Fact Sheet: Advanced Imaging Technology (AIT) Health & Safety

To address evolving threats to aviation security, the Transportation Security Administration (TSA) is using Advanced Imaging Technology (AIT). AIT is also commonly referred to as full body scanner technology. The systems produce images of the body in order to detect potential threats concealed underneath passengers' clothing.

AIT screening is optional for all passengers. Passengers who do not wish to utilize this screening technology will receive alternative screening, including a physical pat-down.

Two different systems of AIT are deployed in airports across the nation: millimeter wave and backscatter x- ray.

Millimeter Wave AIT

Millimeter wave AIT uses non-ionizing radio frequency energy in the millimeter wave spectrum to generate a three-dimensional image of the body based on the energy reflected from the body. The image, which resembles a fuzzy photo negative with facial features blurred for privacy, is displayed on a remote monitor for analysis to determine whether potential threats are present. The energy projected by millimeter wave technology is thousands of times less than a cell phone transmission.

Backscatter X-ray AIT

Backscatter AIT uses a narrow, low-energy x-ray beam that scans the surface of the body at a high speed. The machine then generates an image resembling a chalk etching with a privacy filter applied to the entire body. The image is displayed on a remote monitor for analysis to determine whether objects are present.

Some news reports have raised questions about backscatter x-ray safety. The x-ray dose produced by backscatter systems is extremely low (less than 0.10 microsievert (10 microrem)). An airline passenger that has been screened receives an equivalent dose of radiation from less than two minutes of flight at altitude. Furthermore, naturally occurring ionizing radiation is all around us. We are continuously exposed to this background radiation. In 17 minutes of ordinary living, a person receives more radiation from naturally occurring sources than from one scan.

Backscatter safety standards

Backscatter systems must conform to ANSI/HPS N43.17, a consensus radiation safety standard that applies to the manufacture and operation of security screening systems intended to expose people to ionizing radiation. This standard provides radiation safety guidelines for the design and operation of these systems and limits the annual effective dose to individuals that are screened. The annual limit is based on recommendations for dose limits for the general public published by the National Council on Radiation Protection and Measurements (NCRP).[2] The dose limits were set with the understanding that the general public includes individuals who may be more susceptible to radiation-induced health effects, such as pregnant women, children, and persons receiving radiation treatment for medical conditions.

Backscatter systems have been independently evaluated by the following:

- Food and Drug Administration (FDA) Center for Devices and Radiological Health (CDRH);
- National Institute for Standards and Technology (NIST) on behalf of TSA; and
- Johns Hopkins University Applied Physics Laboratory (APL).

All results consistently confirm that radiation doses are well below the limits specified by the standard established by the American National Standards Institute and through the Health Physics Society (ANSI/HPS) – *ANSI/HPS N43.17-2009 Radiation Safety for Personnel Security Screening Systems Using X-ray or Gamma Radiation*.

Conclusion

AIT enables TSA to prevent harm by the detection of non-metallic threats including weapons, explosives and other objects concealed under layers of clothing. While the radiation risk from backscatter x-ray screening is extremely low, passengers may choose to opt out of the screening.