~~SENSITIVE SECURITY INFORMATION~~

DHS/TSA/SEB-06/01

TRANSPORTATION SECURITY ADMINISTRATION

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SYSTEMS ENGINEERING BRANCH

OPERATIONAL REQUIREMENTS DOCUMENT

WHOLE BODY IMAGER
AVIATION APPLICATIONS

U.S. Department of Homeland Security
Transportation Security Administration
William J. Hughes Technical Center
Atlantic City International Airport, NJ 08405

July 2006
Version 1.9
Final Report

U.S. Department of Homeland Security
Transportation Security Administration

CONTENTS

1. PURPOSE

1.1. Scope

This document defines minimum requirements for Whole Body Imager (WBI) systems that provide the capability to locate potential threats on a person including beneath clothes or otherwise obscured.

1.2. Overview

WBI systems are intended to perform discreet, non-contact, threat-cueing for both routine screening and probable-cause searches in aviation applications.

1.3. Concept Of Operations (CONOPS)

The WBI system will be used to aid in the detection of metallic, non-metallic, and organic threats. The system will also be used to aid in the discrimination of innocuous items. The system may be used as either a primary or secondary means for detecting or locating (or both) anomalous objects on a person.

The WBI system and the screener workstation, where image interpretation takes place, may not be co-located. Therefore a capability for two operator positions will be required. The Scanning Initiation Position (SIP) is located by the scanner. The SIP assists the passenger in properly positioning themselves for scans and initiates all scans. The Image Screening Position (ISP) is located remotely. At the ISP, the screener examines the images and determines if the passenger needs additional screening.

As part of their contribution to the CONOPS, the vendor will determine the proper positioning of passengers, including the number of positions that must be taken and the number of scans needed for a "full" scan to be completed. The vendor CONOPS will be used in evaluating the detection and throughput of the WBI system.

2. FUNCTIONAL AND OPERATIONAL REQUIREMENTS

The term "shall" reflects a system requirement.

2.1. Detection

The WBI system shall (1) visually locate weapons and explosives concealed anywhere on or near the surface of the body.

The accuracy and precision of localization shall (2) be sufficient to support the accurate and precise verbal communications of the area that needs to be resolved to a second screener responsible for resolution. The second screener will not have access to the image.

The desired level of accuracy and precision is conveyed by plain English examples such as "... inside of the leg below the knee", "... in the center of the back above the waist", and "... under the right arm above the elbow."

The WBI system shall (3) provide images sufficient for the operator to identify threats and prohibited items at a level of accuracy consistent with the detection standards specified in Tier 1 of Appendix A.

False positive decisions shall (4) be less than or equal to the nuisance alarm rate specified in Appendix A.

2.2. Throughput

Throughput with an operator-in-the-loop from start of the system's process to the end shall (5) be at least 60 persons per hour.

2.3. Privacy

The goal of the requirements described below is to conform to 4th Amendment requirements as interpreted by the Department of Justice as described in NRC Publication NMAB-482-1.

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If the system applies privacy algorithms, the WBI shall (7) meet the detection requirements contained in Par. 2.1.

2.4. Passenger Positioning

The operations manual for the WBI shall (8) provide detailed instructions for positioning passengers, including the number of positions that must be taken and the number of scans required for a "full" scan to be completed.

The WBI shall (9) include a positioning aid for passengers. The intent of the positioning aid is to reduce the time it takes to put a passenger in place for screening and to reduce position errors for better repeatability.

The WBI shall (10) include an aid to assist passengers with limited mobility and stamina.

2.5. Scanning Initiation Position (SIP)

The WBI shall (11) provide indicators to the local screener positioned at the SIP for the following conditions.

a) The WBI system is on and the ISP screener has logged into the control terminal and is ready to evaluate images.
b) There is a problem with the system (i.e. fault indicator).
c) The passenger is cleared to go.
d) The remote screener at the ISP requires that this passenger be subject to secondary screening.
e) The remote screener at the ISP requires additional scans of this person.

When a remote screener determines that a passenger requires second level screening, the means of informing the local operator provided by the WBI shall (12) be discreet, subtle, and unseen by passengers.

2.6. Image Screening Position (ISP)

The WBI shall (13) possess a means to manually analyze images remotely at least 100 feet from the SIP.

WBI images shall (14) be displayed ONLY at the ISP while the system is in remote operation mode.

The remote image shall (15) be transmitted in an operationally secure fashion to include secure or encrypted transmission.

To relay the result of the scan, the WBI shall (16) provide a secure means using secure protocols to communicate between the image analyst at the ISP and the TSO managing the passenger at the portal.

The WBI shall (17) provide a means to achieve the following at the ISP position.

a) Communicate to the SIP display that there are no suspected threats and the passenger is clear to go.

b) Communicate to the SIP display that the ISP operator wants to take additional scans of the passenger beyond the required minimal number of scans. The exact positioning of the passenger in the additional scans will be communicated by voice.

c) Communicate to the SIP display that the passenger shall (18) be detained and searched. The specific details of body areas to be searched and potential threats will be communicated by voice.

d) Communicate to the SIP display that the remote screener shall (19) abort the scan sequence and restart.

The WBI shall (20) prevent the remote screener from initiating or controlling any of the activities of the system.

Images shall (21) conform to the following guidelines.

a) The keyboard right and left arrows enable the screener to scroll right and left through the images.

b) The minimum number of scans for any given passenger is a configurable parameter (adjustable up to 10 scans) at a supervisory or higher level.

c) Indicating that a passenger is "Clear" erases all images.

d) The system shall (22) not allow another image onscreen until the current image has been cleared.

e) Indicating "Search" requires a second confirmation pop-up window to erase the images.

f) Positive confirmation of search erases all images.

g) Logging out of the control terminal clears all image data from system buffers and confirmation is given to the screener.

h) If the system is idle for 45 seconds, the workstation screen will blank out to be refreshed by movement of the mouse or any key stroke.

2.7. Control of the Scanner

The SIP shall (23) be prevented from scanning a second passenger before the screener at the ISP has completed the evaluation of the first passenger's images.

2.8. Data Logger

Fielded versions of the WBI shall (24) prohibit the recording or storage of images.

The WBI shall (25) lock all media, communication interfaces, and ports, using both physical and software controls accessible only by the designated Federal Security Director (FSD) with the exception of communication interfaces intended for verbal communication between the SIP and persons managing the WBI, managing passengers, and/or resolving alarms.

One WBI system, identified by the Government, shall (26) have the capability, which can be configurable at the superuser level, to record images for training purposes. The superuser password shall (27) be managed by the TSA.

The capability to retain images at the superuser level will be disabled on operational systems.

2.9. Quality Control

The WBI shall (28) possess a built-in test function, which verifies key functions automatically on power-up and displays results.

The duration of the power-up diagnostics function shall (29) be less than 1 minute.

The WBI shall (30) provide ten (10) selectable levels of privacy.

3. PERFORMANCE REQUIREMENTS

3.1. Field of View Minimum

The WBI shall (31) image an entire person for people that are 187.0 cm tall and are 103.5 cm measured from elbow to elbow with arms extended horizontally to the body.

3.2. Imaging Function Verification

The WBI shall (32) include a deployable field test kit to verify image quality at checkpoints.

3.3. Capacity

The imaging area of the WBI shall (33) be dimensioned so that a person within the 95th percentile following the procedures outlined shall (34) be able to attain these poses easily without bumping against any part of the system.

3.4. Reliability, Maintainability and Availability (RMA)

3.4.1. Reliability

The WBI shall (35) be designed to meet a Mean Time Between Critical Failure (MTBCF) of 1,168 operational hours.

3.4.2. Maintainability

The WBI shall (36) be designed to have a critical failure (CF) Mean Time To-Repair (MTTR) of not more than 1 hour.

The WBI shall (37) have a parts and labor maintenance cost of less than 5% per unit per year on average over the service life including both preventive and corrective maintenance actions.

3.4.3. Maintenance Access

The external clearance distance required for performing any maintenance action on the WBI shall (38) be less than or equal to 1 meter.

3.4.4. Preventative Maintenance

The WBI shall (39) be designed to have a Mean Time Between Maintenance Action (MTBMA) for preventative maintenance of not more than once each week of operation. An operational day is defined as 16 hours of duty.

The maintenance manual shall (40) specify all scheduled maintenance activities and the intervals of performance.

3.4.5. Corrective Maintenance

The WBI shall (41) be designed to have built in diagnostic software to determine the health of the system.

The diagnostic software shall (42) perform built in test (BIT) and fault isolation test (FIT) reporting the resultant error/failure code(s) to the user display and store the resultant error/failure code(s) on the system for later retrieval.

The WBI shall (43) be modular in design to allow easy removal and replacement of failed Lowest Replaceable Units (LRUs).

The maintenance manual shall (44) contain all corrective maintenance procedures and the associated operational or calibration parameters.

3.4.6. Operational Availability (Ao)

The WBI shall (45) demonstrate an Operational Availability (Ao) threshold of at least 98%.

3.5. Input Power

The WBI shall (46) operate using 110 VAC power with up to ± 15% voltage tolerance and up to ± 10% in frequency tolerance at no more than 20 amp service.

The WBI shall (47) use power connectors that connect securely to the electrical outlet.

4. PHYSICAL INTEGRATION

4.1. Floor Loading

The unit shall not (48) exceed 650 kg/m^2. The goal *should* be 400 kg/m^2.

4.2. Footprint

The device shall (49) have a footprint which does not exceed 4 square meters.

4.3. Height Limit

The system shall (50) not exceed 3 meters in height.

4.4. Service Life

The unit shall (51) have a service life of at least 8 years.

5. FUNCTIONAL INTEGRATION

5.1. Network Interface

WBI shall (52) contain a RJ-45 interface for the Ethernet interface connection and that interface shall (53) be 10/100 compatible.

The WBI shall (54) also be 802.11X compatible.

The network interface(s) shall (55) be configurable with an IP address.

5.2. STIP Interface

WBI shall (56) provide data and prescribed interface with the Security Technology Integration Program as referenced in the STIP TSE Interface Requirements Document (IRD) Version 1.5.2. See Appendix C.

6. HUMAN INTEGRATION

6.1. Human/Product Interface Design

Whole Body Imager shall not (57) physically contact the individual being scanned or cause physical discomfort to the individual.

If the system is a portal then it shall (58) be sized to allow entry and exit by 95th percentile passengers without stooping or having to enter or exit at an angle,

If Whole Body Imager uses a platform, it shall (59) have a rail or similar to help a passenger mount and dismount as well as to prevent falling.

7. SAFETY

7.1. Ionizing Radiation

Whole Body Imager shall (60) satisfy all requirements in the following documents as applicable for passengers and operators:

- ANSI/HPS N43.17-2002 American National Standard – "Radiation Safety for Personnel Security Screening Systems Using X-ray".

7.2. Non-Ionizing Radiation

Whole Body Imager shall (61) satisfy all requirements in the following documents as applicable for passengers and operators:

- 29 CFR 1910 (OSHA)
- "Guidelines For Limiting Exposure To Time-Varying Electric, Magnetic, And Electromagnetic Fields (Up To 300 GHz)", International Commission on Non-Ionizing Radiation Protection, Health Phys. 1998 April, Vol.74, No.4, 494-522

- ACGIH-0302 (1996), Sub-Radio Frequency (30 kHz and below) Magnetic Fields
- C95.1-2005 IEEE Standard For Safety Levels With Respect To Human Exposure To Radio Frequency Electromagnetic Fields, 300 KHZ to 300 GHZ.

7.3. Electrical Safety

Whole Body Imager shall (62) comply with UL 61010-1, Part-1 (Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use).

7.4. Ergonomic Safety

Whole Body Imager shall (63) be free of (a) sharp corners or edges that can puncture, cut, or tear the skin or clothing or otherwise cause bodily injury, (b) external wires, connectors, or cables except the power cable and data cable, or (c) loose covers and cowlings.

Ease of access and egress from the screening position shall (64) be provided for people with limited mobility.

Whole Body Imager shall (65) have an impulse peak not greater than 70 dBA at the passenger's ear. The goal is 60 dBA.

The WBI shall (66) have a physical means (E-Stop) to shutdown the unit immediately upon activation during an emergency situation.

7.5. Safety Interlocks

Whole Body Imager shall (67) possess a means to reliably shutdown the radiation source upon opening any panel.

7.6. Personal Medical Electronic Devices

Whole Body Imager shall (68) not adversely impact personal medical electronic devices.

7.7. Environmental Safety

7.7.1. Electromagnetic Emissions

The unit shall (69) comply with 47 CFR Telecommunications Part 15, Radio Frequency Devices and EN 50081-1 (1992) in all operating modes.

7.7.2. Electromagnetic Immunity

Imaging function shall not (70) be degraded by the typical sources of radiated and conducted noise present at airport security checkpoints, (such as Carry-on bag X-ray equipment and feed belts at checkpoints, Walk-Through Metal Detectors, Low-level conducted noise, Transient hum, Noise spike, TV noise, Audio frequency noise, Switching power noise, Fluorescent light noise, and Cell phone transmission) when defined and tested in accordance with IEC 61000-6-1. Equivalent commercial practice or analysis may be substituted.

7.7.3. Vibration Immunity

The unit's function shall not (71) be degraded by low frequency vibration typical at airport terminals stemming from sources such as aircraft departure/landings, heavy foot traffic, electric carts, large HVAC systems, sub-floor bag conveyors, and outdoor truck traffic. The manufacturer may base compliance on IEC 60068-2-64 or equivalent commercial practice or analysis.

8. SECURITY

8.1. Physical Security

The units are to be used in areas accessible to the public. The Whole Body Imager shall (72) provide the means to:

- Physically protect its sensitive components and controls.
- Password protect access to operational configuration parameters and collected data in both operational and non-operational modes.
- Possess lockable maintenance access doors and/or possess highly visible tamper-evident seals or alarms on assemblies that contain sensitive components/data.
- Require operators to log in using a unique user name and password.
- Incorporate a three level user and password scheme allowing supervisors and "superusers" access and override capabilities.

8.2. Information Security

Whole Body Imager shall (73) comply with TSA System Security Requirements (SSR) Version 1.0 as detailed in Appendix B.

9. IN-SERVICE SUPPORT

9.1. Training

The Contractor shall (74) develop and conduct training courses on the Whole Body Imager for operators and maintainers.

The training courses shall (75) be capable of being performed on a Whole Body Imager or a Whole Body Imager Simulator (if necessary). Training shall (76) include Operator Qualification Testing.

The training course shall (77) include a component on privacy and the privacy act.

The contractor shall (78) train 12 operators for each Government selected OT&E airport

The operator training shall (79) adequately prepare operators to use the Whole Body Imager including all system functions and alarm resolution techniques, as evidenced by successful completion of operator qualification testing;

The operator training shall (80) be matched and attuned to the skill level, qualifications, and capabilities of operators who demonstrate the abilities needed to successfully complete Whole Body Imager training and pass qualification testing.

9.1.1. Training Simulator

The contractor shall (81) provide a simulator that emulates all operator functionality.

The contractor shall (82) provide a training library of 50 images that consist of a representative mix of passenger body types and gender.

Of the 50 images, 30 images shall (83) be of persons carrying threats.

The remaining 20 images shall (84) be of innocent persons.

Threats and innocent persons are defined in Appendix A.

10. REFERENCES

1. ACGIH-0302 (1996), American Conference of Governmental Industrial Hygienists, "Documentation of the Threshold Limit Values, Sub-RF (30 kHz and below), Magnetic Fields"
2. ANSI/HPS N43.17-2002, "Radiation Safety for Personnel Security Screening Systems Using X-rays" American National Standards Institute, Inc. (April 3, 2002)
3. EN 50081-1 (1992), European Standard, "Electromagnetic Compatibility – Generic Emission Standard, Part 1: Residential, Commercial and Light Industry"
4. EN 60950 (Electrical Safety)
5. FCC 47 CFR Part 15 (1996), Federal Communications Commission, "Code of Federal Regulations; Title 47 – Telecommunications; Part 15, Radio Frequency Devices."
6. IEC 60068-2-64, "Environmental Test – Part 2: Test Methods – Test FH: Vibration Broadband Random (Digital Control) and Guidance"
7. IEC 61000-6-1 (amended EN 50082-1), European Standard, "Electromagnetic Compatibility – Generic Immunity Standard, Part 1: Residential, Commercial and Light Industry"
8. International Commission on Non-Ionizing Radiation (ICNIRP) Guidelines, "Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Field (Up to 300 GHz)" found at: http://www.icnirp.de/ and http://www.icnirp.de/Documents/Emfgdl.PDF
9. MIL-STD-461D Method RS101, Military Standard, "Requirements for the Control of Electromagnetic Interference, Emissions, and Susceptibility, Method RS101, Radiated Susceptibility, Magnetic Field, 30 Hz to 100 kHz."
10. MIL-STD-462D Method RS101, Military Standard, "Test Method Standard for Measurement of Electromagnetic Interference Characteristics, Method RS101, Radiated Susceptibility, Magnetic Field, 30 Hz to 100 kHz"
11. 29 CFR 1910 (OSHA)
12. 21 CFR 1020 (FDA)
13. UL 1950, Second Edition, Underwriters Laboratories, "Standard for Information Technology Equipment, Including Electrical Business Equipment"
14. Underwriters Lab (UL) 3101, "Electrical Equipment for Laboratory Use"
15. International Electrotechnical Commission (IEC) 61010-1 "Safety Requirements for electrical equipment for measurement, control, and laboratory use"
16. Publication NMAB-482-1, Appendix C, "Airline Passenger Security Screening-Newer Technologies and Implementation Issues", Committee on Commercial Aviation Security, Panel on Passenger Screening, National Materials Advisory Board, Commission on Engineering and Technical Systems, National Research Council, 1996
17. C95.1-2005 IEEE Standard For Safety Levels With Respect To Human Exposure To Radio Frequency Electromagnetic Fields, 300 KHZ to 300 GHZ

11. ACRONYMS

BIT	Built In Test
CF	Critical Failure
CONOPS	Concept of Operations
FIT	Fault Isolation Test
FSD	Field Security Director
HVAC	Heating Ventilation & Air Conditioning
ILS	Integrated Logistics Support
IP	Internet Protocol
IRD	Interface Requirements Document
ISP	Image Screening Position
LRU	Line Replacement Unit
MTBCF	Mean Time Between Critical Failure
MTBMA	Mean Time Between Maintenance Action
MTTR	Mean Time To Repair
OT&E	Operational Test and Evaluation
RMA	Reliability, Maintainability and Availability
SIP	Scanning Initiation Position
SSR	System Security Requirements
STDO	Security Technology Deployment Office
STIP	Security Technology Integration Program
TSA	Transportation Security Agency
TSO	Transportation Security Officer
UPS	Uninterruptible Power Supply

APPENDIX A
TRD for Automated Weapons & Explosives Detection System Carry-on Baggage/Possessions at Passenger Checkpoints

APPENDIX B
TSA System Security Requirements (SSR) Version 1.0

APPENDIX C
Security Technology Integration Program (STIP) TSE Interface Requirements Document (IRD) Version 1.5.1

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NOTE: The RMA terms used below are defined in APPENDIX C, TSA STDO ILS Reliability, Maintainability, Availability (RMA) Metrics Terms and Definitions.

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5.1. Network Interface

WBI shall (52) contain a RJ-45 interface for the Ethernet interface connection and that interface shall (53) be 10/100 compatible.

The WBI shall (54) also be 802.11X compatible.

The network interface(s) shall (55) be configurable with an IP address.

5.2. STIP Interface

WBI shall (56) provide data and prescribed interface with the Security Technology Integration Program as referenced in the STIP TSE Interface Requirements Document (IRD) Version 1.5.1. See Appendix C.

6. HUMAN INTEGRATION

6.1. Human/Product Interface Design

Whole Body Imager shall not (57) physically contact the individual being scanned or cause physical discomfort to the individual.

If the system is a portal then it shall (58) be sized to allow entry and exit by 95th percentile passengers without stooping or having to enter or exit at an angle,

If Whole Body Imager uses a platform, it shall (59) have a rail or similar to help a passenger mount and dismount as well as to prevent falling.

7. SAFETY

7.1. Ionizing Radiation

Whole Body Imager shall (60) satisfy all requirements in the following documents as applicable for passengers and operators:

- ANSI/HPS N43.17-2002 American National Standard – "Radiation Safety for Personnel Security Screening Systems Using X-ray".

7.2. Non-Ionizing Radiation

Whole Body Imager shall (61) satisfy all requirements in the following documents as applicable for passengers and operators:

- 29 CFR 1910 (OSHA)
- "Guidelines For Limiting Exposure To Time-Varying Electric, Magnetic, And Electromagnetic Fields (Up To 300 GHz)", International Commission on Non-Ionizing Radiation Protection, Health Phys. 1998 April, Vol.74, No.4, 494-522
- ACGIH-0302 (1996), Sub-Radio Frequency (30 kHz and below) Magnetic Fields
- C95.1-2005 IEEE Standard For Safety Levels With Respect To Human Exposure To Radio Frequency Electromagnetic Fields, 300 KHZ to 300 GHZ.

7.3. Electrical Safety

Whole Body Imager shall (62) comply with UL 61010-1, Part-1 (Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use).

7.4. Ergonomic Safety

Whole Body Imager shall (63) be free of (a) sharp corners or edges that can puncture, cut, or tear the skin or clothing or otherwise cause bodily injury, (b) external wires, connectors, or cables except the power cable and data cable, or (c) loose covers and cowlings.

Ease of access and egress from the screening position shall (64) be provided for people with limited mobility.

Whole Body Imager shall (65) have an impulse peak not greater than 70 dBA at the passenger's ear. The goal is 60 dBA.

The WBI shall (66) have a physical means (E-Stop) to shutdown the unit immediately upon activation during an emergency situation.

7.5. Safety Interlocks

Whole Body Imager shall (67) possess a means to reliably shutdown the radiation source upon opening any panel.

7.6. Personal Medical Electronic Devices

Whole Body Imager shall (68) not adversely impact personal medical electronic devices.

7.7. Environmental Safety

7.7.1. Electromagnetic Emissions

The unit shall (69) comply with 47 CFR Telecommunications Part 15, Radio Frequency Devices and EN 50081-1 (1992) in all operating modes.

7.7.2. Electromagnetic Immunity

Imaging function shall not (70) be degraded by the typical sources of radiated and conducted noise present at airport security checkpoints, (such as Carry-on bag X-ray equipment and feed belts at checkpoints, Walk-Through Metal

Detectors, Low-level conducted noise, Transient hum, Noise spike, TV noise, Audio frequency noise, Switching power noise, Fluorescent light noise, and Cell phone transmission) when defined and tested in accordance with IEC 61000-6-1. Equivalent commercial practice or analysis may be substituted.

7.7.3. Vibration Immunity

The unit's function shall not (71) be degraded by low frequency vibration typical at airport terminals stemming from sources such as aircraft departure/landings, heavy foot traffic, electric carts, large HVAC systems, sub-floor bag conveyors, and outdoor truck traffic. The manufacturer may base compliance on IEC 60068-2-64 or equivalent commercial practice or analysis.

8. SECURITY

8.1. Physical Security

The units are to be used in areas accessible to the public. The Whole Body Imager shall (72) provide the means to:

- Physically protect its sensitive components and controls.
- Password protect access to operational configuration parameters and collected data in both operational and non-operational modes.
- Possess lockable maintenance access doors and/or possess highly visible tamper-evident seals or alarms on assemblies that contain sensitive components/data.
- Require operators to log in using a unique user name and password.
- Incorporate a three level user and password scheme allowing supervisors and "superusers" access and override capabilities.

8.2. Information Security

Whole Body Imager shall (73) comply with TSA System Security Requirements (SSR) Version 2.0 as detailed in Appendix D.

9. IN-SERVICE SUPPORT

9.1. Training

The Contractor shall (74) develop and conduct training courses on the Whole Body Imager for operators and maintainers.

The training courses shall (75) be capable of being performed on a Whole Body Imager or a Whole Body Imager Simulator (if necessary). Training shall (76) include Operator Qualification Testing.

The training course shall (77) include a component on privacy and the privacy act.

The contractor shall (78) train 12 operators for each Government selected OT&E airport

The operator training shall (79) adequately prepare operators to use the Whole Body Imager including all system functions and alarm resolution techniques, as evidenced by successful completion of operator qualification testing;

The operator training shall (80) be matched and attuned to the skill level, qualifications, and capabilities of operators who demonstrate the abilities needed to successfully complete Whole Body Imager training and pass qualification testing.

9.1.1. Training Simulator

The contractor shall (81) provide a simulator that emulates all operator functionality.

The contractor shall (82) provide a training library of 50 images that consist of a representative mix of passenger body types and gender.

Of the 50 images, 30 images shall (83) be of persons carrying threats.

The remaining 20 images shall (84) be of innocent persons.

Threats and innocent persons are defined in Appendix A.

10. REFERENCES

1. ACGIH-0302 (1996), American Conference of Governmental Industrial Hygienists, "Documentation of the Threshold Limit Values, Sub-RF (30 kHz and below), Magnetic Fields"
2. ANSI/HPS N43.17-2002, "Radiation Safety for Personnel Security Screening Systems Using X-rays" American National Standards Institute, Inc. (April 3, 2002)
3. EN 50081-1 (1992), European Standard, "Electromagnetic Compatibility – Generic Emission Standard, Part 1: Residential, Commercial and Light Industry"
4. EN 60950 (Electrical Safety)
5. FCC 47 CFR Part 15 (1996), Federal Communications Commission, "Code of Federal Regulations; Title 47 – Telecommunications; Part 15, Radio Frequency Devices."
6. IEC 60068-2-64, "Environmental Test – Part 2: Test Methods – Test FH: Vibration Broadband Random (Digital Control) and Guidance"
7. IEC 61000-6-1 (amended EN 50082-1), European Standard, "Electromagnetic Compatibility – Generic Immunity Standard, Part 1: Residential, Commercial and Light Industry"
8. International Commission on Non-Ionizing Radiation (ICNIRP) Guidelines, "Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Field (Up to 300 GHz)" found at: http://www.icnirp.de/ and http://www.icnirp.de/Documents/Emfgdl.PDF
9. MIL-STD-461D Method RS101, Military Standard, "Requirements for the Control of Electromagnetic Interference, Emissions, and Susceptibility, Method RS101, Radiated Susceptibility, Magnetic Field, 30 Hz to 100 kHz."
10. MIL-STD-462D Method RS101, Military Standard, "Test Method Standard for Measurement of Electromagnetic Interference Characteristics, Method RS101, Radiated Susceptibility, Magnetic Field, 30 Hz to 100 kHz"
11. 29 CFR 1910 (OSHA)
12. 21 CFR 1020 (FDA)
13. UL 1950, Second Edition, Underwriters Laboratories, "Standard for Information Technology Equipment, Including Electrical Business Equipment"
14. Underwriters Lab (UL) 3101, "Electrical Equipment for Laboratory Use"
15. International Electrotechnical Commission (IEC) 61010-1 "Safety Requirements for electrical equipment for measurement, control, and laboratory use"
16. Publication NMAB-482-1, Appendix C, "Airline Passenger Security Screening-Newer Technologies and Implementation Issues", Committee on Commercial Aviation Security, Panel on Passenger Screening, National Materials Advisory Board, Commission on Engineering and Technical Systems, National Research Council, 1996
17. C95.1-2005 IEEE Standard For Safety Levels With Respect To Human Exposure To Radio Frequency Electromagnetic Fields, 300 KHZ to 300 GHZ

11. ACRONYMS

BIT	Built In Test
CF	Critical Failure
CONOPS	Concept of Operations
FIT	Fault Isolation Test
FSD	Field Security Director
HVAC	Heating Ventilation & Air Conditioning
ILS	Integrated Logistics Support
IP	Internet Protocol
IRD	Interface Requirements Document
ISP	Image Screening Position
LRU	Line Replacement Unit
MTBCF	Mean Time Between Critical Failure
MTBMA	Mean Time Between Maintenance Action
MTTR	Mean Time To Repair
OT&E	Operational Test and Evaluation
RMA	Reliability, Maintainability and Availability
SIP	Scanning Initiation Position
SSR	System Security Requirements
STDO	Security Technology Deployment Office
STIP	Security Technology Integration Program
TSA	Transportation Security Agency
TSO	Transportation Security Officer
UPS	Uninterruptible Power Supply

APPENDIX A

TRD for Automated Weapons & Explosives Detection System Carry-on Baggage/Possessions at Passenger Checkpoints

APPENDIX B

TSA STDO ILS Reliability, Maintainability, Availability (RMA) Metrics Terms and Definitions

APPENDIX C
TSA System Security Requirements (SSR) Version 1.0

APPENDIX D
Security Technology Integration Program (STIP) TSE Interface Requirements Document (IRD) Version 1.5.1