~~SENSITIVE SECURITY INFORMATION~~

Transportation Security Administration

OFFICE OF SECURITY CAPABILITIES

FUNCTIONAL REQUIREMENTS DOCUMENT FOR A

SECOND-GENERATION ADVANCED IMAGING TECHNOLOGY SYSTEM FOR CHECKPOINT OPERATIONS

U.S. Department of Homeland Security
Transportation Security Administration
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~~SENSITIVE SECURITY INFORMATION~~

APPROVALS

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1.2	AIT requirements for (b)(3):49 U.S.C. § 114(r) (b)(3):49 U.S.C. § 114(r)	09/30/10
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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

1.1 Background

The Department of Homeland Security (DHS) Transportation Security Administration (TSA) has the requirement for a second-generation Advanced Imaging Technology (AIT)-2 System. The AIT-2 System includes Automated Target Recognition (ATR) capability that provides an avatar-like image to the operator depicting the location(s) of any anomalies, thus eliminating the need for an operator to review raw AIT images. This will reduce privacy concerns, staffing requirements and security posture compared to first-generation AITs that require an Image Operator (IO) to review the AIT images. In addition, AIT-2 Systems will include two configuration options for development, either a full-size system or a reduced-size system. Reduced-size systems will be offered as an alternative to full-size systems to help reduce the system's overall footprint for smaller checkpoint configurations. The system specified in this document is intended to satisfy this need by identifying the requirements an AIT-2 System shall meet.

1.2 Scope

This Functional Requirements Document (FRD) establishes the performance, design, manufacturing, and verification requirements that define an AIT-2 System for the detection of anomalies on a person, (b);(3);49 U.S.C. § 114(r) or otherwise obscured.

1.3 System Description

An AIT-2 System is a passenger screening device that uses imaging technology to scan individuals and uses a computer-based image processing algorithm to analyze the images for the presence of anomalies on the person, (b);(3);49 U.S.C. § 114(r) or otherwise obscured. The images presented to the Screening Operator (SO) at the AIT-2 System are Representative Human Figure images on the AIT-2 Operator Control Panel (OCP) display monitor. The Representative Human Figure images (b);(3);49 U.S.C. § 114(r) drawings that include at least a front and back view for displaying scan results. The Representative Human Figure does not (b);(3);49 U.S.C. § 114(r) The mission of the AIT-2 System is to eliminate the requirement for an operator to review and analyze AIT images by having the system perform all AIT image analysis to determine the presence and location of anomalies on an individual.

This FRD establishes the technical requirements for an AIT-2 System. Requirements are denoted by the use of a bold italic "***shall***."

1.3.1 Major Components

An AIT-2 System consists of the following major components:

- Scanner and
- OCP.

1.4 Definitions

The following terms were used in this document.

Term	Definition
Anomaly	Any undivested object, including (b);(3);49 U.S.C. § 114(r); (b);(3);49 U.S.C. § 114(r);
AIT Image	The resulting image produced by the scanning of an individual. These images generally provide (b);(3);49 U.S.C. § 114(r); (b);(3);49 U.S.C. § 114(r); and may present privacy concerns to individuals.
Downloading	Retrieving data or information from the ATR AIT System either locally or remotely.
Screening Operator (SO)	The Transportation Security Officer (TSO) responsible for scanning and reviewing the passenger's results on the Representative Human Figure images during the AIT-2 screening process.
Shall	A bold italic "***shall***" indicates a requirement that the vendors' submitted AIT-2 Systems must meet, in accordance with the tier system.
Should	A bold italic "***should***" indicates a goal that TSA has for the vendors' submitted AIT-2 Systems to meet, in accordance with the tier system.
System Performance Characteristic	The "Performance Characteristics" indicate requirement the vendors is expected to meet, in accordance with the tier system.
Uploading	Loading data or information into the AIT-2 System, either locally or remotely.
User	Anyone with a User Access Level above Operator, i.e., Maintenance Technicians, Federal Security Director, and Lead-in-Charge.

2.0 APPLICABLE DOCUMENTS

2.1 General

The documents listed in this section are referenced in this FRD. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all requirements of this specification, whether or not the applicable references are listed. The following specifications, standards, handbooks, documents, and drawings of the exact revisions listed below form a part of this FRD to the extent noted herein; if a revision is not shown, then the version in effect at the time of contract award shall govern.

2.2 Government Documents

Reference	Title
United States Code: Title 5, Section 552	*Freedom of Information Act*, 1996
29 Code of Federal Regulations (CFR), Part 1910.7	Occupational Health and Safety Administration (OSHA): *Occupational Safety and Health Standards; Definition and Requirements for a Nationally Recognized Testing Laboratory*, January 1, 2007
29 CFR, Part 1910.1096	OSHA: *Occupational Safety and Health Standards; Ionizing Radiation*, January 1, 2007
29 CFR, Part 1910.1200	OSHA: *Occupational Safety and Health Standards; Toxic and Hazardous Substances: Hazard Communication*, January 1, 2007
47 CFR, Part 15	Federal Communications Commission (FCC): *Radio Frequency Devices*, October 1, 2007
49 CFR, Part 15	TSA: *Protection of Sensitive Security Information*, October 1, 2007
49 CFR, Part 1520	TSA: *Protection of Sensitive Security Information*, October 1, 2006
49 CFR, Part 1544.405	TSA: *Airport Operator Security: Air Carriers and Commercial Operators: New Screeners: Qualifications of New Screening Personnel*, October 1, 2010
Department of Transportation (DOT)/Federal Aviation Administration (FAA)/CT-03/05	*Human Factors Design Standard for Acquisition of Commercial Off-the-Shelf, Non-developmental, and Developmental Systems*, 2003
FAA-G-2100H	*Handbook for Electronic Equipment, General Requirements, 3.1.1.3.1, Power Factor*
FAA-G-2100H	*Handbook for Electronic Equipment, General Requirements, 3.1.1.3.2.h, Inrush Current*

Reference	Title
FAA-G-2100H	*Handbook for Electronic Equipment, General Requirements, 3.1.1.4, Electric Load Balance*
FAA-G-2100H	*Handbook for Electronic Equipment, General Requirements, 3.1.1.5.c*, Table 1, *Harmonics*
Federal Information Processing Standard (FIPS) 197	*Federal Information Processing Standard 197 Advanced Encryption Standard (AES)*
Military Standard (MIL-STD) 810G	*Department of Defense Test Method Standard, Environmental Engineering Considerations and Laboratory Tests*
National Institute of Standards and Technology (NIST)	Federal Information Processing Standard Publication 140-2
TSA	*Transportation Security Equipment Information Technology Security Requirements*, Version 1.5, August 16, 2010
(b)(3):49 U.S.C. § 114(r)	(b)(3):49 U.S.C. § 114(r)

2.3 Non-Government Documents

Reference	Title
Air Transport Association (ATA)	Air Transport Association Spec 300: *Specification for Packaging of Airline Supplies*
American National Standards Institute (ANSI) C63.16-1993	*Discharge Test Methodologies and Criteria for Electronic Equipment*, 1993
ANSI/Health Physics Society (HPS) N43.17-2009	*American National Standard – Radiation Safety for Personnel Security Screening Systems Using X-ray or Gamma Radiation*
European Committee for Electro-technical Standardization (CENELEC) Standard EN 55022	*Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment (Radiated Radio Frequency (RF) Emissions)*
Information Technology Industry Council (ITI)	*ITIC (CBEMA) Curve 07.01.2000*

Reference	Title
International Electrotechnical Commission (IEC) 60068-2-64	*Environmental Testing, Part 2: Test Methods – Test Fh: Vibration, Broad-band Random (Digital Control) and Guidance,* May 28, 1993
IEC 60601-1	*General requirements for basic safety and essential performance*
IEC/EN61000-3-3	*Flicker and Voltage Variation*
IEC 61000-4-3	*Testing and Measurement Techniques. Radiated, radio frequency, electromagnetic field immunity test*
IEC 61000-4-4	*Testing and Measurement Techniques. Electrical fast transient/burst immunity test*
IEC 61000-4-5	*Testing and Measurement Techniques. Surge immunity test*
IEC 61000-4-6	*Testing and Measurement Techniques. Immunity to conducted disturbances, induced by radio-frequency fields*
IEC 61000-4-8	*Testing and Measurement Techniques. Power frequency magnetic field immunity test*
IEC 61000-4-11	*Testing and Measurement Techniques. Voltage dips and interruptions*
IEC 61000-4-11	*Voltage Dip Immunity*
IEC 61000-4-34	*Voltage Sag Immunity*
IEC 61000-6-3	*Electromagnetic Compatibility (EMC). Generic Standards. Emission Standard for Residential, Commercial, and Light-Industrial Environments*, 17 July 2006
Institute of Electrical and Electronic Engineers (IEEE) 519-1992	*IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power System, Harmonic Limits*
IEEE C95.1-2005	*Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz*, revision of C95.1, 1991
IEEE	*IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, 12(2): 131 139
International Commission on Non-Ionizing Radiation Protection (ICNIRP)	*International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (up to 300 GHz). Health Physics* 74 (4): 494-522; April 1998
Underwriters Laboratories (UL) 310	*Standard for Electrical Quick Connect Terminals,* May 27, 2003
UL 60950	*UL Standard 60950 – Safety of Information Technology*

Reference	Title
UL 61010-1	*Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use, Part 1: General Requirements,* July 12, 2004

2.4 Order of Precedence

In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes national and state laws and regulations unless a specific exemption has been obtained.

3.0 REQUIREMENTS

3.1 System

3.1.1 Detection/Imaging

The system will scan an individual, analyze the AIT image data for potential threats, and present the location of possible threats to the SO by populating a Representative Human Figure with anomaly location indicators. The system will perform the scanning of individuals divested according to the current TSA procedures.

The system ***shall*** (1) (b)(3):49 U.S.C. § 114(r)
(b)(3):49 U.S.C. § 114(r)

The system ***shall*** (2) provide an ATR capability for detecting the presence of anomalies on an individual (b)(3):49 U.S.C. § 114(r) or otherwise obscured at the Detection Rate (P_d) as defined in (b)(3):49 U.S.C. § 114(r)
(b)(3):49 U.S.C. § 114(r)

In order to meet the overall P_d defined in (b)(3):49 U.S.C. § 114(r)
(b)(3):49 U.S.C. § 114(r) a defined threat set of items must be detected. The following sections define the items that must be included in the threat sets for the different phases. (b)(3):49 U.S.C. § 114(r)
(b)(3):49 U.S.C. § 114(r)

The system ***shall*** (3) automatically detect the presence and identify the location of the
(b)(3):49 U.S.C. § 114(r)

Any system submitted for (b)(3):49 U.S.C. § 114(r) capabilities listed
(b)(3):49 U.S.C. § 114(r)

Any system submitted for (b)(3):49 U.S.C. § 114(r) detection capabilities listed in Tables 2, 3 & 4 (b)(3):49 U.S.C. § 114(r) (b)(3):49 U.S.C. § 114(r)
(b)(3):49 U.S.C. § 114(r) (b)(3):49 U.S.C. § 114(r)

Any system submitted for (b)(3):49 U.S.C. § 114(r) detection capabilities listed in (b)(3):49 U.S.C. § 114(r) (b)(3):49 U.S.C. § 114(r)

3.1.1.3 Privacy

An individual's privacy must be maintained and protected during screening. Therefore, upon receiving operator input indicating the screened individual is cleared, the system ***shall*** (7) unallocate the volatile memory locations storing that individual's scan data. Scan data is defined as data that could be used to reconstruct an image of the screened individual.

The system ***shall*** (8) not be capable of locally storing scan data in any non-volatile storage/memory, from any user level, in any mode.

The system ***shall*** (9) be prohibited from exporting scan data.

The system ***shall*** (10) be prohibited from displaying raw scan data on the OCP.

All source code and firmware ***shall*** (11) be made available for government inspection and testing.

3.1.1.4 False Alarm Rate

The false alarm rate (P_{fa}) for the system ***shall*** (12) be in accordance with the value defined in (b)(3):49 U.S.C. § 114(r) (b)(3):49 U.S.C. § 114(r)

3.1.1.5 System Visual and Audible Indicators

3.1.1.5.1 Representative Human Figure

The system ***shall*** (13) provide at least two (2) (b)(3):49 U.S.C. § 114(r) Representative Human Figure images, one of the "front view" and one of the "back view." Refer to Figure 1 for an example. The Representative Human Figure images ***shall*** (14) indicate Left and Right orientation, e.g., the right-side front, left-side front, left-side back, right-side back. The images will be used to present scanning results to the SO. The Representative Human Figure images ***shall*** (15) be sized in order to provide at a minimum a 1-cm to 10-cm (1:10) scale image of a (b)(3):49 U.S.C. § 114(r) passenger in the scan pose. The Representative Human Figure may be larger in scale (e.g., 1:9, 1:8, etc.).

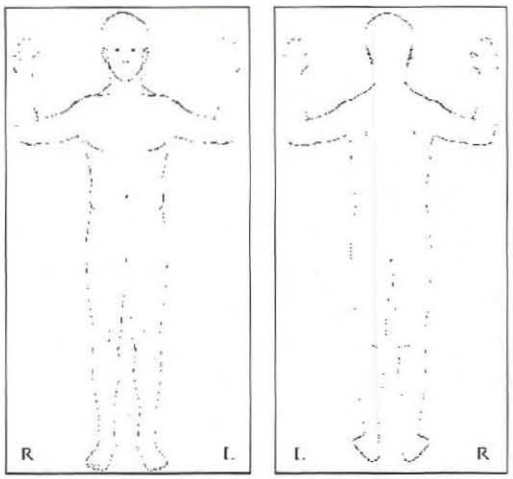


Figure 1: Representative Human Figure (Example)

3.1.1.5.2 Visual Indicators

While the system is conducting a scan, the system ***shall*** (16) provide an indicator that is visible to the passenger to notify the passenger to maintain their pose.

When an individual has been scanned by the system, the status of the scan results ***shall*** (17) be displayed on the OCP display monitor with the following messages:

a. A green status indicator with the corresponding text "CLEAR" if no anomalies are found;
b. A red status indicator with the text "ANOMALY PRESENT" if one or more anomalies are found;
c. A yellow status indicator with the text "UNABLE TO PROCESS IMAGE" if the system cannot analyze an AIT image (b);(3);49 U.S.C. § 114(r)
(b);(3);49 U.S.C. § 114(r)
d. An orange status indicator with the corresponding text "SCANNER MALFUNCTION – CALL SERVICE TECHNICIAN" if the system cannot analyze an image due to a system malfunction.

The system ***shall*** (18) display the location of all detected anomalies (b);(3);49 U.S.C. § 114(r)
(b);(3);49 U.S.C. § 114(r)
(b);(3);49 U.S.C. § 114(r) Each anomaly indicator ***shall*** (19) (b);(3);49 U.S.C. § 114(r)
(b);(3);49 U.S.C. § 114(r) from the actual anomaly prior to being scaled to the same level as the Representative Human Figure images.

Each anomaly location indicator ***shall*** (20) be one yellow-filled box with a red border positioned on the Representative Human Figure in the location corresponding to where each anomaly was detected on the individual being scanned. The system is allowed to use multiple anomaly location indicators to indicate the location of an anomaly. If multiple anomaly location indicators overlap, the system ***shall*** (21) use a single red border to capture the entire anomaly area. Each anomaly location indicator ***shall*** (22) be an 8-cm-by-8-cm square scaled to the same level as the Representative Human Figure. That is, if the Representative Human Figure is scaled to 1:10, then the 8-cm-by-8-cm square would scale to a 0.8-cm-by-0.8-cm square.

The system ***shall*** (23) store both the scaled and actual X and Y coordinates for the center of each anomaly location indicator, based on the XY coordinate plane shown in Figure 2, for retrieval as part of the Field Data Reporting System (FDRS). If multiple anomaly location indicators overlap, and have been indicated by a singular red border, the system ***shall*** (24) assign a group Identification (ID) to all anomaly location indicators within that grouping. If the system uses a three-dimensional (3D) Representative Human Figure, the system ***shall*** (25) store the scaled and actual Z coordinate information for the center of each anomaly location indicator. The scaled coordinates ***shall*** (26) be scaled to the same level as the Representative Human Figure.

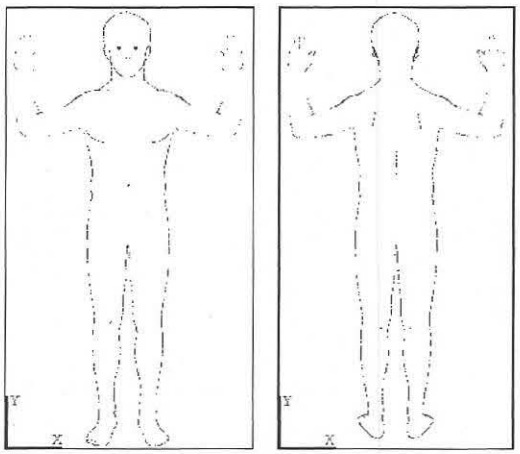


Figure 2: Anomaly Indicator Box Coordinate Planes

3.1.2 Processing Time

The system ***shall*** (27) have an image processing time no greater than 7 seconds (T) / 5 seconds (O) [redacted]

Note: Image processing time is defined as the time it takes the system to conduct either a complete full scan (full-size systems) or a single pose (reduced-size systems) of an individual already positioned for scanning, to analyze the image data obtained from the scan for potential threats, and to present the scan results on the OCP display monitor.

The system ***shall*** (28) provide a means to scan and process at least one individual while the previous individual's scan result is displayed on the Representative Human Figure images.

3.1.3 Modes of Operation

3.1.3.1 Screening Mode

The performance characteristics of the system with respect to the Screening Mode include(s):

Providing a system Screening Mode.
Having the Screening Mode as the normal mode of operation for screening individuals for anomalies.

3.1.3.2 Sleep/Standby Mode

The performance characteristics of the system with respect to the Sleep/Standby Mode include(s):

Entering a Sleep/Standby Mode if the system is powered on and no one is logged in to the system for more [redacted] (b)(3):49 U.S.C. § 114(r)

Note: The Sleep/Standby Mode is defined as a power-conserving state that cuts power to all unneeded components and parts of the system in order to lower its power consumption.

Completing a Sleep/Standby start-up procedure in one (1) minute or less.

3.1.3.3 Lock-down Mode

The performance characteristics of the system with respect to the Lock-down Mode (LDM) include(s):

Entering a lock-down mode, when the Emergency Stop (E-Stop) is activated (as defined in Section 3.1.6).

Not allowing any portion of exposed mechanical parts move under power, while in LDM;

Not allowing any individual to be screened, while in LDM;

Not emitting scanning source radiation, while in LDM; and

Not disabling the display monitor, while in LDM.

3.1.3.4 Maintenance Mode

The performance characteristics of the system with respect to the Maintenance Mode include(s):

Providing a system Maintenance Mode.

Having a Maintenance Mode to perform all system maintenance.

3.1.4 Start-up and Power-down

The performance characteristics of the system with respect to the Start-up and Power-down Mode include(s):

Having a system Start-up and Power-down functions at the OCP.

Displaying a log-on window on the OCP display monitor when start-up is complete.

3.1.4.1 Log-on Process

The performance characteristics of the system with respect to the Log-on Process include(s):

Requiring the system no more than thirty (30) seconds to complete the log-on process at the OCP in 98 percent of instances.

Note: The log-on process is defined as the time from when the operator enters user information and password to the time the operator is able to initiate a scan of an individual.

3.1.4.2 Cold Start-up

The performance characteristics of the system with respect to the Cold Start-up include(s):

Completing the cold start-up procedures in three (3) minutes or less from a powered-off state in 98 percent of instances.

Note: Powered-off is defined as a state in which the system has been turned off or shut down, but is still connected to a power source. Cold start-up is completed when the log-on screen is displayed and the system is ready for the operator to enter log-in information.

3.1.4.3 Fault Reset

The performance characteristics of the system with respect to the Fault Reset include(s):

Having a fault reset time of no more than two (2) minutes in 98 percent of instances.

Having the system display the log-on screen, once the fault reset is complete.

3.1.4.4 Power-down

The performance characteristics of the system with respect to the Power-down include(s):

Completing a power-down procedure in three (3) minutes or less in 98 percent of instances.

Note: Power-down is defined as the transition from operational mode to when the system has completely powered down.

3.1.5 Calibration

If the system employs a technology that requires recalibration over time, the performance characteristics of the system with respect to the Calibration include(s):

Employing a calibration process that culminates in a visible notification to clearly indicate to the operator at the OCP that the system is correctly calibrated and ready/not ready to scan an individual.

Having a calibration process that can be (b)(3):49 U.S.C. § 114(r)

(b)(3):49 U.S.C. § 114(r)

Providing a message on the OCP display monitor to indicate to the operator that recalibration is necessary.

Disabling anomaly detection screening of individuals until the system has completed the recalibration process.

(b)(3):49 U.S.C. § 114(r)

Providing a calibration process that takes less than 30 seconds to perform in 90 percent of instances.

Providing a calibration process that repeats on a cycle (b)(3):49 U.S.C. § 114(r)

If the system employs ionizing radiation, the system ***shall*** (29) not require any personnel to be in the scanning area during calibration.

3.1.6 Emergency Stop

The system ***shall*** (30) include a physical Emergency Stop (E-Stop) button with protective guards to prevent accidental initiation of an emergency stop. The E-Stop button ***shall*** (31) be located at the OCP. When the E-Stop button is enabled, the system ***shall*** (32) enter Lock-down mode and render the system incapable of scanning individuals by cutting the power to any radiation-generating components and moving parts. Activation of the E-Stop button ***shall*** (33) provide visual notification on the OCP display monitor.

3.1.7 Network Requirements

3.1.7.1 System Compatibility

(b)(3):49 U.S.C. § 114(r)

(b)(3):49 U.S.C. § 114(r)

3.1.7.2 Network Interface

(b)(3):49 U.S.C. § 114(r)

3.1.8 External Interface

3.1.8.1 Operator Control Panel

The performance characteristics of the system with respect to the Operator Control Panel (OCP) include(s):

Having an OCP that does not interfere with the operator's view of individuals waiting to be scanned, their divested accessible property, the entrance of the scanner, and the exit of the scanner;

Having a display monitor as defined in Section 3.1.8.2;

Permitting only authorized operators with the required access level defined in Appendix C to log-on to the system;

Having an activation button to initiate a scan;

Providing a clear button, separate from the scan activation button, to clear the scan results from the Representative Human Figure images; and

Having a means to reset the transit counts (e.g., scans, alarms, etc.) in no more than four mouse clicks, where a mouse click is defined as an operator input, and be accessible by users with the required access level defined in Appendix C.

3.1.8.2 Operator Control Panel Display Monitor

The performance characteristics of the system with respect to the OCP Display Monitor include(s):

Having one or more flat panel color display monitors for viewing the Representative Human Figure images.

Having display monitor(s) that display the full Representative Human Figure images, defined in Section 3.1.1.5.1, without requiring the operator to perform any display manipulations (e.g., scrolling, zooming out, etc).

Displaying all visual indicators defined in Section 3.1.1.5.2.

Indicating, at a minimum, the following on the OCP display monitor:

a. Current power status
b. Current software version,
c. Current operational state of the system,
d. System error messages and diagnostic results,
e. Visual indicators that alert the SO of a passenger's scan results (e.g. anomaly detection using a Representative Human Figure or clear status message and when the system is ready or not ready to scan a passenger), and
f. Scan count.

Providing the ability to manually reset the scan count, e.g., "Trip" count.

Providing the capability to manual reset the scan count, without affecting the total scan count of the system.

Note: The scan count is defined as an incremental count of the number of scans performed since the count was manually reset.

Providing a scan count that can be displayed continuously and clearly while the system is powered on or idle.

Providing a scan count that has at least six (6) digits, in order to provide a count from 0 to 999999.

3.1.8.2.1 Image Quality

The performance characteristics of the system with respect to Image Quality include(s):

Providing an OCP display monitor(s) that exhibits no perceptible motion artifacts.
Providing an OCP display monitor(s) that has a manufacturer's luminance rating of ≥ 150 candelas per meter squared (cd/m^2).

3.1.8.2.2 Operator Control Panel Display Monitor Mounting

The performance characteristics of the system with respect to the OCP Display Monitor Mounting include(s):

Mounting for the OCP display monitor(s) that allows the monitor(s) to be placed directly in front of the operator when the operator is in his or her working position (standing in front of the OCP).

Providing a monitor(s) that allows the vertical distance between the centers of the monitor(s) and the surface on which the operator stands to adjust from 137 cm to 183cm.

Providing an in-the-field configurable OCP with mounting capabilities on the Left or Right side passenger exit;

Allowing operators to adjust height, tilt, and viewing angle without requiring the use of tools;

Allowing for either continuous adjustment or incremental adjustment of no more than 25 millimeters (mm) (1 inch);

Enabling adjustments to be accomplished by a single individual;

Ensuring the OCP is not located within the scanning area for systems that use ionizing radiation;

Providing adjustability to ensure line of sight from the operator's eye level to the center of the screen is between 10° and 20° below horizontal;

Having the capability to tilt monitor(s) up or down between −5° and +20°, in 5° increments or continuously;

Having the capability to swivel the monitor(s) by a minimum of 20° to the left or right, in 5° increments or continuously, to accommodate for varying ambient lighting conditions; and

Ensuring the monitor(s) position is stable once a position has established and does not require repeated adjustments.

3.1.10 Field Data Reporting and Recording

The performance characteristics of the system with respect to Field Data Reporting and Recording include:

Having an FDRS that can collect, analyze, store, and output data in accordance with Appendix D;

Ensuring that all data recorded in the FDRS is no less than (b)(3):49 U.S.C. § 114(r) accurate, as specified in Appendix D, and that all data in each of the tables is captured and correlated throughout;

Allowing users with the required access level defined in Appendix C to display FDRS reports identified in Appendix D to the OCP display monitor(s);

Making FDRS raw data available for downloading;

Making FDRS data reports available for downloading; and

Providing internal storage so that data elements (as defined in Appendix D) are stored for a minimum six (6) months without being overwritten.

3.1.11 Data Storage and Transfer

The performance characteristics of the system with respect to Data Storage and Transfer include:

(b)(3):49 U.S.C. § 114(r)

Prohibiting the storage and transfer of scanned images.

Providing connectivity to download FDRS data as described in Section 3.1.10 and to upload/download a user database as defined in Section 3.10.2.b.

Providing an installed high capacity read/write drive that permits data uploads and downloads.

Providing all necessary software drivers and operating system services to support the data collection devices as preinstalled and preconfigured components.

3.1.12 Operational Test Kit

The performance characteristics of the system with respect to the Operational Test Kit include(s):

Having an Operational Test Kit (OTK) that does not require any part of the individual to be scanned.

Only requiring one individual to operate.

Ensuring the system's capability to detect anomalies at the standard of the Detection requirement.

3.2 Electrical

The performance characteristics of the system with respect to the Electrical include(s):

Providing the capability to operate on commercially available 120 Volts Alternating Current (VAC) power at 60 Hz with a ± 10 percent voltage tolerance and up to a ± 3 percent variance in frequency, at no more than 20 amperes service for 120 VAC;

Drawing no more than 16 amperes in steady state;

Routing the power and data cables (if applicable) to the ceiling or the floor level;

Providing a power cable that is no less than 7.3 m (24 ft) long when measured from the base of the unit to the power plug end (if the core originates from the top of the unit, that distance must be included as additional length);

Operating all functions under a single 5-20R receptacle.

3.2.1 Uninterruptible Power Supply

The performance characteristics of the system with respect to Uninterruptible Power Supply include:

Preventing damage to the AIT-2 System equipment and preserve data without corruption in the event of loss of electrical power or fluctuation.

Having the UPS contained and secured within the system, or if mounted to the system, no less than 12 inches off the floor;

Providing an indicator, displayed on the OCP monitor, that notifies the operator when it is running on UPS power; and

Providing an indicator, displayed on the OCP monitor, that notifies the operator when the UPS battery requires replacement.

3.3 Physical

3.3.1 Capacity

The performance characteristics of the system with respect to the Capacity include(s):

Being capable of scanning individuals from (b)(3):49 U.S.C. § 114(r) (b)(3):49 U.S.C. § 114(r) while maintaining the scan pose.

Having entrance and exit access to the imaging area of the system no less than 50.8 cm (20 inches) wide.

Requiring individuals to be (b)(3):49 U.S.C. § 114(r) (b)(3):49 U.S.C. § 114(r) from the system in order to complete a scan.

3.3.2 Scan Position

The performance characteristics of the system with respect to the Scan Pose include(s):

Maintaining consistent foot placement markers across all systems, (b)(3):49 U.S.C. § 114(r) (b)(3):49 U.S.C. § 114(r)

Providing, at a minimum, a visual indicator for the passenger that ensures correct foot placement for optimal screening results (e.g. a yellow footpad with a red border).

3.3.3 Floor Loading

The performance characteristics of the system with respect to the Floor Loading include(s):

Having a total floor loading of the system no greater than 416.04 kg/m^2 (85 lbs/ft^2) based on the actual footprint dimensions.

Having a point load (concentrated load) no greater than 453.59 kg over 193.55 cm^2 (1,000 lbs over 30 in^2) floor area.

Indicating the number of support legs and pad size, including the maximum actual load in pounds per square inch (psi) per leg.

3.3.4 Orientation

The performance characteristics of the system with respect to the Orientation include(s):

Providing a configurable system that allows individuals to face left or right in relation to the entrance of the system during scanning.

3.3.5 Slope Tolerance

The performance characteristics of the system with respect to the Slope Tolerance include(s):

Providing a system capable of performing, per Section 3.1.1, when installed on a floor that has a slope of no more than ±5 percent parallel to the entrance of the system.

Providing a system capable of performing per Section 3.1.1, when installed on a floor that has a slope of no more than ± 2 percent perpendicular to the entrance of the system.

3.3.6 Exterior Dimensions

The performance characteristics of the system with respect to the Exterior Dimensions include(s):

Providing a full-size system that has dimensions no greater than that shown in Table 1.

Table 1: Full-Size System Dimensions

Height	Width	Depth
300 cm (118 inches)	225 cm (88.6 inches)	152.4 cm (60 inches)

Providing a reduced-size system that has dimensions no greater than that shown in Table 2.

Table 2: Reduced-Size System Dimensions

Height	Width	Depth
Range: 213.4 cm (84 inches) to 300 cm (118 inches)	152.4 cm (60 inches)	152.4 cm (60 inches)

Ensuring the height specified in the tables above are sufficient to allow the system to be installed, moved and have maintenance performed within the checkpoint.

3.3.7 Identification Markings

3.3.7.1 Identification Information

The performance characteristics of the system with respect to the Identification Information include(s):

Meeting the labeling requirements of ANSI/HPS N43.17-2009, Paragraph 7.3, if ionizing radiation is produced.

Identifying the following information in a location that is readable without disassembly of any hardware:

a. Manufacturer name,

b. Model,

c. Unique serial number,
d. Safety placards, and
e. Hazardous material placards.

3.3.7.2 Permanency and Legibility

The performance characteristics of the system with respect to the Permanency and Legibility include(s):

Ensuring direct identification marking and identification plates, tags, or labels used are as permanent as the life expectancy of the system to which it is affixed, including the ability to withstand the environmental tests and cleaning procedures specified.

Providing Identification plates, tags, or labels that are legible by human or machine, as applicable.

Ensuring information contained on identification plates, tags, or labels are displayed in English and in a color that contrasts to the color of the surface of the plate, tags, or labels.

Ensuring the minimum text character height for the identification plates, tags, or labels is no greater than 2.54 mm (0.1 inch).

3.4 Environmental

3.4.1 Temperature, Altitude, and Humidity

The performance characteristics of the system with respect to the Temperature, Altitude, and Humidity include(s):

Providing supporting documentation confirming each of the following system environmental specifications shown in Table 3 and Table 4 were used to validate the system's capability to meet the detection, processing time and A_i requirements.

Table 3: System Operational Environmental Specifications To Be Tested

Test Method Title	Test Method Number	Procedure	Configuration	Lower Range	Upper Range
High Temperature	(b)(3):49 U.S.C. § 114(r)				
Low Pressure (Altitude)					

Test Method Title	Test Method Number	Procedure	Configuration	Lower Range	Upper Range
Low Temperature	(b)(3):49 U.S.C. § 114(r)				
Humidity					

Table 4: System Storage Environmental Specifications To Be Tested

Test Method Title	Test Method Number	Procedure	Configuration	Lower Range	Upper Range
High Temperature	(b)(3):49 U.S.C. § 114(r)				
Low Pressure (Altitude)					
Low Temperature					
Humidity					

(b)(3):49 U.S.C. § 114(r)

3.4.2 Vibration Immunity

The performance characteristics of the system with respect to the Vibration Immunity include(s):

(b)(3):49 U.S.C. § 114(r)

Providing (as required by airport installation) seismic bracket(s) to facilitate anchoring the equipment to a checkpoint supporting floor structure;

Designing seismic bracket(s) in accordance with the installation site state/region guidelines and provide documentation affirming the design is applicable to the governing codes dictating the use of seismic anchorage;

OR

Designing standardized seismic bracket(s) corresponding to the most severe seismic design category in the country and provide documentation affirming the design is applicable to all locations where codes dictate the use of seismic anchorage; and

Submitting to TSA signed/sealed calculations and details of the above mentioned seismic brackets to be used as part of the submittals for permitting purposes where required.

3.5 Electromagnetic Compatibility – Emissions and Immunity

For all operating modes, the system ***shall*** (34) comply with the Class A Emissions and Industrial Immunity requirements of IEC 61326-1, *Electrical Equipment for Measurement, Control and Laboratory Use—Electromagnetic Compatibility (EMC) Requirements—Part 1: General Requirements.*

(b)(3):49 U.S.C. § 114(r)

[redacted]

(b)(3);49 U.S.C. § 114(r)

3.6 Human Factors

The performance characteristics of the system with respect to the Human Factors include(s):

Providing a system be operable by TSOs meeting personnel requirements specified in 49 CFR Parts 1544.405 in terms of auditory and visual acuity, dexterity, English proficiency, and educational level (high school diploma, General Educational Development (GED), or a combination of education and experience).

3.6.1 User Interface

The performance characteristics of the system with respect to the User Interface include(s):

Providing a Graphical User Interface (GUI) that is viewable and operable at the OCP.

Having functions appear in the same location across screens, if the same function keys or icons are available on more than one screen.

Having related information grouped together.

Ensuring labels on buttons have the same meanings across all applications and screens.

Providing a GUI layout designed to ensure that users can avoid errors by providing only appropriate choices and making potentially dangerous actions reversible.

Providing Icons designed to ensure comprehension and understanding by TSOs meeting the personnel requirements stated in Section 3.6.

Providing a GUI with explanation and guidance when an error or problem exists.

Providing key strokes that do not buffered (buffering is defined as preloading data (e.g., keystrokes) into a reserved area of memory before completing a selected action).

Indicating the current mode and function at all times (Functions will activated by command from the control panel).

Having modes change via menu selection.

Assigning a single function for main function keys and icons required for screening.

Having available at all times a menu selection, key, or icon that allows the operator to cancel the last action and a menu selection, key, or icon that allows the operator to return to the starting position, if an action requires the use of an embedded menu system or a multistep process.

Allowing no more than one (1) second from the time that a soft key or icon is selected to the time the action is complete, or the operator receives feedback that the soft key or icon was successfully selected.

Displaying a message or icon (such as an hourglass icon) to indicate when the system is busy processing an operator-initiated or machine-initiated command.

NOTE: Reference the human factors standards in DOT/FAA/CT-03/05 HF STD-001 - Human Factors Design Standard: *Acquisition of Commercial Off-the-Shelf Subsystems, Non-Developmental Items, and Developmental Systems* (2003) for the following requirements.

3.6.2 Noise

The performance characteristics of the system with respect to the Noise include(s):

Ensuring audible noise levels produced by the system not exceed a time-weighted average of 70 dBA within 1 m from the system over a 5-minute period.

3.7 Regulatory

3.7.1 Electromagnetic Emission Safety

The system ***shall*** (38) comply with IEC 61000-6-3, *Electromagnetic Compatibility (EMC). Generic Standards*: Emission Standard for Residential, Commercial, and Light-industrial Environments, 17 July 2006.

3.7.2 Emission Control

All system radio frequency emissions ***shall*** (39) comply with 47 CFR 15, Radio Frequency Devices.

3.8 Reliability, Maintainability and Availability

3.8.1 Reliability

Reliability is the measure that determines the frequency of system failures or maintenance actions and supports the user need for satisfactory performance for a given period of time. This includes the ability of a system to perform its mission without failure, degradation, or demand on the support system. Reliability is a measure of the degree to which a system can complete it primary mission over a given duration.

3.8.1.1 Mean-Time-Between-Critical-Failure (MTBCF)

For determining the reliability of TSE in the operational environment, TSA uses MTBCF which considers the System Operating Time/Hours and the Number of Critical Failures. System Operating Time is the period of time a system is available to perform its required mission. Number of Critical Failures is the number of failures which prevents the TSE from performing its intended function and cannot be cleared by operator intervention alone; the fault requires a

call to the maintenance service provider to restore the system to operation. Events that a TSO can correct via system resets, simple removal of obstructions, etc., are not categorized as critical failures. MTBCF is calculated as follows:

$$\text{MTBCF} = \frac{\text{System Operating Hours}}{\text{Number of Critical Failures}}$$

The system ***shall*** (40) meet a minimum of 1,000 hours (T) / 2,000 hours (O) MTBCF in an airport operational environment.

3.8.1.2 Mean-Time-Between-Preventive-Maintenance (MTBPM)

Preventive Maintenance (PM) consists of all actions scheduled and performed in an attempt to retain the system in a specified condition by providing systematic inspections, detection, and prevention of incipient failures. It consists of Level I PM (performed by a user) and Level II PM (performed by a trained technician routinely on a set time schedule, such as monthly, quarterly, yearly). Mean Time Between Preventive Maintenance (MTBPM) (Level II PM) is the metric for the system. MTBMA (Level II PM) is based on the total operating hours during which the reported PMs occurred and the number of PM actions during the period.

The system ***shall*** (41) be designed to have an MTBPM for scheduled Level II PM of not less than seven (7) days. The maintenance manual ***shall*** (42) specify all maintenance activities and, for PM, the intervals of performance. MTBPM (Level II PM) is calculated as follows:

MTBPM (Level II PM) = Minimum Number of Days Between Level II PM

3.8.2 Maintainability

Maintainability is the ability of the system to be restored to operational condition when corrective maintenance is performed by personnel having specified skill levels, using prescribed procedures and resources, at each prescribed level of maintenance and repair. It includes the total corrective maintenance time to repair the system, but it does not include lead time for parts not readily available or other administrative or logistics downtime.

3.8.2.1 Mean-Down-Time

Maintainability supports the user's need to rapidly restore security equipment to operational status following a failure. For determining the maintainability of TSE in the operational environment TSA uses MDT. MDT measures the combined operational impact of a technology's maintainability design and the effectiveness of the logistics support system. MDT is calculated as follows:

$$MDT = \frac{\text{Total Downtime}}{\text{Number of Failures}}$$

Where Total Downtime is the period of time during which a system is not in a condition to perform its required mission. This includes all times that a system is not available due to corrective or depot maintenance, including logistics delay time. Number of Failures is the number of unscheduled events that prevent a system from performing a mission function.

The system ***shall*** (43) have a maximum MDT of 15 hours (T) / 6 hours (O) in the event of a failure.

3.8.2.2 Mean-Time-To-Repair

Mean Time To Repair (MTTR) is the inherent Maintainability functional requirement for the system. MTTR does not include delays such as repair technician response time, lead time for parts not readily available, or other administrative or logistical downtime. MTTR is calculated as follows:

$$MTTR = \frac{\text{Corrective Maintenance Time}}{\text{Number of Failures}}$$

The system ***shall*** (44) have a maximum MTTR of five 5 hours (T) / 2 hours (O) to be restored to its operational condition.

3.8.2.3 System Maintenance

The performance characteristics of the system with respect to the Maintenance include(s):

Deleting all raw image data from any and all locations where image data could be resident, when the system enters the Maintenance Mode.

Note: Raw images are defined as any visual image from the system that may contain imagery of sensitive areas.

Disabling the OCP, if the system uses raw image data to support maintenance actions (e.g. system diagnostic).

Including a watermark around the border of the images displaying the current mode, e.g., "MAINTENANCE." See Figure 3.

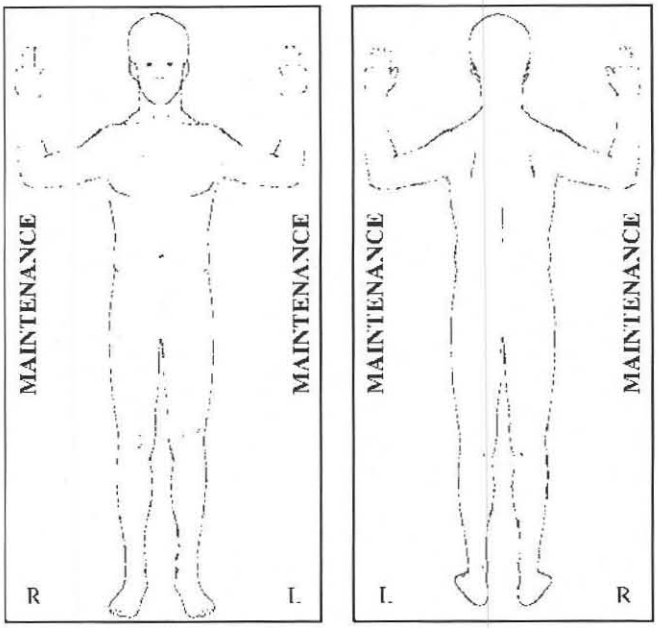


Figure 3: Sample Maintenance Mode Watermark

Having a watermark that is prominent but does not interfere with the maintenance being performed.

Providing a system that does not require any custom tools for the performance of system maintenance.

Note: Custom tools are defined as non-commercially available products.

Providing custom tools as part of the maintenance tool kit, if custom tools are required.

3.8.2.4 Corrective Maintenance

The performance characteristics of the system with respect to the Corrective Maintenance include(s):

Having a system that is modular in design to allow easy removal and replacement of failed Line Replaceable Units (LRUs).

Providing a list of all LRUs

Note: A LRU is defined as a component or part that is designed to be quickly replaced in the field by a maintenance technician to restore the system to an operational ready condition.

Providing a Built-In Testing (BIT) diagnostic capability that:

a. Initiates on power-up;

b. Monitors system health in a non-interference (background) mode during normal operations; and

c. Captures and reports error and failure codes to the FDRS.

Providing a Fault Isolation Test (FIT) diagnostic capability that:

a. Can be manually initiated by the TSO as a result of BIT or other system-generated error;

b. Can identify the failed LRU with (b)(3):49 U.S.C. § 114(r)

c. Will be at leas (b)(3):49 U.S.C. § 114(r) when isolating the failed component to (b)(3):49 U.S.C. § 114(r) LRUs; and

d. Reports the resultant error or failure codes to the user display and stores the resultant error or failure codes on the system for later retrieval as part of the FDRS.

3.8.2.5 Maintenance Access

The performance characteristics of the system with respect to the Maintenance Access include(s):

Providing maintenance doors that are either removable or sliding, with a key lock and handles.

Providing a Full-size systems that has a maintenance access capability with no more than 60.96 cm (24 in.) of external clearance distance for performing scheduled or unscheduled maintenance actions.

Providing a Reduced-size system:

a. That has heavy-duty, removable, and lockable casters capable of supporting the entire weight of the system;

b. That requires no more than one individual to relocate the system within the screening checkpoint, for maintenance or relocation purposes, using casters;

c. That has casters robust enough to support the AIT-2 System while traveling over multiple types of flooring surfaces (i.e., carpet or terrazzo) within the screening checkpoint and;

d. That does not require external access to the top of the system for performing maintenance.

3.8.3 Availability

Availability is the percentage of time, during operational hours, that TSE is available to perform its required mission.

3.8.3.1 Operational Availability

For determining the availability of TSE in the operational environment, TSA uses A_o which considers Uptime and Downtime. Uptime is the period of time a system is available to perform its required mission. Downtime is the period of time during which a system is not in a condition to perform its required mission. Downtime includes all times that a system is not available due to administrative downtime, logistics downtime, etc. A_o is calculated as follows:

$$A_o = \frac{\text{Uptime}}{\text{Uptime + Downtime}} \Rightarrow \frac{\text{MTBCF}}{\text{MTBCF + MDT}}$$

The system ***shall*** (45) maintain an A_i of 98.5 percent (T) / 99.7 percent (O). The value is calculated off of a 16-hour duty day as this is the most common duty day for federalized airports.

3.8.3.2 Inherent Availability

Inherent Availability is any measure of availability that includes only the effects of item design and installation, and assumes an ideal operating and support environment. MTBCF represents the minimum permissible time between critical failures or maintenance actions that will permit the system to meet availability requirements. MTTR represents the maximum acceptable corrective maintenance time after a critical failure. It does not include repair delay times such as field technician response time, lead time for parts not readily available, or other administrative or logistics downtimes. The A_i is calculated as follows:

$$A_i = \frac{\text{MTBCF}}{\text{MTBCF + MTTR}}$$

The system ***shall*** (46) maintain an A_i of 99.5 percent (T) / 99.8 percent (O). The value is calculated off of a 16-hour duty day as this is the most common duty day for federalized airports.

3.9 Safety

3.9.1 General

The external surface temperature of the system ***shall*** (47) be below 43.9 °C (111 °F).

3.9.2 Radiation

Ionizing systems ***shall*** (48) comply with the General-Use System requirements defined in ANSI/HPS N43.17-2009 American National Standard, *Radiation Safety for Personnel Security Screening Systems Using X-ray.*

The system ***shall*** (49) comply with OSHA Standard 29 CFR 1910.1096, *Ionizing Radiation*, January 1, 2007.

Non-ionizing systems ***shall*** (50) comply with IEEE C95.1 – 2005, *Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields*, 3 kHz to 300 GHz, revision of C95.1-1991 (Active).

The system ***shall*** (51) comply with ICNIRP *Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic, and Electromagnetic Fields (Up to 300 GHz). Health Physics* 74 (4): 494–522, April 1998.

3.9.3 Electrical Safety

The system:

a. ***Shall*** (52) comply with UL 61010-1, *Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use*, Part 1: *General Requirements*, July 12, 2004; and
b. ***Shall*** (53) comply with UL 310, *Standard for Electrical Quick Connect Terminals*, May 27, 2003.

These standards are applicable to electrical equipment used in the workplace and require approval or certification by a Nationally Recognized Test Laboratory (NRTL) listed by OSHA in 29 CFR 1910.7.

3.9.4 Physical Safety

The system:

a. ***Shall*** (54) possess no sharp corners or edges that can puncture, cut, or tear the skin or clothing, or otherwise cause bodily injury;
b. ***Shall*** (55) mount external wires, connectors, or cables in a manner which will prevent trip hazard, disconnection, or damage by operators and passengers through incidental contact; and
c. ***Shall*** (56) possess no loose covers and cowlings.

3.9.5 Hazardous Materials

If hazardous materials are used in the system, they ***shall*** (57) be identified, including their location and amount by weight or volume. A complete Material Safety Data Sheet (MSDS) ***shall*** (58) be developed and provided to the TSA Occupational Safety, Health, and Environment office stating compliance with the requirements of 29 CFR 1910.1200, OSHA Hazard Communication. The hazardous materials ***shall*** (59) be packaged or configured to not require the use of personal

protective equipment (e.g., respiratory protection, eye and face protection, hand protection, protective clothing).

3.10 Security

3.10.1 Physical Security

The performance characteristics of the system with respect to the Physical Security include(s):

Providing the means to physically protect its sensitive components and controls.

Possessing highly visible tamper-evident seals or alarms on assemblies that contain sensitive components/data; and

Providing the means to prevent individuals from entering the system when the system is not in service.

3.10.2 Software Access

The performance characteristics of the system with respect to the Software Access include(s):

Allowing user access, password protection, and capabilities defined in Appendix C;

Having a user database with a minimum capacity of 10,000 users. A user database is defined as the user ID and password combinations to access the system;

Through the use of a GUI or menu at the OCP, allowing the user to encrypt per National Institute of Standards and Technology (NIST) Federal Information Processing Standard Publication 140-2 and export a user database;

Through the use of a GUI or menu at the OCP, allowing the user to import and decrypt, per NIST Federal Information Processing Standard Publication 140-2, a user database; and

(b)(3):49 U.S.C. § 114(r)

3.10.3 Information Security

The performance characteristics of the system with respect to the Information Security include(s):

Meeting the technology security requirements set forth in *Transportation Security Equipment Information Technology Security Requirements*.

APPENDIX A: ACRONYMS, TERMS, DEFINITIONS, AND ABBREVIATIONS

The following acronyms, terms, definitions, and abbreviations were used in creating this document.

Acronym or Abbreviation	Term or Definition
3D	Three-dimensional
AES	Advanced Encryption Standard
AIT	Advanced Imaging Technology
ANSI	American National Standards Institute
ATA	Air Transport Association
ATR	Automated Target Recognition
cd/m^2	Candela per meter squared
CENELEC	European Committee for Electro-technical Standardization
CFR	Code of Federal Regulations
cm	Centimeter
COTS	Commercial off-the-Shelf
dBA	Decibel A-weighting
DHS	Department of Homeland Security
DOT	Department of Transportation
DPF	Displaced Power Factor
EMC	Electromagnetic Compatibility
E-Stop	Emergency Stop
FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FDRS	Field Data Reporting System
FIPS	Federal Information Processing Standard
FRD	Functional Requirements Document
FRP	Full Rate Production

Acronym or Abbreviation	Term or Definition
GED	General Educational Development
GUI	Graphical User Interface
HPS	Health Physics Society
HVAC	Heating, Ventilation, and Air Conditioning
Hz	Hertz
ICNIRP	International Commission on Non-Ionizing Radiation Protection
ID	Identification
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronic Engineers
$I_{max\ peak}$	Maximum Peak Inrush
$I_{max\ RMS}$	Maximum Steady State RMS Current
I_N	Individual Harmonics
IO	Image Operator
$I_{UNB\ Avg}$	Average Current Unbalance
$I_{UNB\ Max}$	Maximum Current Unbalance
LRIP	Low Rate Initial Production
mA	Milliampere
MIL-STD	Military Standard
mm	Millimeter
MSDS	Material Safety Data Sheet
NEMA	National Electrical Manufacturers Association
NIST	National Institute of Standards and Technology
NRTL	Nationally Recognized Test Laboratory
OCP	Operator Control Panel
OS	Operating System
OSHA	Occupational Health and Safety Administration

Acronym or Abbreviation	Term or Definition
OTK	Operational Test Kit
P_d	Probability of Detection
P_{fa}	False Alarm Rate
(b)(3):49 U.S.C. § 114(r)	(b)(3):49 U.S.C. § 114(r)
PIN	Personal Identification Number
psi	Pounds per Square Inch
RF	Radio Frequency
RMS	Root Means Square
SO	Screening Operator
TCP/IP	Transmission Control Protocol/Internet Protocol
THD	Total Harmonic Distortion
TPF	Total Power Factor
TSA	Transportation Security Administration
TSL	Transportation Security Laboratory
TSO	Transportation Security Officer
UL	Underwriters Laboratory
UPS	Uninterruptible Power Supply
(b)(3):49 U.S.C. § 114(r)	(b)(3):49 U.S.C. § 114(r)
VAC	Volts Alternating Current
VLSI	Very Large Scale Integration

APPENDIX B: FIELD DATA REPORTING SYSTEM REQUIREMENTS

B.1 Data Elements

The data elements to be collected by the AIT System are described in the following seven tables.

Table	Title
B-1	Operator Log Information
B-2	System Event Information
B-3	Access History Information
B-4	Scan Information
B-5	User Data File
B-6	Alarm Information

(b)(3); 49 U.S.C. § 114(r)

Table B-1: Operator Log Information

(b)(3):49 U.S.C. § 114(r)

Table B-2: System Event Information

(b)(3):49 U.S.C. § 114(r)

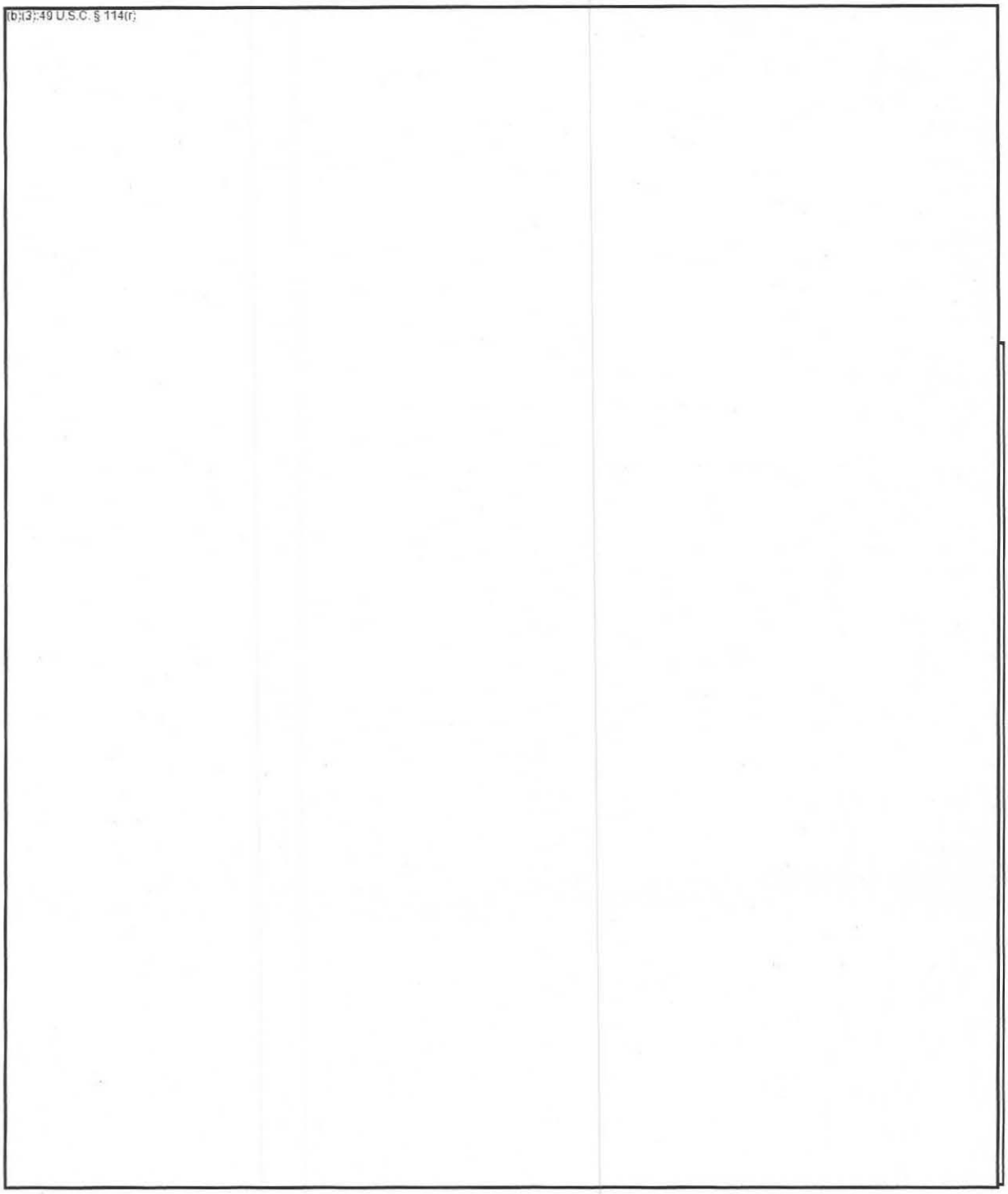


Table B-3: Access History Information

(b)(3): 49 U.S.C. § 114(r)

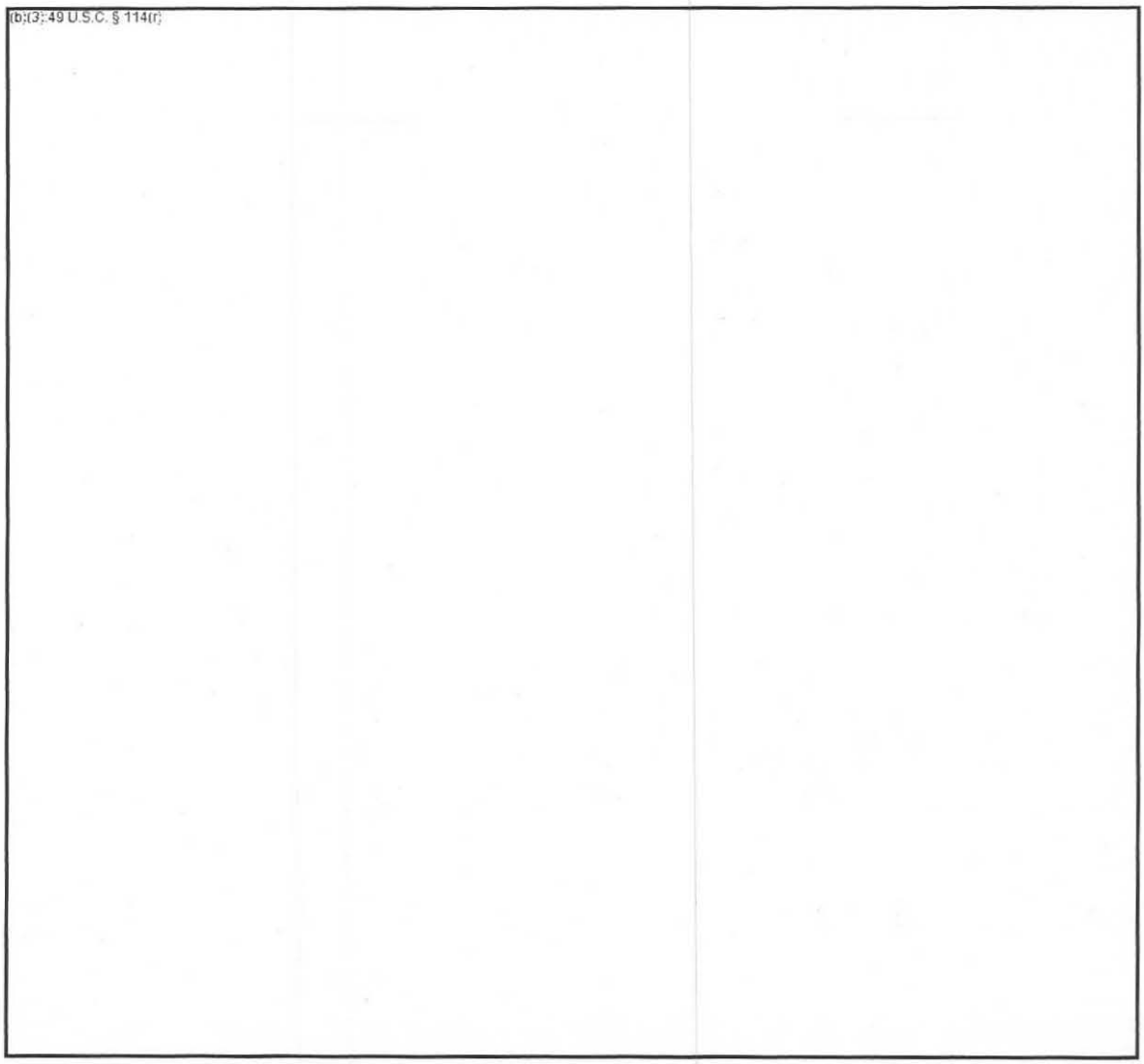


Table B-4: Scan Information

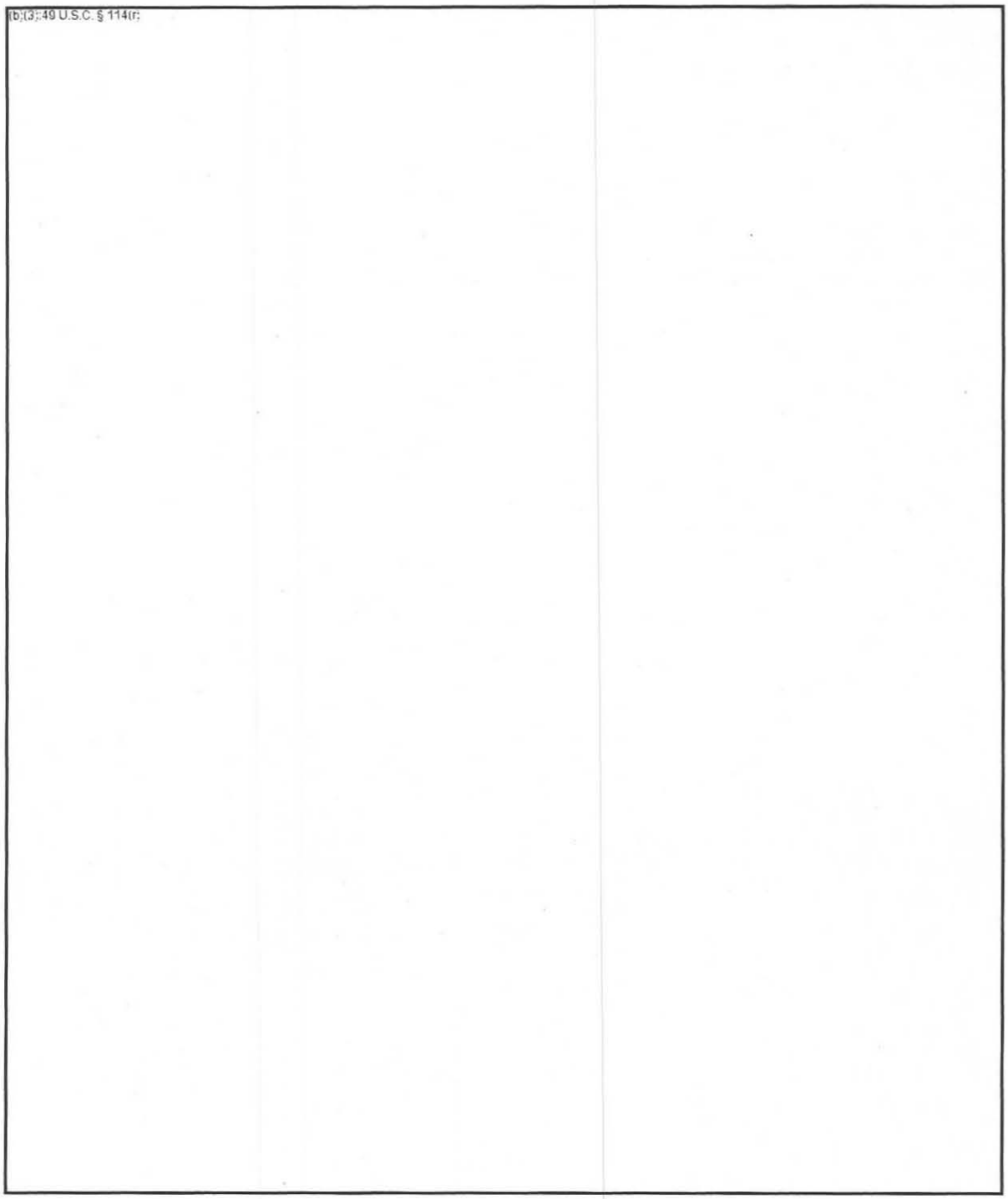
(b)(3):49 U.S.C. § 114(r)

Table B-5: User Data File

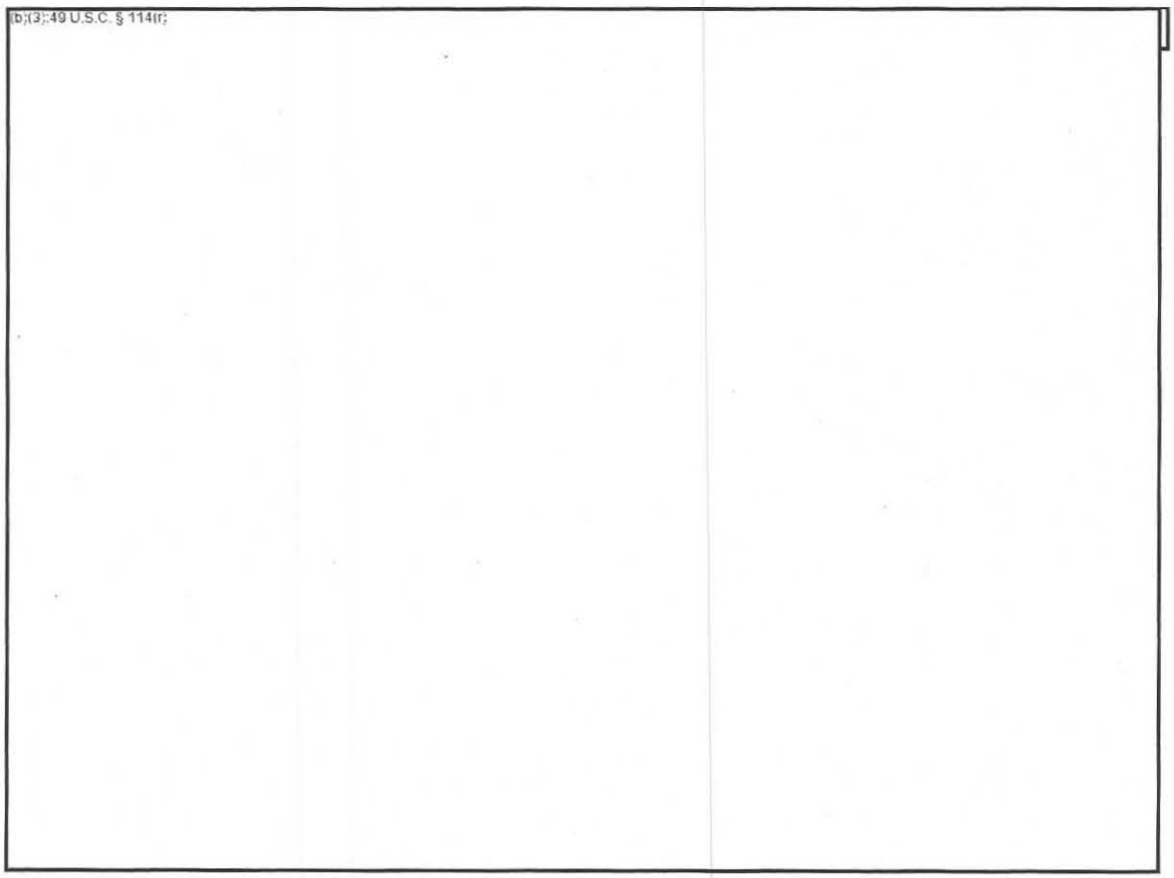
(b)(3):49 U.S.C. § 114(r)

Table B-6: Alarm Information

(b)(3):49 U.S.C. § 114(r)



(b)(3);49 U.S.C. § 114(r)



APPENDIX C: USER ACCESS LEVELS AND CAPABILITIES

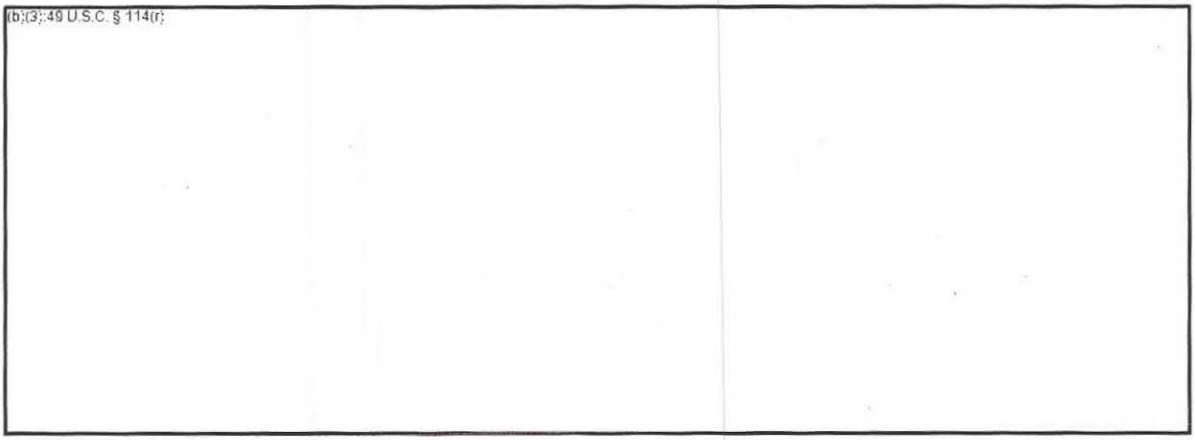
Table C-1: Access Control Levels

(b)(3):49 U.S.C. § 114(r)

APPENDIX D: ADVANCED IMAGING TECHNOLOGY REPORTS

D.1 Field Data Reporting System Report Display

(b);(3);49 U.S.C. § 114(r)



D.2 Daily Passenger Count Report

(b);(3);49 U.S.C. § 114(r)

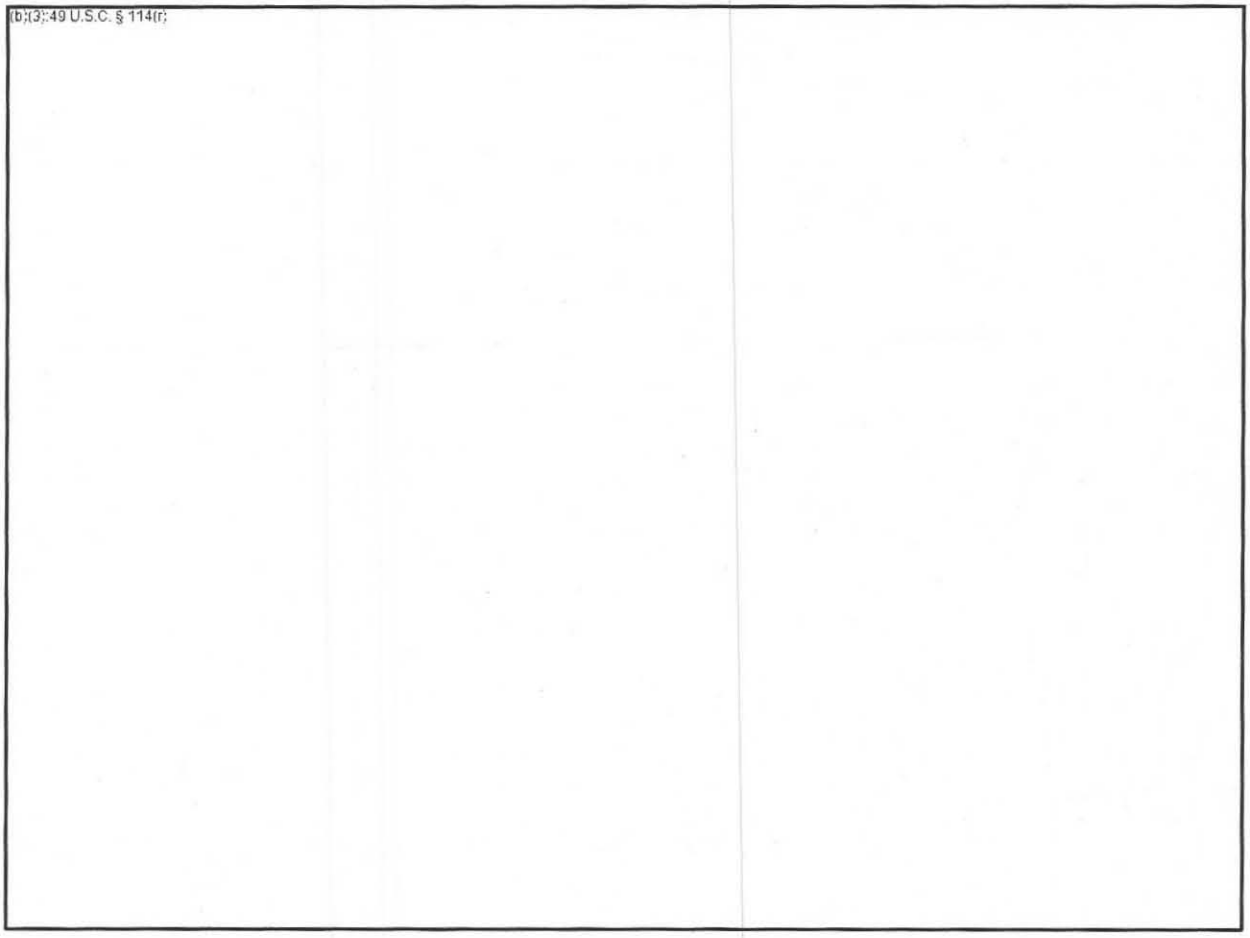


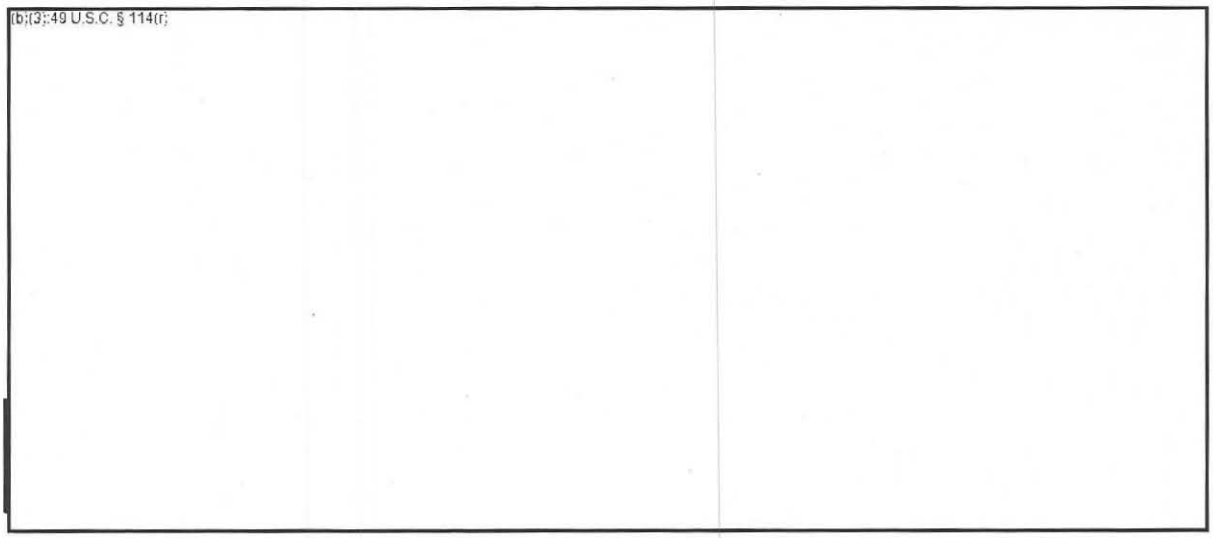
Table D-1: Daily Passenger Count Summary Report

(b)(3):49 U.S.C. § 114(r)

(b)(3):49 U.S.C. § 114(r)

Table D-2: Total Daily Passenger Count Summary Report

(b)(3):49 U.S.C. § 114(r)



D.3 Monthly Passenger Count Report

(b)(3):49 U.S.C. § 114(r)

Table D-3: Monthly Passenger Count Summary Report

(b)(3):49 U.S.C. § 114(r)

(b)(3):49 U.S.C. § 114(r)

(b)(3):49 U.S.C. § 114(r)

Table D-4: Total Monthly Passenger Count Summary Report

(b)(3):49 U.S.C. § 114(r)

APPENDIX E: OPERATIONAL TEST KIT DESIGN AND CONSTRUCTION

E.1 Assembly

The performance characteristics of the system with respect to OTK Assembly include:

Having an assembly that does not exceed 20 lbs (9.07 kg) in weight;

Having an assembly that is designed to accommodate standard shipping by commercial air carrier without necessitating any special packaging or labeling provisions for dangerous goods or hazardous materials, as defined by 49 CFR Part 172, *Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, Training Requirements and Security Plans*;

(b)(3):49 U.S.C. § 114(r)

Providing an assembly and associated consumables, that does not require any special storage; and

If the assembly is reusable, having an operational life that is equal to or greater than that of the system.

E.2 Interchangeability

The performance characteristics of the system with respect to Interchangeability include:

(b)(3):49 U.S.C. § 114(r)

E.3 Maintenance

The performance characteristics of the system with respect to Maintenance include:

Having an OTK that can be designed to be maintenance-free (i.e., require no preventive maintenance schedules).

E.4 Durability

The performance characteristics of the system with respect to Durability include:

Having an OTK that can be designed to withstand normal air transport handling conditions, in accordance with Category I of ATA *Spec 300: Specification for Packaging of Airline Supplies*.