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POLICIES AND STANDARDS FOR SECURITY SCREENING EQUIPMENT

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Pursuant to EO No. 277 as amended by EO 311; Annex 17 to the Convention on International Civil Aviation (Chicago Convention), Chapter 11-2 of the SOLAS Convention otherwise known as International Ship and Port Facility Security (ISPS) Code; Aviation Security Manual (ICAO Document 8973); the National Civil Aviation Security Program (NCASP), Transportation Security Regulation (TSR) No. 002-2006 "Daily Operational Testing of Screening Equipment" the Office for Transportation Security (OTS) adopts the following policies and standards:

I. PURPOSE

To prescribe policies and standards for procurement, calibration, operation and maintenance of security screening equipment.

II. COVERAGE

This covers all airport operators, aircraft operators, cargo operators and other transportation entities charged with procurement, calibration, operation and maintenance of security screening equipment.

III. POLICIES/GUIDELINES

A. Procurement

1. All procurement of security screening equipment shall conform and be guided by standards established under this circular.

2. The following are the standard security screening equipment and technologies recognized for aviation security:

   a. Hand-held metal detectors - detectors employ an electromagnetic field that interacts with any metal nearby, triggering an alarm.

   b. Walk-through metal detectors - detectors that employ a pulsed magnetic field, which induces eddy currents in any metallic conductor.

c. Security scanners - scanners that detect both metallic and non- metallic items concealed on the body of a person. Body scanners use a range of different technologies, which may include the following:

(1) Active Millimeter (MM) Waves - Objects (threats, both metallic and non-metallic) concealed on the body can be detected as anomalies by analyzing the reflected MM wave radiation;
(2) Passive Millimeter (MM) Waves; (3) Terahertz Imaging System;
(4) X-ray-Based - Backscatter - Objects (threats, both metallic and non-metallic) concealed on the body under clothing can be detected as anomalies by viewing the backscatter radiation from a backscatter X-ray system; and,
(5) X-ray-Based - Transmission.

d. Explosives Trace Detectors - The detection of explosive residues can be conducted by explosives trace detection systems when screening passengers, baggage and cargo to indicate the presence of explosives having three (3) different approaches to the detection of explosive traces:

(1) Explosive particulate; (2) Explosive vapors; and
(3) Canine olfaction or Explosive Detection Dogs (EDD).

e. Conventional X-rays - Explosives and weapons can be detected in cabin baggage through the recognition of their image by a screener on a transmission X-ray system.

f. Liquid Explosives Detection Systems (LEDS) - Liquid Explosives Detection systems are able to analyze liquids, aerosols and gels (LAGs) carried in cabin baggage to detect the presence of liquid explosives or precursors, while at the same time clearing benign items. Several technologies are employed to screen LAGs for the presence of liquid explosives and precursors. Examples are:

(1) Raman laser;
(2) Algorithm-based X-ray;
(3) FTIR (Fourier Transform Infra-Red) laser;
(4) Di-electric;
(5) Chemical test strips;
(6) Chemiluminescence;
(7) Ion Mobility Spectrometry;
(8) Gas chromatography; and
(9) Mass spectroscopy.

g. Algorithm-Based X-rays - For algorithm-based x-ray systems (also known as Explosives Detection Systems - EDS), dual-energy, dual-axis and X-ray backscatter technologies are used in varying degrees to allow the determination of a material's mass absorption coefficient and effective Z number through the interaction of X-ray energy with the material.

h. Computed Tomography Systems - CT images are acquired by one or more linear arrays of X-ray detectors on a rotating gantry illuminated by one X-ray source (typically about 160 kV) that is also on the gantry that rotates around the baggage to be screened.

i. Explosives Detection Dogs - Explosives detection dogs associated with proficient handlers are another efficient method to detect explosives. They shall be trained to detect explosives only, not narcotics nor shall they be used as a protection dog.

j. Threat Image Projection (TIP) - TIP consists of the virtual insertion of threat images from a database into the stream of images of scanned baggage and provides:

(1) Continual refresher training free of downtime;
(2) Objective performance assessment; and,
(3) Maintenance of operator vigilance.

B. Considerations for Procurement

a. The identification and scientific analysis of the characteristics and properties of a threat shall be the basis for the selection of the appropriate technology to efficiently detect threat items. This shall also consider technology detection capabilities and limitations to determine the minimum detection requirement.

b. An assessment of the existing technology detection capabilities shall be performed based on the minimum detection requirement. This consists of selecting key performance parameters and conducting an evaluation of associated detection capabilities thereafter. The key performance parameters considered for security screening equipment shall include:

(1) Probability of detection (Pd): refers to the probability that a detection system will detect a certain threat item under a given set of conditions;

(2) False alarm rate (FAR): there are two types of false alarm:

(1) False negative: occurs when a device fails to alarm in the presence of a threat item. This type of false alarm has an impact on security; and
(2) False positive: occurs when a device generates an alarm even though no threat item is present. This type of false alarm has a mostly operational impact;
(3) Throughput: a system's throughput rate is expressed in units such as persons per minute, bags per hour, etc. The

ability to screen people or items quickly is very important; and
(4) Other key parameters, such as automated detection, multi-view, and image quality.

2. With the concept of operations and function provided by the manufacturer, equipment performance shall be assessed based on the minimum detection requirements. Testing shall be conducted so that as many variables as possible can be eliminated, providing for repeatable test scenarios and consistency in the results.

3. All testing scenarios shall be documented and applied to all pieces of equipment tested during the assessment, thus giving comparable benchmark data.

4. Technology assessments shall develop testing tools that can be used for the "proof of performance" and routine testing of security screening equipment for procurement. Testing tools developed and referenced by detection requirement during laboratory assessments shall also be used to measure the ongoing performance of equipment in the field.

5. The standard minimum detection requirement reference is reflected in (Appendix 1 - Security Screening Equipment Minimum Detection Standards Checklist).

6. Operational requirements shall be part of security screening equipment procurement cycles. Before a piece of equipment is deployed operationally, the following shall be considered:

a. Size of items to be screened;
b. Size and mass of the equipment;
c. Screening capacity (throughput and hourly screening capacity);
d. Reliability and maintainability;
e. Integrity (possible sources of interference);
f. Licensing, such as of frequency bands used by the equipment;
g. Safety requirements;
h. Automation;
i. Operator interface;
j. Power requirements;
k. Data recording;
I. Threat image projection capability;
m. Training requirements;
n. Ease of use;
o. Environmental constraints (e.g. temperature and humidity); and, p. Networking.

7. Consideration of the following costs when establishing a budget for the procurement of security screening equipment are as follows:

a. Equipment capital:

(1) Costs related to equipment integration, which may in some instances represent a greater cost than the equipment capital cost and shall therefore be examined