSA).

"They say the risk is minimal, but statistically someone is going to get skin cancer from these x-rays," Dr. Michael Love, who runs an x-ray lab at Johns Hopkins University School of Medicine, said.

Those who choose to opt out of a body scan face an "enhanced" pat down procedure that has been described as nothing short of molestation.

Republicans and Independents are more opposed to the new body scans and pat downs than Democrats, with 69 percent of Republicans and 65 percent of Independents opposing them, compared to only 50 percent of Democrats.
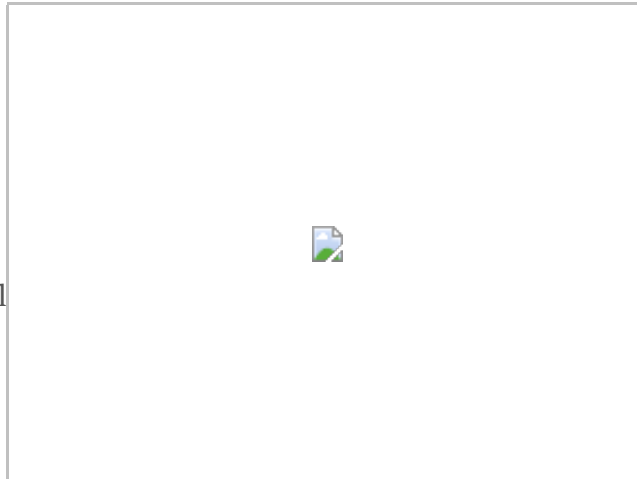
The poll also found that men were slightly more opposed than women, with 63 percent of men and 60 percent of women opposing the TSA's new checkpoint procedures.

In addition, 52 percent of respondents think the new security procedures will not prevent terrorist activity, 48 percent consider it a violation of privacy rights and 32 percent consider it to be sexual harassment.

"It is clear the majority of Americans are not happy with TSA and the enhanced security measures recently enacted," said pollster John Zogby. "The airlines should not be happy with 42 percent of frequent flyers seeking a different mode of transportation due to these enhancements."

The poll also found likely voters prefer body scans to TSA pat downs, 48 to 7 percent.

One traveler at Lindbergh Field was so fed up with the new procedures he stripped down to his underwear to avoid a pat down, **NBC San Diego** reported. He was arrested for refusing to put his clothes back on.

"TSA needs to see that I'm not carrying any weapons, explosives, or other prohibited substances, I refuse to have images of my naked body viewed by perfect strangers, and having been felt up for the first time by TSA the week prior, I was not willing to be molested again," he said in a statement released by his attorney Sunday.

Many who are upset about the new body scanners and intrusive airport pat down procedure have decided to hold an "**opt-out" protest on November 24** to show travelers how "the TSA treats law-abiding citizens" who refuse to be scanned.

The American Civil Liberties Union has received more than 600 complaints from passengers, a legislative counsel for the organization told the **Associated Press**.

"We all wish we lived in a world where security procedures at airports weren't necessary," John Pistole, the head of the TSA, said, "but that just isn't the case."

Exhibit E

October 4, 2013

HUFF POST POLITICS

Andrea Stone
andrea.stone@huffingtonpost.com
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John Mica Attacks TSA 'Chat-Downs' As 'Idiotic,' Says Screening Failures Are 'Off The Charts'

First Posted: 10/24/11 04:25 PM ET Updated: 12/24/11 05:12 AM ET

WASHINGTON -- The chairman of the House committee that oversees the Transportation Security Administration blasted the agency's recent test of "chat-downs" of airline passengers, calling the pilot program "idiotic."

House Transportation and Infrastructure Committee Chairman John Mica (R-Fla.) told reporters during a briefing Monday that the TSA's experiment at Boston's Logan International Airport -- in which officers engaged passengers in brief conversations to help detect suspicious behavior -- is "a mess."

"This is no joke," said Mica, who has pummeled the TSA as a bloated bureaucracy with a mission he believes could be carried out more efficiently and cheaply by private companies under federal government supervision.

Mica laced into the pilot program, slated to be tested next in Detroit before rolling out to airports nationwide, as a pale imitation of the interrogations routinely conducted by Israeli security at Ben Gurion International Airport in Tel Aviv. He noted that the expanded behavior detection pilot builds on an existing program that the Government Accountability Office said lacked scientific validity and has cost "a quarter billion" to hire thousands of screening officers.

During a recent visit to Logan to observe the pilot, Mica said he watched about a dozen officers quiz passengers in the terminal. "I put my ear up and listened to some idiotic questions," he said of the questions that delved into where travelers were coming from, why they'd been there and where they were going.

"I talked to them about their training, which was minimal," he said of his conversations with security personnel. He went on to say that even though passengers selected for further screening were supposed to go through hi-tech scanners, on the day he visited the machines were out of service because there weren't enough trained personnel to run them.

"It's almost idiotic," Mica said. "It's still not a risk-based system. It's not a thinking system."

This isn't the first time Mica has denounced the agency he helped to create in the wake of the Sept. 11 terrorist attacks -- on Monday he even trashed the TSA's blue uniforms and badges. But his latest harsh criticisms offered a preview of an upcoming committee report on the TSA's first decade.

The assessment will likely recount TSA's controversial record of using imaging technology that has raised the hackles of privacy advocates and has proven less than effective in spotting the dangerous materials they were designed to detect.

"The failure rate (for imaging equipment) is classified but it would absolutely knock your socks off," Mica told reporters. The number of times TSA pat-downs failed to detect contraband is also secret but, according to the chairman, is "off the charts."

Mica said the report, due out in the next couple of weeks, would be "sort of like the record of the Marx Brothers."

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Exhibit F

Airport body scanners useless: German police

(AFP) – Jul 30, 2011   34

BERLIN — Body scanners being tested at Germany's Hamburg airport have had a thumbs down from the police, who say they trigger an alarm unnecessarily in seven out of 10 cases, a newspaper said Saturday.

The weekly Welt am Sonntag, quoting a police report, said 35 percent of the 730,000 passengers checked by the scanners set off the alarm more than once despite being innocent.

The report said the machines were confused by several layers of clothing, boots, zip fasteners and even pleats, while in 10 percent of cases the passenger's posture set them off.

The police called for the scanners to be made less sensitive to movements and certain types of clothing and the software to be improved. They also said the US manufacturer L3 Communications should make them work faster.

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The European parliament backed on July 6 the deployment of body scanners at airports, but on condition that travellers have the right to refuse to walk through the controversial machines.

Worried about embarrassing intrusion into people's privacy, the parliament said the scanners should only produce images of "stick figures" and that any data must be immediately destroyed.

Concerned about the potential health risks, lawmakers also called for a ban on the use of X-ray scanners that use ionising radiation.

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Washington then urged the European Union to follow suit but Europeans decided to first study their impact on health and privacy.

Some EU states, including Britain, France, the Netherlands, Italy and Finland, as well as Germany, have tested body scanners.

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AFP

A woman is checked by a full body scanner at Hamburg's Fuhlsbuettel airport in 2010 (AFP/File, Fabian Bimmer)

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Exhibit G

AlaskaDispatch
News and voices from the Last Frontier

Published on *Alaska Dispatch* (http://www.alaskadispatch.com)

Home > High false alarm rate for TSA body scanners raises questions

Michael Grabell, Christian Salewski
December 24, 2011
Main Image:
TSA body detector anomaly detected [1]

While X-ray body scanners used in airports face concerns about potentially increasing cancer cases [2], a safer type of scanner has been plagued by another problem: a high rate of false alarms.

The scanner, known as the millimeter-wave machine, uses low-level electromagnetic waves that, unlike X-rays, have not been linked to cancer. The Transportation Security Administration already uses the millimeter-wave machine and says both types of scanners are highly effective at detecting explosives hidden under clothing.

But two of Europe's largest countries, France and Germany, have decided to forgo the millimeter-wave scanners because of false alarms triggered by folds in clothing, buttons and even sweat.

In Germany, the false positive rate was 54 percent, meaning that every other person who went through the scanner had to undergo at least a limited pat-down that found nothing. Jan Korte, a German parliament member who focuses on homeland security, called the millimeter-wave scanner "a defective product."

While it's difficult to know for sure if the millimeter-wave machine has a worse false-alarm rate than the X-ray machine, recent tests suggests that it does. The TSA wouldn't release its results, citing national security. But a British study found the X-ray machine had a false-alarm rate of just 5 percent.

For the millimeter-wave machines, a complicating factor is new privacy software [3] that was installed in many countries after a public outcry over the scanners' graphic images. The software automates detection and no longer creates an image of a passenger's body. While false alarms were reported before automation when human screeners interpreted images, the software appears to have made the problem worse.

The privacy safeguards are also an obstacle to lowering the false-alarm rate, researchers say. The machines do not save images or data, which could be used to teach the software how to distinguish real threats from false ones.

The problem of false alarms comes down to fundamental physics. Millimeter waves penetrate clothing and reflect off objects. But because of their frequency, millimeter waves also reflect off

water, which can cause the scanner to mistake sweat for a potentially dangerous object, said Doug McMakin [4], the lead researcher who developed the millimeter-wave scanner at the Pacific Northwest National Laboratory. (X-rays, which operate at a higher frequency, pass through water more easily.)

In addition, millimeter waves penetrate clothing materials differently, and layers of clothing can create a barrier, triggering a false alarm.

"These are known as clutter issues in the imaging," McMakin said.

The manufacturer, L-3 Communications, said that in the United States the scanners have not experienced a high rate of false alarms caused by either clothing or sweat. L-3 executives noted that the millimeter-wave machine is installed in airports in some of America's most humid cities, including Houston, New Orleans and Miami.

But as late as last November, the head of the TSA told Congress that false alarms were too frequent to deploy the privacy software. The TSA said the rate has improved since then and now meets its standards, which it would not disclose.

"As with many types of technology, there will be an anticipated amount of false alarms that are considered acceptable, and we continue to work with industry vendors to improve both the detection and operation capabilities for all of our technology," spokesman Greg Soule said.

But results from other countries, as well as tests conducted in the United States before 9/11, show false alarms occurred between about a quarter and half of the time. Moreover, dozens of U.S. travelers told ProPublica they had to get a pat-down despite passing through the body scanners.

Only one report of the false alarm rate for the X-ray body scanners could be found. At Manchester Airport in the United Kingdom, where 13 machines have been tested on more than 2.5 million people, the rate has been less than 5 percent -- and that includes passengers who left items such as keys in their pockets, said airport spokesman John Greenway.

Referring to the false alarm rate, Peter Kant of the manufacturer, Rapiscan Systems, said, "Our numbers internally are in the very low single digits." The company, as well as several physicists, said sweat does not cause false alarms with the X-ray scanners.

In an effort to close a gaping hole in its ability to catch explosives, the TSA in 2009 began installing body scanners alongside metal detectors for routine screening. The deployment ramped up quickly after a Nigerian man tried to blow up a plane that Christmas with explosives hidden in his underwear.

The TSA purchased both types of scanners [5] with plans to deploy them at nearly every security lane by 2014. In hubs, such as Atlanta and Dallas-Fort Worth, it installed millimeter-wave machines, which look like round glass booths and emit low-powered electromagnetic waves similar to those found in police radar guns.

In other major airports, such as Los Angeles and Chicago O'Hare, it installed X-ray machines, also known as backscatters, which look like two large blue boxes and emit extremely low levels of ionizing radiation, a form of energy that strips electrons from atoms and damages DNA,

potentially leading to cancer.

The possible health risk of the X-ray scanners, while small, has prompted several prominent radiation experts to ask why the TSA doesn't just use the millimeter-wave machine. The agency has said keeping both technologies in play encourages the contractors to improve their detection capabilities and lowers the cost for taxpayers.

The United States is almost alone in deploying the X-ray body scanners for airport security: Nigeria has installed them, and the United Kingdom is testing them for random screening and to check passengers who have set off the metal detector. Last month, the European Union prohibited the X-ray machines [6], effectively leaving the millimeter-wave scanner as the only option in Europe.

The United Kingdom will have to stop using the machines once its test is completed, according to the European Commission. But the commission has also asked one of its scientific committees for a health study that could change its position on the backscatters.

Guns, Sweat and Privacy Fears

During a Republican presidential debate in 1988 [7], George H.W. Bush, pulled out a .22-caliber miniature revolver made with only a small amount of metal to dramatize the new types of guns that could pass through airport metal detectors.

"That weapon at this point cannot be detected," he said. "That weapon can kill the pilot of an airplane."

The comments, along with concerns over a new Glock pistol made of plastic, spurred the Federal Aviation Administration, which was then in charge of security, to fund research into a millimeter-wave imaging system at the Pacific Northwest National Laboratory.

After 9/11, the lab licensed the technology to a startup company, which was acquired by L-3 in 2006.

When the scanners debuted, TSA officials boasted that they were so good at detection, that screeners could literally see the sweat on someone's back.

At that time, human operators viewed the image. Although sweat might appear similar to a threat, trained officers learned to recognize normal sweat patterns, said Kip Hawley, TSA administrator from 2005 to 2009. In fact, sweat could help officers detect a sheet explosive, he said, because something taped or glued to the body changes the natural sweat pattern.

"It never popped up where we said, 'Oh God, we're getting killed with false positives,'" Hawley said. "I think it's a training issue, training the officers on interpreting the images."

But because of the uproar over agents seeing passengers' bodies -- what critics decried as a "virtual strip search" -- other countries began installing automated detection software last year, and the TSA followed suit in July.

Now, instead of displaying an image of a particular passenger's body, the machine shows a

generic, unisex outline that's reminiscent of the cartoon character Gumby. Any potential threat is indicated by a yellow box that shows up roughly where the software detected it -- on the right ankle, for example, or the left elbow.

"It looks for abnormalities," said Tom Ripp, president of L-3's security and detection division. "It looks for objects that are not supposed to be there."

The advantage, L-3 officials said, is that screeners can focus their checks on the highlighted area instead of patting down a passenger's entire body.

"If you go out to an airport like D.C., Reagan, you'll see how easily the process works," said senior vice president Bill Frain. "Usually somebody left something in their pocket. We sat there and watched for 20 minutes. The duration between an alarm and a check -- they were just putting people through. It was a very quick check."

The European Experience

That wasn't the case in Germany.

The German interior ministry tested two L-3 body scanners with the automated detection software at Hamburg Airport, screening 809,000 airline passengers from September 2010 through July 2011. Despite the high rate of detection, the delays caused by frequent false alarms were so unbearable that Germany decided that the technology was not ready for everyday use.

Nearly seven out of 10 passengers had to be stopped for further screening. Although some passengers had forgotten coins or tissues in their pockets, 54 percent of all passengers who went through the scanners triggered true false alarms -- meaning that no hidden objects were found on those people, a ministry spokesperson said.

The vast majority of false alarms, affecting 39 percent of all passengers, were attributed to sweat, buttons or folds in clothing. Another 10 percent resulted from passengers moving during the scan, while 5 percent couldn't be explained at all.

Ripp from L-3 said the high alarm rate comes down to how diligent the screeners are about asking passengers to take off belts and boots, remove bulky sweaters and assume the proper stance with their hands over their heads. In the United States, the stance has become routine, he said.

"That was not the case in these trials in Hamburg," Ripp said.

The German interior ministry, however, dismissed the idea that it hadn't followed the manufacturer's protocol. Officials there provided ProPublica with a flier [8] that was handed out to passengers before the screening that specifically tells them how to stand and to remove sweaters, belts and boots.

"Prior to the field test, the security personnel was specially trained to deal with body scanners and has adhered to the control procedure," the spokesperson said via email. "The passengers were asked to take off the named items."

Germany wasn't the only country to have problems with false alarms.

France tested the scanners with and without the privacy software on more than 8,000 passengers flying out of Paris's Charles de Gaulle Airport to New York from February to May 2010. But the government decided not to deploy them because there were too many false alarms, said Eric Heraud, a spokesman for the French civil aviation authority.

Heraud wouldn't release specific figures but said the false alarm rate was higher with the automated detection than when officers interpreted the images. France plans to conduct a new test of the millimeter-wave scanners in 2012.

In Italy, the rate of false alarms was 23 percent, said Giuseppe Daniele Carrabba, head of the airports coordination department for the Italian civil aviation authority.

Italy tested two L-3 scanners with the automated detection software at the airports in Rome and Milan. The test ended in September, and officials are awaiting a final decision on whether to deploy the machines later this month. Carrabba said he thinks Italy will use them, and that the false positive rate will improve with more training and better preparation of the passengers for screening.

L-3 attributed the variations in experiences to the different settings that countries choose for what to detect and what to ignore.

Other countries that have deployed millimeter-wave scanners -- Canada with 51 machines and the Netherlands with 60 -- said they had not experienced problems with false alarms. They declined to disclose their false-positive rates.

The American Experience

In the United States, the TSA has deployed more than 250 millimeter-wave machines and plans to install 300 more by next spring.

The TSA declined to answer detailed questions. Instead, the agency released a statement saying that it had tested the automated detection software rigorously.

"Once it met the same high standards as the technology currently in use, TSA successfully tested the software in airports to determine whether it was a viable option for deployment," the statement said. "While there are no silver bullet technologies, advanced imaging technology with this new software is effective at detecting both metallic and non-metallic threats."

Shortly after the machines were developed, preliminary tests at Seattle-Tacoma International Airport in 1996 resulted in a false alarm rate of 31 percent, according to a research paper presented at a conference the following year. During the tests, screeners who were new to the machine viewed images of people carrying various weapons, explosives and innocuous objects and had up to 27 seconds to identify them. According to the paper, researchers did test the results with layered clothing.

In 2000, those same images were run through a primitive model of the automated detection and privacy software. The false alarm rate increased to 38.5 percent when the machine was set on

high sensitivity but decreased to 17 percent when set on low sensitivity, according to another study by the same researchers at the Pacific Northwest National Laboratory.

"Overall, these results show comparable performance" between the software and the human screeners, the researchers concluded.

The TSA ran additional tests over several years before deploying the scanners, but late last year, administrator John Pistole told Congress the tests were still showing a high rate of false alarms with the software. Officials said the false alarm rate improved, and the agency began installing the software over the summer.

Still, American travelers frequently complain about false positives similar to those experienced in Europe.

Lynne Goldstein, an archaeologist at Michigan State University, said she generally prefers the scanners because, with two knee replacements, she always sets off the metal detectors and has to undergo a pat-down.

But, she said, a cotton shirt she frequently wears while traveling set off the millimeter-wave machine several times while flying out of Detroit. TSA agents told her it was the shirt's "kangaroo pocket" similar to those found on sweatshirts that triggered the alarm.

"The last time, they did a full pat-down," Goldstein said. "The thing that's ironic to me: I actually like the machine."

Many travelers, however, also reported false alarms with the X-ray body scanner.

Jason Ritchie, an associate chemistry professor at the University of Mississippi, said he was flying out of Memphis on his way to a conference in August when the operator of the X-ray machine spotted something that required further checking.

The suspicious item: The pockets of his cargo pants, he was told.

"It kind of annoys me when I have to go through the X-ray system because I don't like to be irradiated unnecessarily," Ritchie said. "To have to go through that and then be told I also had to get a pat-down was frustrating."

ProPublica tried to get a handle on the false alarm rate in the United States by commissioning a poll by Harris Interactive. The poll of 2,198 people was conducted online to ensure that those who responded could view images of the machines in addition to reading a description.

Of the 581 people who said they had taken a flight in the past six months, nearly two-thirds, or 367, reported going through a body scanner.

About 11 percent of those scanned said they were patted down anyway despite having nothing on them -- the equivalent of a false alarm.

Among this group, the rate of false alarms was slightly higher for the millimeter-wave machine over the X-ray scanner. But Harris Interactive cautioned that because the sample size of people reporting this experience was small, the result cannot be generalized to the population at large.

Possible Solutions

Improving the technology to increase detection but limit false alarms is extremely challenging because of the great variety of body shapes and clothing, said McMakin of the Pacific Northwest National Laboratory.

The machine can be taught to recognize patterns in clothing such as a left breast pocket in men's dress shirts, he said. But whereas screeners could generally see the outline of an abnormal pocket or buttons in an image, the privacy software eliminates such human discretion.

One option is to combine the millimeter-wave scan with an optical camera to weed out those issues, McMakin said. For example, software could compare the millimeter-wave scan with the photograph to determine if a button or a zipper was causing the alarm. Developers could also increase or decrease the frequency of the waves or improve the shape and location information in the algorithm, he added.

"We're just at the beginning of where this technology can go," McMakin said.

Ripp from L-3 said it all comes down to "machine learning."

Getting the information of what's normal in order to improve the technology requires many thousands of scans. But because of the privacy outcry, the machines used in airports do not save the images or data from the scans. Without that real-world data, developers have to find other ways to teach the software to distinguish real threats from false ones.

Christian Salewski, a former fellow at ProPublica and a staff writer for the Financial Times Deutschland, reported from Hamburg.

This report [9] was originally published by ProPublica [10] and is republished here with permission.

Source URL: http://www.alaskadispatch.com/article/high-false-alarm-rate-tsa-body-scanners-raises-questions

Links:
[1] http://www.alaskadispatch.com/image/tsa-body-detector-anomaly-detected
[2] http://www.propublica.org/article/u.s.-government-glossed-over-cancer-concerns-as-it-rolled-out-airport-x-ray
[3] http://www.tsa.gov/approach/tech/ait/privacy.shtm
[4] http://www.youtube.com/watch?v=eXDPWTJQD0w
[5] http://www.tsa.gov/approach/tech/ait/how_it_works.shtm
[6] http://www.propublica.org/article/europe-bans-x-ray-body-scanners-used-at-u.s.-airports
[7] http://www.c-spanvideo.org/program/RepublicanP/start/2072/stop/2113
[8] http://www.propublica.org/documents/item/274754-germany-20100921-flyer-koerperscanner-dn4-klein
[9] http://www.propublica.org/article/sweating-bullets-body-scanners-can-see-perspiration-as-a-potential-weapon/#22900
[10] http://www.alaskadispatch.com/ProPublica.org

Exhibit H

Imaging

For demonstration of image characteristics in x-ray backscatter systems, we simulated an abdomen by a cylindrical (45 cm-tall in a 50 cm field of view) uniform tissue elliptical phantom, 45 cm-wide and 25 cm-thick, the closest point of the front placed at a 26 cm distance from the plane of the detector. For imaging, detector dimensions were changed from the above evaluations: While the height and outside dimensions are limited by cabinet sizes, we assumed for imaging a smaller dead space between right and left detector, 18 cm rather than 58 cm. The effect of this change is to increase sensitivity *at the center* by factors of 3.4 and 3.6 at high and low kilovoltage, respectively. Detector performance continued to be assumed at 100% for all photons reaching its surface. The pixel size was 2.5 mm×2.5 mm, and the beam dimension 6 mm×6 mm. The display is for 5 mm×5 mm pixels, with the average of the four pixels forming it.

Four examples were simulated. No added material, added tissue, added TATP at density 1.2 and added PETN at density 2.0. These added materials were configured as a cone or "pancake" of 20 cm-diameter, 1 cm-height at the center, tapering to zero thickness at the border and conformal with the "abdomen". The volume of this added material was approximately 160 cm^3, making the weight of PETN approximately 320 g (note that the "shoe bomber" and "Christmas bomber" were reported to carry 40 g and 80 g of PETN, respectively, both considered sufficient to blow a hole in an aircraft fuselage.)

We compared these images to those of a tissue "brick" of the same volume (15 cm×10 cm, 1 cm-thickness, 150 g), the brick geometry being typically used for demonstrations of backscatter detection capabilities.

All tests included a water bottle of 3 cm-diameter and 5 cm-length, and an iron bar of 10 cm×1 cm and 1 mm-thickness. For all images, the entrance exposure is 10 nanoGy. Counts at this exposure are shown in Table 2. It is important to note that the 10 nanoGy exposure images shown here are a best case assumption. Detector efficiency is likely to be 50% of the value assumed, or even less at low kilovoltage, especially for multiple-scattered photons. The solid angle can be as much as 3.5 times lower, and is certainly less away from center, especially as departing center in the vertical direction, so the exposure could reach 70 nanoGy, close to 100 nGy

Table 2 Imaging results for 10 nGy entrance exposure.

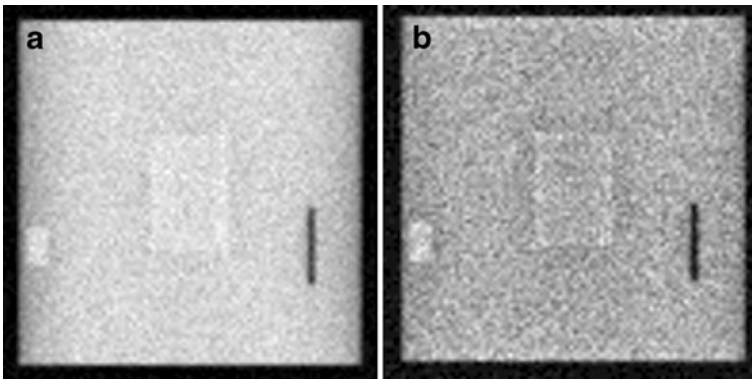| Pixel size (mm × mm)	Counts	s.d. (%)
High kVp, 40,000,000 input x-rays		
2.5×2.5	170	7.7
5×5	680	3.8
10×10	2,720	1.9
Low kVp, 25,000,000 input x-rays		
2.5×2.5	44	15
5×5	176	7.5
10×10	704	3.8

Figure 15 Simulated images at high (**a**) and low (**b**) kilovoltage for 10 nGy entrance exposure of a 150 g brick of tissue (15×10×1 cm). The center intensity is approximately 4.5% higher than background because of edge effects. Note that the brick is of the same composition as the underlying "abdomen". If the brick were larger, its internal signal would be that of surrounding tissue
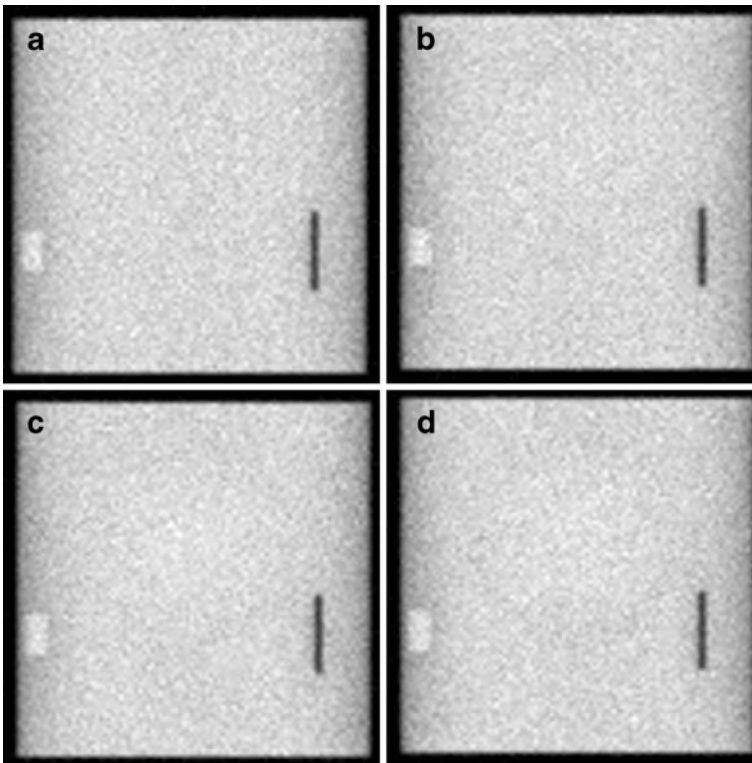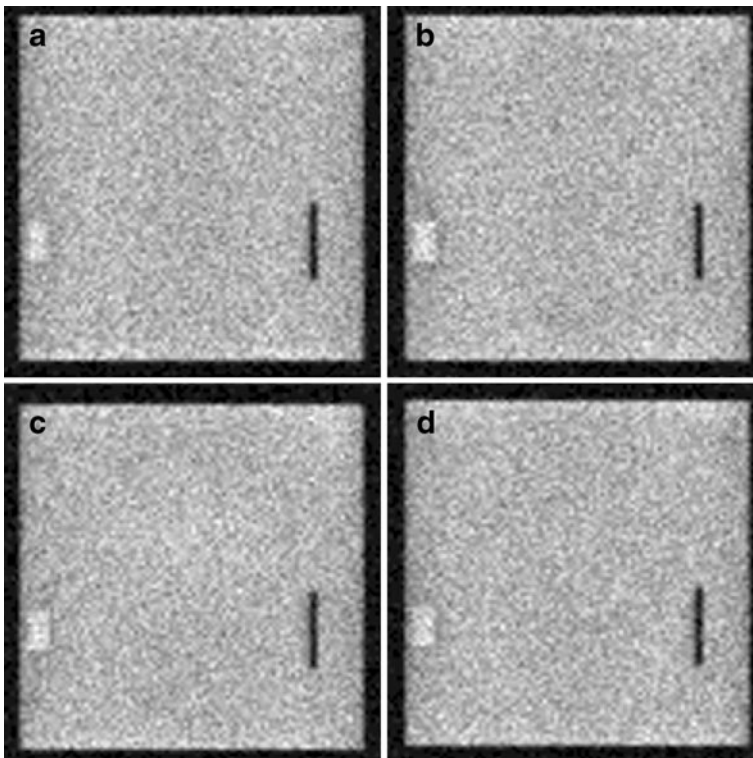

Figure 16 Simulated images at high kilovoltage for 10 nGy entrance exposure. data were acquired in 2.5 mm (200×200 matrix) pixels and are averaged and displayed with 5 mm pixels. **a** Tissue only; **b** Added 1 cm-thick, 20 cm-diameter pancake of 160 g of tissue; **c** Same as B, but with 190 g of TATP (density 1.2); **d** Same as B, but with 320 g of PETN (density 2.0)

A characteristic of backscatter imaging is a hard edge effect akin to a high pass filter with overshoot. Consider an x-ray beam scanning along a flat surface from, say, left to right. Most of the x-rays scattered into the detector come from deep into the subject, many not even from the beam position (Figures 8, 9, and 10), and they leave through the surface. For a uniform surface, neglecting solid angle changes, the scattered intensity is uniform. As the beam approaches a step that makes the material thicker, deep-scattered x-rays have more material to traverse if they scatter right rather than left. At the edge itself, half of the scattered x-rays have to traverse more material to exit, and there is a maximum drop in signal intensity. Consider now the beam scanning along the stepped material from right to left. Except for a small change in solid angle (proximity to detectors), the intensity is uniform and the same as for the beam in the far left. As the beam approaches the edge, some deep-scattered photons now can exit through less material, and the signal intensity increases, reaching a maximum at the edge. Thus, in a scan, there will be an undershoot at the edge on the lower surface, and an overshoot on the higher surface side. This effect will be unidirectional if the detectors are not symmetrical with respect to the edge location.

Figure 17 Simulated images at low kilovoltage for 10 nGy entrance exposure. data were acquired in 2.5 mm (200×200 matrix) pixels and are averaged and displayed with 5 mm pixels. **a** Tissue only; **b** Added 1 cm-thick, 20 cm-diameter pancake of 160 g of tissue; **c** Same as B, but with 190 g of TATP (density 1.2); **d** Same as B, but with 320 g of PETN (density 2.0)

Figure 15 shows the tissue brick at high and low kilovoltages. The brick is clearly visible since it is almost all "edge", given the beam spread shown in Figures 9 and 10, and more so at high than at low kilovoltage.

Figure 16 shows the abdominal phantom at high kilovoltage. Figure 16a is for the abdominal phantom with the bottle and iron alone. Figure 16b includes a pancake of tissue, which is not discernible. Figure 16c and d are for TATP and PETN respectively. The TATP shows as a faint increase in signal around its center, and the PETN also exhibits a faint dark ring at its periphery. Given the featureless background and knowledge of where to look, there are indications of the presence of these contraband materials. Figure 17 is for the low kilovoltage case. Again, knowing its presence, the TATP is faintly visible as a signal increase at the center, not that different of what can be an anatomic feature (see Figures 3, 4, 14 and 18).

Discussion

The publicly available information on backscatter airport scanners permits a reasonable evaluation of their performance. The results indicate that the radiation used penetrates throughout the body, a not surprising fact to those familiar with radiologic imaging at 50 and 125 kVp. Empirical support comes from noting that the routine diagnostic use of x-ray CT is practiced at 80 kVp to 120 kVp. Mammography, similarly needing enough x-rays leaving a breast of 10 cm or more thickness to make exquisite resolution and S/N images, is practiced at well below 50 kVp.

Figure 18 Demonstration of the importance of edge effects to detection. The breast blends into the shading of the image when the lower edge is covered. ?Separately, note that the heavy object on her left hip (a handgun) is only noticeable because her arm allows for a shadow of part of it. Arms raised, as they would have been in normal use, this object would be hard to notice
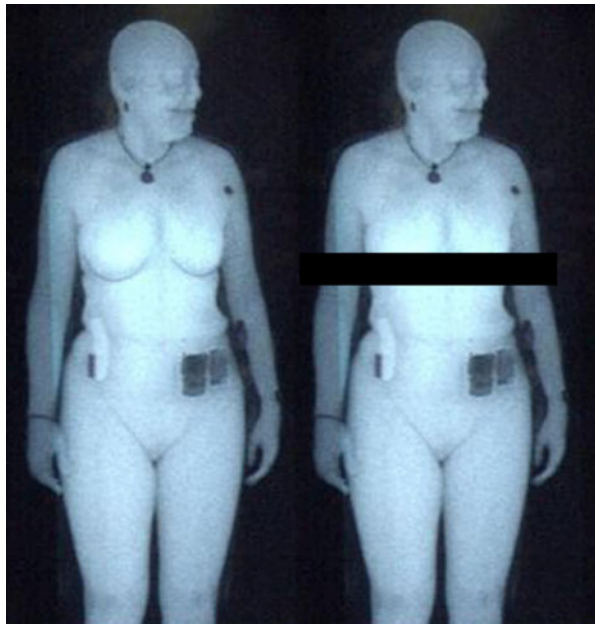
The penetration not only distributes exposure throughout the body (this affecting the calculation of efective dose, which comprises a sum over all organs), but tends to diffuse the effects caused by contraband materials. Images can be made at low entrance exposures, but of very poor spatial resolution and S/N. The calculated signal excursions at high kilovoltage are so small as to make it doubtful that at any reasonable exposure levels density differences will be noticeable unless the contraband is packed thickly and with hard edges. Although the excursions are larger at low kilovoltage, they are still small and in the noise of the device's operational limits. The eye is a good signal averager at certain spatial frequencies, but it is doubtful that an operator can be trained to detect these differences unless the material is hard-edged, not too large and regular-shaped. Anatomic features and benign objects add structured noise that interferes with signal averaging. Figure 18 shows a widely-distributed backscatter image. On the left is a complete view of her torso, on the right, a section has been blacked out. While the breasts are easily recognized at right, without some prior knowledge of the subject, it would be hard to distinguish the increase of intensity in the superior part of her breasts from the natural gradients of the image.

It is very likely that a large (15–20 cm in diameter), irregularly-shaped, cm-thick pancake with beveled edges, taped to the abdomen, would be invisible to this technology, ironically, because of its large volume, since it is easily confused with normal anatomy. Thus, a third of a kilo of PETN, easily picked up in a competent pat down, would be missed by backscatter "high technology". Forty grams of PETN, a purportedly dangerous amount, would fit in a 1.25 mm-thick pancake of the dimensions simulated here and be virtually invisible. Packed in a compact mode, say, a 1 cm×4 cm×5 cm brick, it would be detected.

The images are very sensitive to the presence of large pieces of high Z material, e. g., iron, but unless the spatial resolution is good, thin wires will be missed because of partial volume effects. It is also easy to see that an object such as a wire or a box-cutter blade, taped to the side of the body, or even a small gun in the same location, will be invisible. While there are technical means to mildly increase the conspicuity of a thick object in air, they are ineffective for thin objects such as blades when they are aligned close to the beam direction.

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Exhibit I

The scientific foundation and efficacy of the use of canines as chemical detectors for explosives

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Abstract

This article reviews the use of dogs as chemical detectors, and the scientific foundation and available information on the reliability of explosive detector dogs, including a comparison with analytical instrumental techniques. Compositions of common military and industrial explosives are described, including relative vapor pressures of common explosives and constituent odor signature chemicals. Examples of active volatile odor signature chemicals from parent explosive chemicals are discussed as well as the need for additional studies. The specific example of odor chemicals from the high explosive composition C-4 studied by solid phase microextraction indicates that the volatile odor chemicals 2-ethyl-1-hexanol and cyclohexanone are available in the headspace; whereas, the active chemical *cyclo*-1,3,5-trimethylene-2,4,6-trinitramine (RDX) is not. A detailed comparison between instrumental detection methods and detector dogs shows aspects for which instrumental methods have advantages, a comparable number of aspects for which detector dogs have advantages, as well as additional aspects where there are no clear advantages. Overall, detector dogs still represent the fastest, most versatile, reliable real-time explosive detection device available. Instrumental methods, while they continue to improve, generally suffer from a lack of efficient sampling systems, selectivity problems in the presence of interfering odor chemicals and limited mobility/tracking ability. © 2001 Elsevier Science B.V. All rights reserved.

Keywords: Explosive detector dogs; Explosive vapor detection; Solid phase microextraction

1. Introduction

The use of dogs as chemical detectors dates back to their use as hunting dogs 12 000 years ago based on tomb evidence. Since World War II, dog-handler teams have been used extensively by the military to locate explosives. The civilian use of dogs began with tracking individuals and locating drugs and bombs. Civilian use has expanded

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to include the detection of guns, pipeline leaks, gold ore, contraband food, melanomas, gypsy moth larvae, brown tree snakes and their use in the controversial dog-scent lineup for forensic evidence. In the last decade, dogs trained to detect flammable and ignitable liquid residues, commonly called accelerant detector dogs, have become widely utilized and their alert has proven to be admissible as evidence [1]. The use of detector dogs has now also become widespread and routine in search and rescue, including finding the last missing person after the World Trade Center bombing, discouraging employee drug use, termite infestation inspection, and screw worm detection [2–5]. A number of studies have been performed to study detection dog-handler teams. Unfortunately, the reports and articles are often not in refereed journals, but are in trade publications, books, manuals, and government reports. In some cases, errors have been perpetuated leading to additional confusion. This paper reviews much of the available information presenting a current evaluation of the state of knowledge of explosive detection dog-handler teams. Some of the reasons why relatively inexpensive and extremely effective bomb dogs have not been more widely employed has been debated in trade journals [6,7] and are evaluated scientifically in this paper. The scientific validity of the use of detector dogs is sometimes challenged by stating that inadequate scientific data are available to substantiate the reliability of their use. Indeed, only recently have researchers begun to determine the actual chemicals which dogs use to find forensic specimens, including explosives, as detailed later in this paper [8]. This paper demonstrates that there is sufficient scientifically valid data to demonstrate that dogs can be, and are, trained to reliably detect items.

2. Mechanism of detection by dogs

The scientific evidence that the sense of smell is the major sense used by dogs in detection tasks consists of studies demonstrating low thresholds for detection of odors [9–12], studies of the anatomy of the olfactory system of the dog [13], and observations that dogs with measured or perceived problems with the sense of smell do not perform well in detection tasks [14,15]. Specific odorant binding proteins (for anisole and benzaldehyde) have been isolated and characterized in the dog [16]. A number of putative olfactory receptors from the dog have been cloned with subsequent characterization of some of the molecules [17]. Olfactory receptors have been hypothesized to be relatively loose binding to their respective ligands, and also to be rather nonspecific in that binding. However, there is hypothesized a preferential binding of similar ligands to the receptors, perhaps resulting in a unique encoding of receptor activation for thousands of odors [18].

In general, the sense of smell, as it relates to explosive detection, can be simplified as follows: (1) The odor(s) come into contact with the sensory apparatus most efficiently accomplished by the act of sniffing; (2) The odor chemicals, originating in vapor or possibly particulate form, are dissolved in the mucus layers within the nasal cavity, particularly overlying the olfactory mucosa, the epithelium within the nasal cavity containing the bulk of the olfactory receptors; (3) Interaction between the odor(s) and the appropriate receptors results in a second messenger cascade via a G-protein coupled reaction or an inositol 1,4,5-triphosphate (IP3) reaction; (4) The second messenger then sets up a receptor potential via opening sodium channels, eventually to the point of causing an action potential; (5) The action potentials travel to the brain via the neurons of the olfactory nerve to a variety of sub-cortical and cortical structures for further encoding and, eventually, perception; (6) The odors still present on the olfactory mucosa and elsewhere in the nasal cavity must then be purged, otherwise the stimuli would persist and the phenomenon of physiological adaptation would set in. This phenomenon is the lessening of the sensitivity of the system with continued stimulation; and (7) In addition to the olfactory system, the trigeminal nerve and the vomeronasal systems seem to be involved in the sense of smell, but their relative contributions are less well understood.

3. Standards and reliability of dogs as detectors

A field study demonstrating the efficiency of explosives detection by dog-handler teams was performed by Nolan and Gravitte [19] in which the teams were trained to detect landmines. During the summer sessions conducted in Arizona and Michigan, the dogs averaged over 80% correct location with several teams averaging over 90% correct location. Although few additional studies have critically examined the efficacy of detection teams, improved training, certification and maintenance protocols have been developed by various government agencies and private certifying organizations. To ensure scientific validity, important evaluation issues include identifying what items might cause false alerts and exposing these items in training and testing. Measurements should be conducted in a double-blind fashion with impartial evaluators and the results evaluated to determine reliability. Also, tests should include positive controls (known explosive scents free from potential contamination) and negative controls (no sample or potentially interfering or distracting samples). One specific example of the reliability of explosive detection canines repeatedly being substantiated is at the Department of Defense program, which has about 500 explosives detection canines worldwide and has a proficiency requirement of at least 95% detection rate for the targets (known explosive odor standards) used and 5% or less nonproductive rate (alerts to distracter odors) [20]. Another example of a well accepted certification program is that administered by the North American Police Work Dog Association which requires a minimum of 91.6% pass rate on target odors, including 6 different explosive odor classes and 4 of 5 different search areas [21]. While not peer-reviewed in the traditional sense, the guidelines published by such organizations generally undergo reviews and revision by panels of recognized experts before adoption.

These requirements generally meet or exceed the expected 90–95% confidence intervals used in forensic science for instrumental methods and legal conclusions requiring 'beyond a reasonable doubt' [22]. The criteria for accepting, certifying, or otherwise approving a dog-handler team for use in the field are generally more than a simple percentage correct, however. Among behavioral factors evaluated are type and duration of search, alertness of the team, responsiveness of the dog to the handler, and, the handler's skill in observing the behavior of the dog and interpreting those observations. These subtleties not present with instrumental methods make certifications more difficult. The debate over canine standards for bomb dogs was recently highlighted in the media when the U.S. Congress asked the Treasury Department to set standards for bomb-sniffing canines with the Bureau of Alcohol Tobacco and Firearms (ATF), suggesting the controversial standard of 100% accuracy on 60 tests [23].

Therefore, although there is limited data available, the published proficiency and certification standards of government agencies and national certification organizations indicates that K-9's are tested to a level at least equivalent, if not superior, to instruments. Ultimately, relevant evidentiary statements can only be made in court by a qualified expert critically evaluating the detection team involved in a particular case. Proficiency or certification standards and practices for explosives detection instruments, such as the most common instruments based on ion mobility spectrometry (IMS), have also been subjected to limited peer review. One scientific study on the reliability of one of the most commonly used portable IMS instruments, the Ionscan (Barringer Instruments, Warren, NJ), showed 14 of 139 (10%) innocuous substances tested caused false positives when used for detecting controlled substances [24]. In another study evaluating the utility of the Ionscan for the detection of trace explosive evidence demonstrated the instrumental registered a positive response on 12 of 17 (71%) post-blast fragments from improvised explosive devices [25].

4. Representative explosives and constituents

Table 1 is a representative, but not exhaustive, list of the typical mixtures of organic high explosives that include military explosives and industrial explosives. A variety of analytical techniques

Exhibit J

TSA Has Not Deployed Passenger Screening Canine Teams to the Highest-Risk Airports and Did Not Determine Their Effectiveness Prior to Deployment

TSA's 2012 Strategic Framework calls for the deployment of PSC teams based on risk; however, airport stakeholder concerns about the appropriateness of TSA's response resolution protocols for these teams have resulted in PSC teams not being deployed to the highest-risk airport terminals and concourses. Moreover, TSA began deploying PSC teams prior to determining the teams' operational effectiveness and before identifying where within the airport these teams could be most effectively utilized to screen passengers.

TSA Has Deployed PSC Teams to Airports; However, PSC Teams Have Not Been Deployed to the Highest-Risk Terminals and Concourses

In April 2011, TSA began deploying PSC teams to airports terminals and concourses, and plans to deploy all 120 PSC teams for which it has funding by the end of calendar year 2013.[24] TSA's Strategic Framework calls for the deployment of PSC teams based on risk; however, we found that PSC teams have not been deployed to the highest-risk airport terminals and concourses based on TSA's high-risk list. TSA officials stated that PSC teams were not deployed to the highest-risk terminals and concourses for various reasons, including concerns from an airport law enforcement association about TSA's decision to deploy PSC teams with civilian TSI handlers and the appropriateness of TSA's response resolution protocols. These protocols require the canine handler to be accompanied by two additional personnel that may, but not always, include a law enforcement officer. According to representatives from an airport law enforcement association, these protocols are not appropriate for a suicide bombing attempt requiring an immediate law enforcement response.

According to TSA officials, the lack of agreed-upon response resolution protocols with local law enforcement officials has complicated efforts to introduce PSCs at some airports. For example, seven airport operators have declined the deployment of PSC teams because of concerns

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[24]For the purposes of this report, "airport terminal" refers to the entire terminal complex and is inclusive of both the public and the sterile sides, whereas "concourse" refers to the sterile portion of the terminal where passenger gates are located. Details on how TSA developed its airport risk ranking and the rank of specific airports were deemed SSI by TSA.

Exhibit K

Coordinates: 38.953°N 77.450°W

American Airlines Flight 444

From Wikipedia, the free encyclopedia

American Airlines Flight 444 was a Boeing 727 flying from Chicago to Washington, D.C., which on November 15, 1979 was attacked by the Unabomber. The bomb planted in the cargo hold failed to detonate, but gave off large quantities of smoke, and twelve passengers had to be treated afterwards for smoke inhalation. It was later determined that the bomb was powerful enough to have destroyed the aircraft had it worked correctly.

This was not the first Unabomber attack, but it was the attack which led to the FBI investigation into the Unabomber, as airliner bombing is a federal crime.

American still uses the flight number 444 despite the incident. The number may operate several different routings over time as American routinely reassigns flight numbers that are not flagship routes to different sectors; as of April 2013, flight number 444 is used on a Kansas City-Chicago O'Hare routing, and uses a Boeing 737-800 instead of a Boeing 727.

American Airlines Flight 444	
Occurrence summary	
Date	November 15, 1979
Summary	Bombing (attempted)
Passengers	72
Crew	6
Injuries (non-fatal)	12
Fatalities	0
Survivors	78 (all)
Aircraft type	Boeing 727-223
Operator	American Airlines
Flight origin	Chicago O'Hare International Airport
Destination	Washington National Airport

External links

- Non-hull loss description (http://aviation-safety.net/database/record.php?id=19791115-1) at the Aviation Safety Network

Retrieved from "http://en.wikipedia.org/w/index.php?title=American_Airlines_Flight_444&oldid=574879881"
Categories: Failed airliner bombings │ Unabomber targets │ Airliner accidents and incidents in Washington, D.C. │ Airliner accidents and incidents in Illinois │ Terrorist incidents in 1979 │ Terrorist incidents in the United States │ American Airlines accidents and incidents │ Aviation accidents and incidents in 1979 │ 1979 in Washington, D.C. │ 1979 in Illinois │ Airliner bombings in the United States

Exhibit L

Domodedovo International Airport bombing

From Wikipedia, the free encyclopedia

The **2011 Domodedovo Airport bombing** was a suicide attack in the international arrival hall of Moscow's busiest airport, Domodedovo Airport, on 24 January 2011.

The bombing killed at least 37 people[2] and injured 173, including 115 who required hospitalisation.[4] 31 people died at the scene, another died in transit to hospital,[5] and three more died in hospital the same day. Another victim, who had been comatose, died on 2 February, and another died on 24 February.[2] Russia's Investigative Committee later identified the suicide bomber as a 20-year-old male Ingushetia native, who had been trained by Islamist terrorists affiliated with the Caucasus Emirate organization from the North Caucasus region.[6] The group's leader Doku Umarov has taken personal responsibility for the terrorist act, through his web site Kavkaz Center.[7]

‹ The template *Infobox civilian attack* is being considered for merging. ›

2011 Domodedovo Airport bombing

Domodedovo Airport's passenger terminal (2007)

Location	Domodedovo Airport Domodedovsky District, Moscow Oblast, Russia
Date	Monday, 24 January 2011 16:32 MSK[1] (UTC+03:00)
Target	Domodedovo Airport
Attack type	Suicide attack
Weapon(s)	Improvised explosive device
Deaths	37[2]
Injured (non-fatal)	173
Perpetrators	Caucasus Emirate Riyad-us Saliheen Brigade[3]

Major terrorist attacks and suicide bombings in post-Soviet Russia   [hide]

Bold indicates incidents resulting in over 50 deaths.
Incidents are bombings unless described otherwise.

Budyonnovsk hospital crisis

Kizlyar-Pervomayskoye hostage crisis

Vladikavkaz Apartment bombings

Kaspiysk **Moscow theater crisis Grozny**

Znamenskoye Tushino Stavropol Red Square

Moscow Metro (1st) Grozny Dynamo stadium Moscow Metro (2nd) **Aircraft bombings Beslan school crisis**

Moscow (Cherkizovsky Market)

Vladikavkaz

Nazran Nevsky Express

Moscow Metro Kizlyar Vladikavkaz

Domodedovo Airport

Part of the
First Chechen War
Invasion of Dagestan (1999)
Second Chechen War / North Caucasus insurgency

Contents [hide]

Background   [edit]

In 2010, Domodedovo Airport, located 42 kilometres (26 mi) southeast of central Moscow, was ranked as Russia's busiest airport, serving over 22 million domestic and international passengers. Concerns about security at the airport had been raised by an incident in 2004 involving two passenger planes that departed from Domodedovo, in which two female terrorists succeeded in boarding the aircraft with bombs, and subsequently destroying the planes in flight. As a result, expensive improvements were made to the security measures at the airport, including the installation of full body scanners.

The city of Moscow had seen a number of significant terrorist incidents in the years prior to the 2011 bombing at Domodedovo. 2004 saw two separate major attacks on the Moscow Metro, one by a male suicide bomber on 6 February and another by a female suicide bomber on 31 August; in 2006, 13 people were killed in a market bombing; and in March 2010, at least 40 people were killed in suicide bombings on the Moscow Metro.

Bombing   [edit]

The suicide bombing was carried out by 20-year-old Magomed Yevloyev, a native of Ingushetia. Yevloyev had arrived in Moscow a few days earlier, having traveled by bus from Nazran. While in Moscow, he was assisted by brothers Islam and Ilez Yandiev, who drove Yevloyev to the airport and watched him carry out the bombing in the terminal. Yevloyev managed to carry an explosive device under his coat unnoticed past a security checkpoint at the terminal entrance. He proceeded through the international arrival hall to the luggage claim area, where he detonated the bomb. Investigation indicated that the explosive device was packed with shrapnel and pieces of chopped wire, and had an explosive yield equivalent to 2–5 kg of TNT.[8][9]

Victims   [edit]

As the attack took place in the luggage claim area, most of the victims were incoming travellers. On 26 January, the Ministry of Emergency Situations reported the names of 35 casualties.[10] Two additional victims died later from their injuries.

One of the casualties was 29-year-old Ukrainian playwright Anna Yablonskaya, the author of over a dozen plays. She had come to Moscow from her native city of Odessa to attend an award ceremony for young playwrights hosted by *Cinema Art* magazine.[11][12][13]

Other foreigners among the casualties included one from Germany, one from the United Kingdom,[14] two from Austria, two from Tajikistan, and one from Uzbekistan.

According to the Slovak embassy in Moscow, Slovak actress Zuzana Fialová was injured in the blast.[15]

Dead and injured by country

Country	Dead[10]	Hospitalized[16]
Russia	27+2	57
Tajikistan	2	8
Germany	1	1
UK	1	
Uzbekistan	1	1
Austria	2	

🇺🇦 Ukraine	1	
🇳🇬 Nigeria		2
🇸🇰 Slovakia		2
🇫🇷 France		1
🇮🇹 Italy		1
🇲🇩 Moldova		1
🇷🇸 Serbia		1
🇸🇮 Slovenia		1
Citizenship undisclosed		39
Total	**37**	**115**

Aftermath [edit]

A number of flights originally bound for Domodedovo were redirected to Moscow's Vnukovo International Airport following the attack.[9] Russian authorities directed all of the country's airports to immediately begin inspecting all visitors before allowing them to enter the airports.[17] However, this practice was ruled illegal by an appellate court in June 2011.[18]

At Domodedovo, the surge of emergency vehicles caused public transportation delays. In response, citizens volunteered to carpool passengers to Moscow, and taxi drivers slashed their rates.[19]

The blast was followed by a drop of almost two percent at the Moscow stock exchange (MICEX).[1]

Responsibility [edit]

On 8 February 2011, a faction of the Caucasus Emirate led by Doku Umarov claimed responsibility for the attack,[20][7] and threatened further attacks.[21]

Response [edit]

President Dmitry Medvedev apportioned some of the blame to poor security at Domodedovo, and sacked several officials, said to include a regional transport chief and a Moscow police deputy head.[22] He also announced that he would delay his departure to the World Economic Forum in Davos, Switzerland.[9] Prime Minister Vladimir Putin condemned the bombing as an "abominable crime," and vowed that "retribution is inevitable."[23] On 8 February 2011, as a result of the criticism of airport security, Putin fired the head of the government agency that is responsible for overseeing Russia's transportation infrastructure.[24]

President of the European Council Herman Van Rompuy said that those responsible for the attack must be punished.[25]

Many world leaders expressed support and condolences to Russia following the attack,[26][27] including leaders or officials from Abkhazia,[28] Afghanistan,[29] Albania,[30]Angola,[31] Armenia,[32] Australia,[33] Azerbaijan,[34] Belarus,[35] Brazil,[36] Canada,[37]Chile,[38] the People's Republic of China,[39] Colombia,[40] Cuba,[41] Finland,[42] France,[43]Georgia,[44] Germany, Hungary,[45] India,[46] Iran,[47] Israel,[9] Mexico,[48] North Korea,[49]New Zealand,[50] Nicaragua,[51] Pakistan,[52] Palestine,[53] Poland,[54] Romania,[29]Slovakia,[55] South Ossetia,[56] Syria,[57] Ukraine,[58] United Arab Emirates,[59] the United Kingdom, the United States,[60] Venezuela,[61] and Vietnam.[62]

The Chechen Republic of Ichkeria, the former separatist government in exile, which split in 2007 from what would later become the Caucasus Emirate, released a statement expressing condolences to the victims, strongly condemning the bombing, and suggesting that the attackers may have been desperate, traumatized, and hopeless.[63]

Investigation   [edit]

In the aftermath of the explosion, Russia's Investigative Committee stated that the bombing was aimed "first and foremost" at foreign citizens, adding that "it was by no means an accident that the act of terror was committed in the international arrivals hall".[64]

On 7 February 2011, Russian officials identified the suspected suicide bomber as 20-year-old Magomed Yevloyev, born in the village of Ali-yurt, Ingushetia (not to be confused with the journalist of the same name killed in 2008).

Magomed Yevloyev's 16-year-old sister Fatima Yevloyeva and friend Umar Aushev were suspected of collaboration in the Domodedovo attack and detained in February 2011. They were released a few months later, but remained under investigation for illegal possession of firearms.[65] In September, Yevloyeva and Aushev were no longer considered suspects, and were cleared of all charges.[66]

In February and March 2011, Russian law enforcement agencies conducted special operations against members of the Caucasus Emirate in Ingushetia, during which they arrested several associates of Magomed Yevloyev, including Islam and Ilez Yandiyev.[67][68]

By October 2011, four alleged associates of Yevloyev had been arrested: the Yandiyevs, Bashir Khamkhoyev, and Akhmed Yevloyev, Magomed's 15-year-old brother, who had allegedly helped assemble the bomb. They were charged with terrorism, formation of or participation in illegal armed bands, assault on a police officer, and illegal possession of firearms and explosives.[69] Doku Umarov, who has claimed responsibility for masterminding the attack, has not been apprehended.

A year after the event, in January 2012, the Investigative Committee reported that the investigation was complete, and the final version of the indictment against Yevloyev, Khamkhoyev, and the Yandiyevs was to be brought by March 2012.[70]

A separate investigation was conducted into the lax or inefficient security measures that were in place at the Domodedovo airport at the time of the attack.

It was reported that Doku Umarov had planned to follow the Domodedovo attack with two additional bombings in Moscow. An attack in Moscow's Red Square was planned for New Year's Eve, 2011, but it was foiled when the suicide bomber accidentally triggered the bomb in a hotel room in Kuzminki District, killing herself in the explosion.[71] Another bombing was to be carried out by a Slavic Russian couple who had converted to Islam, and become members of Caucasus Emirate. However, they were unable to leave Dagestan, and instead committed two separate suicide bombings in the village of Gubden on 14 February 2011, killing two policemen and injuring 27 people.

See also   [edit]

- 21st century attacks in Russia
- Suicide attacks in the North Caucasus conflict

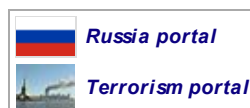*Russia portal*

Terrorism portal

Exhibit M

Freedom To Travel USA

BACKGROUND BRIEFING

Transportation Security Administration (TSA)
Documented Abuses, Legal Issues, Security Issues,
and Health Risks

Sommer Gentry, Ph.D.

- Operations research is the discipline of applying advanced analytical techniques to help make better decisions.

- Our role as operations researchers is to allocate resources to maximize the desired outcomes, to quantitatively analyze responses to risk, to calculate responses to strategic behavior, to capture all the intended and unintended consequences of various courses of action.

Bayes Rule and the Base Rate Fallacy

- TSA's behavior detection program flags individuals for more in-depth questioning and screening
  - In the airports where it is used, fifty thousand travelers have been flagged. Zero of these were terrorists.
  - Sixteen known terrorists passed through behavior detection airports on at least 24 occasions. Zero of the terrorist travelers were flagged.

- But what if, instead, we had a spectacularly effective test? Let's assume our test **always flags terrorists** and, further, gives a **false positive on one in ten thousand (0.00001) innocent travelers.**

Bayes Rule and the Base Rate Fallacy

- The base rate fallacy results from failure to account for the incidence of the condition being tested for.
  - Probability passenger is terrorist: 21 out of 10 billion, or 0.0000000002
  - Bayes rule: $P_{terrorist|flag} = P_{flag|terrorist} * P(terrorist)/P(flag)$
  - $P_{terrorist|flag} = 1 \cdot 0.0000000000002/0.00001000000002 = 0.0000002$
  - So, with a nearly perfect test, only one out of every five million flagged "high risk" travelers is a terrorist.
  - False positives are not free – they undermine security

VIPR operations suffer a worse fate

- In the VIPR program, TSA partners with local law enforcement and/or transit agencies to search bags, question transit passengers, or stop truck drivers where there is no specific threat.

- Thus, VIPR operations affect perhaps a few hundred thousand out of untold trillions of commutes every year in the U.S., without even targeting these actions toward threats.

- This is like saying, "if we throw a bunch of anvils in the air, will they come down and hit terrorists?"

How to solve the base rate fallacy

- Apply counter-terrorism measures to high-risk populations, which means use police forces and intelligence techniques to target plots at early stages.

- All successes of counter-terrorism are of this type: liquids plot in Britain, the recently recovered underwear bomb, Times square bomber, et cetera.

- Analagously, test people for HIV if their behaviors indicate some reasonable likelihood they have been exposed.

National Research Council, Review of DHS' Approach to Risk Analysis

- With the exception of risk analysis for natural disaster preparedness, the committee did not find any DHS risk analysis capabilities and methods that are yet adequate for supporting DHS decision making. Moreover, it is not yet clear that DHS is on a trajectory for development of methods and capability that is sufficient to ensure reliable risk analyses other than for natural disasters. (2_3, 80)

- Little effective attention was paid to the features of the risk problem that are fundamental. (11)

National Research Council, Review of DHS' Approach to Risk Analysis

- Assessment of individual components of risk and their integration into a measure of risk is seriously deficient and is in need of major revision. (11)

- Until these deficiencies are improved, only low confidence should be placed in most of the risk analyses conducted by DHS. (11, 98)

- Most DHS risk models and analyses are quite complex and poorly documented, and thus are not transparent. Moreover, some of these models imply false precision. (7)

National Research Council, Review of DHS' Approach to Risk Analysis

- With one exception, the committee was not told about or shown any document explaining the mathematics of the risk modeling or any write-up [explaining] how risk analyses are conducted. (42)
- It appears that the choice of weightings in these risk assessments, and the parameters in the consequence formulas, are chosen in an ad hoc fashion. (72)
- DHS has a very thin base of expertise in risk analysis – many staff members are learning on the job. (90)

National Research Council, Review of DHS' Approach to Risk Analysis

- It is very difficult to know precisely how DHS risk analyses are being done and whether their results are reliable and useful. (11)
- DHS has frequently chosen to weight heavily its consequence analyses, where magnitudes of effects can be estimated, and to reduce the weight attached to threats, where the uncertainties are large. This is not an acceptable way of dealing with uncertainty. (97)
- There are people at DHS who are aware of these limitations, but the committee did not hear of efforts to remedy them. (65)

Probability neglect is rampant at DHS

- Emphasizing worst-case scenarios, assuming they are certain rather than assessing their likelihood
- Adding, rather than multiplying probabilities
  - DHS devised a rating scale where probabilities are added to losses. Losses on 80-point scale + likelihood of attack on 20-point scale.
  - This procedure violates all accepted risk assessment principles. Risk is attack probability multiplied by losses: de Moivre (1711).
- Inflating the definition of critical infrastructure
  - DHS OIG: criticality is not immediately apparent in groundhog zoo, Mule Day Parade, a flea market, mini golf courses, Weeki Watchi.
- Inflating terrorist capacities

Mueller and Stewart: Risk never quantified

- Researchers found *one* reference to a numerical estimate of risk reduction after an extensive search of the agency's reports and documents.
- Moreover, they found no reference whatever to the likelihood of a terrorist attack beyond rather vague references such as "high", "imminent", "dynamic", "persistent", and "emerging".
- What is needed are numbers, not adjectives – particularly ones that, without explanation, cluster at the dire end of the threat spectrum.

Direst predictions have been overblown

- Tom Ridge, 2003: "extremists abroad are anticipating near-term attacks that they believe will either rival, or exceed" those of 2001.
- John Ashcroft, 2004: "credible intelligence from multiple sources indicates that al Qaeda plans to attempt an attack on the U.S. in the next few months" and arrangements are 90% complete.
- Flynn, 2004, declared al-Qaeda had the ability and intent to detonate a weapon of mass destruction, killing hundreds of thousands, collapsing our economy, and delivering a "fatal blow to our way of life."

Direst predictions have been overblown

- Robert Mueller, 2003: al Qaeda has "developed a support infrastructure" in U.S., and has both "the ability" and "intent" to inflict "significant casualties in the U.S. with little warning." Estimates there are 5000 al Qaeda operatives in U.S., active in most sizable cities with Muslim communities.
- Robert Mueller, 2005, responding to the fact that FBI had not unearthed a single al Qaeda cell in the U.S., said, "I remain very concerned about what we are not seeing."

Risk estimates "chosen in an ad hoc fashion"

- Tenet, 2007: His "operational intuition" was telling him al Qaeda "infiltrated a second wave or a third wave into the United States at the time of 9/11. Can I prove it to you? No."
- Michael Chertoff, 2007, said his gut was telling him there would be an attack that summer.
- Richard Clarke, 2005, issued a scenario involving shootings at casinos, campgrounds, theme parks, and malls in 2005, bombings of subways and railroads in 2006, and missile attacks on airliners in 2007.

Distorted priorities

- Fmr. Homeland Security Secretary Chertoff: "I've never heard anyone say that the Department is overfunded. Well, actually, some people _do_ say that, but no one _in_ the Department has ever said that."
  - Brookings Institution, 2006, televised by CSPAN
- In fact, by 2008, U.S. was spending more on counterterrorism (excluding military) than on combating all other forms of crime and fraud.
  - DC Metro, for example
- One trillion dollars later, DHS refuses to quantify how much safer these expenditures have made us

Homeland Security: Risks and Costs

16

- Terror, Security, and Money by Mueller and Stewart
- How can we justify even talking about money when there are human lives at stake?
  - Every safety action has alternatives. Could the same dollars have saved even more lives? Seatbelts: $40,000 per life saved, bike helmets cost $120,000 per life saved, smoke alarms cost $2 million per life saved
  - DHS > $550 million per life saved, assuming effective.
- It is profoundly irresponsible, even immoral, to spend public safety funds without questioning whether they are being directed to the most beneficial uses.

Security measures with no benefit

17

$$\text{Net Benefit} = \underbrace{p_{attack} \times C_{loss} \times \Delta R}_{benefit} - \underbrace{C_{security}}_{cost}$$

- Security measures should have positive net benefit
- All these numbers are uncertain, except $C_{security}$
- Estimate C_{loss} and ΔR, giving benefit of the doubt to proponents of TSA security procedures
- Calculate how high the probability of attack would have to be for airport screening to be beneficial (break-even)

Example: New Orleans levee improvements

18

$$\text{Net Benefit} = \underbrace{p_{attack} \times C_{loss} \times \Delta R}_{benefit} - \underbrace{C_{security}}_{cost}$$

- $p_{breach} = 0.5$
- $C_{breach} = \$60$ billion
- $\Delta R = 0.95$
- $C_{security(levees)} = \$27$ billion
- Net Benefit = $1.5 billion = 0.5×$60 b ×0.95 - $27 b

Cost-effectiveness of body scanners

19

- For Advanced Imaging Technology (body scanners) to be cost effective with 90% likelihood, assuming body scanners are 5 times more effective than any other airport screening measure, the probability of an attack downing four major aircraft must be in the range of 160% to 330% per year.
- Body scanners are cost-effective if we think 9/11-sized attacks are likely to happen about 2 or 3 times every year.

Cost-effectiveness of other air security measures

- Hardening cockpit doors is cost-effective if the probability of an attack involving $200 billion worth of damage is 0.0012, that is, if we expect a 9/11-sized attack at least once in every 800 years
- The federal air marshal service is cost-effective if the probability of a successful attack causing $200 billion in damage is 35% per year, that is, if we expect 9/11-sized attacks about once every 3 years.

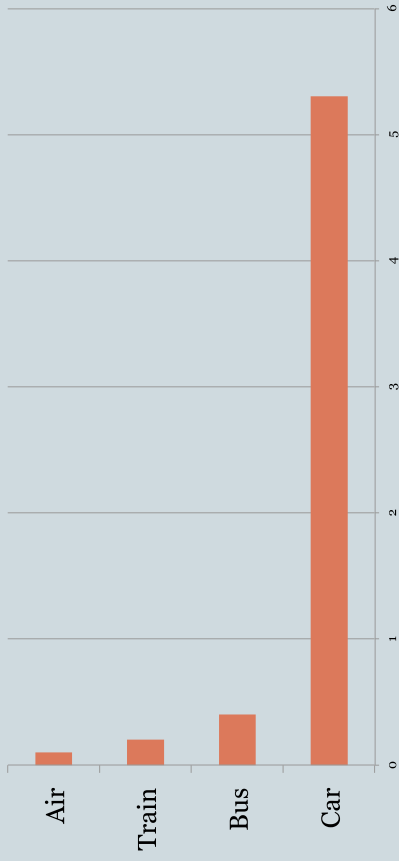## Cost-effectiveness of U.S. counterterrorism

- Assuming the combination of all counterterrorism programs have reduced risk by 95%, these programs are cost-effective if we expect an average of one or two 9/11-type attacks every year, or 33 major subway bombings per year, or 1,667 Times Square bombings every year.

Game theory: where is the weakest link?

- A hypothetical enemy is free to choose the attack with highest likelihood of success, so the best investments strengthen the weakest defenses
  - Carry items through a body scanner as a passenger
  - Carry items through a metal detector as a passenger
  - Bribe TSA screeners to bypass screening
  - Get a job as a tarmac worker or airport retail worker
  - Bribe a tarmac worker or airport retail worker
  - Breach airport fence
  - Attack aircraft with shoulder-fired missile from nearby
  - Attack malls, schools, unsecured areas of airports

No good deed goes unpunished

- Misguided and overly intrusive security measures are not merely wasteful. Intrusive and bothersome security kills.
- For every million travelers who drive instead of fly to their destinations, 15 will be killed in car accidents.
- In 2006, about 6% of would-be airline passengers were diverted by the inconvenience of screening, resulting in an estimated 516 unnecessary deaths on the road.
- In 2011, those numbers are likely higher because screening has become more intrusive and more controversial
  - With 700 million airline passengers per year, if even 1% of people who would prefer to fly choose to drive, 105 deaths will result.

Slide 24

Short-haul flying down; trip length up

Passenger trip length (BTS)

Y-axis (Miles): 900, 880, 860, 840, 820, 800, 780
X-axis: 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011

Slide 25
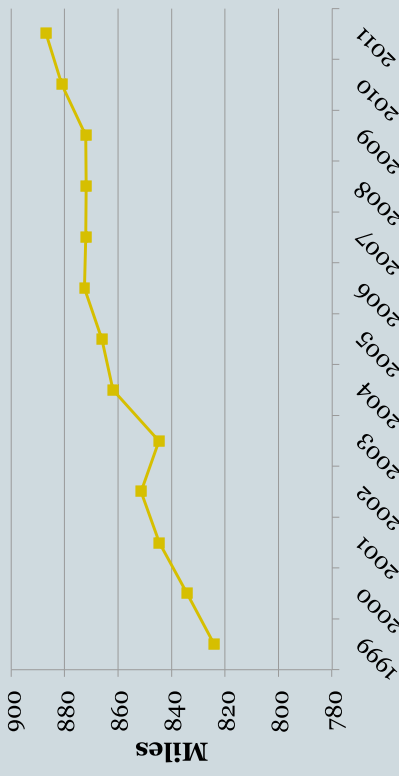
The FAA understands this. Why not TSA?
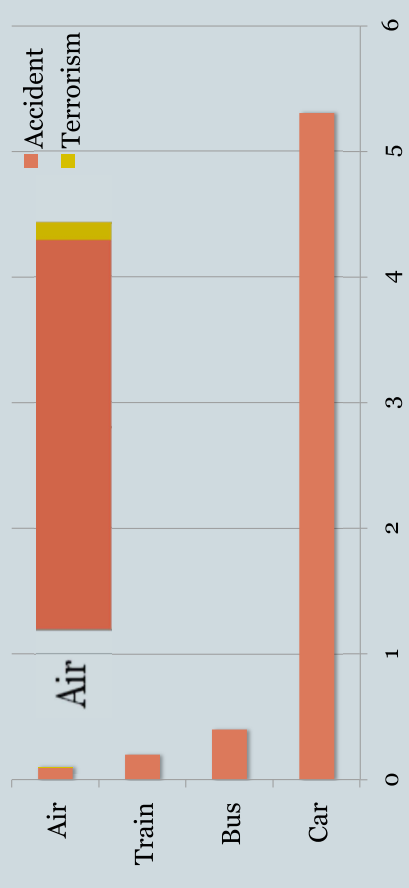
- The FAA faced a very similar dilemma in rulemaking for lap children under 2. Children under 2 are safer belted in their own child seats on airplanes, but forcing parents to buy an extra airplane ticket would be costly enough to divert many families to the road.
- It was estimated that eliminating the lap child policy would cause nine child fatalities from road accidents for every one child fatality prevented in air accidents.
- The FAA took a rational approach to safety. In contrast, the TSA has refused to quantify how many would-be flyers are diverted to roads by its policies.

Slide 26

Air travel is incredibly safe!

Fatalities per billion passenger miles

Categories: Air, Train, Bus, Car
X-axis: 0, 1, 2, 3, 4, 5, 6

Slide 27

Airplane deaths are overwhelmingly accidental

Fatalities per billion passenger miles

Legend: Accident, Terrorism

Categories: Air, Train, Bus, Car
X-axis: 0, 1, 2, 3, 4, 5, 6

Fatalities per billion passenger miles

Air

Legend: Accident, Terrorism

Categories: Air, Train, Bus, Car

All accidents	1 in 2,500
Homicide	1 in 22,000
Food poisoning	1 in 100,000
Drowning in bathtub	1 in 950,000
Home appliances	1 in 1,500,000
Deer accidents	1 in 2,000,000
Terrorism (U.S.)	1 in 3,500,000