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Test and Evaluation Plan for Measuring Checkpoint Effectiveness and Efficiency

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Brenda A. Klock
J. L. Fobes, Ph.D.

Aviation Security Human Factors Program, AAR-510
William J. Hughes Technical Center
Atlantic City International Airport, NJ 08405

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Draft prepared by: William Maguire, Ph.D. & Michael Snyder
Federal Data Corporation, Science and Engineering Division,
500 Scarborough Drive,
Egg Harbor Township, NJ 08234

16. Abstract:
This test and evaluation plan describes the method to obtain baseline measurements of the operational effectiveness and efficiency of checkpoints at Detroit Wayne Metropolitan Airport. The project will consist of carefully structured observations of checkpoint tasks under operational conditions. Data collection will be accomplished by live observation of the checkpoint, use of video recordings from the airport's closed-circuit security monitoring system, and automated data collection instruments already in place, including threat detection as measured by the Threat Image Projection system.

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ACRONYMS

c	Response Bias
COIC	Critical Operational Issues and Criteria
d'	Sensitivity Measure
DTW	Detroit Wayne Metropolitan Airport
FAA	Federal Aviation Administration
HFE	Human Factors Engineer
KSA	Knowledge, Skills, and Abilities
MOP	Measure of Performance
NWA	Northwest Airlines
P_d	Probability of Detection
P_{fa}	Probability of False Alarm
TEP	Test and Evaluation Plan
TIP	Threat Image Projection

1. INTRODUCTION

The Aviation Security Improvement Act, Public Law 101-604, mandates the Federal Aviation Administration (FAA) to enhance and improve X-ray baggage screener selection, training, and performance. The Aviation Security Human Factors Program (AAR-510) of the Aviation Security Research and Development Division is the FAA unit tasked with this responsibility.

1.1 Background

Northwest Airlines (NWA) and the FAA have taken on a joint venture to enhance security at Detroit Wayne Metropolitan Airport (DTW). This includes the occurrence of security breaches when passengers go through the checkpoints unscreened and, at times, a slow movement of passengers through the checkpoints. A human factors evaluation, which includes screener performance, can identify factors that contribute to these problems. Improvements in throughput and security can be accomplished once the causes of the problems have been identified. Potential changes include redesigning the checkpoints, deploying advanced technological systems, and improving screener performance through training and testing.

1.2 Scope

This project will collect, analyze, and report baseline data for passenger flow restrictions, conditions that facilitate breaches, and threat detection problems at DTW Checkpoints Red and Brown. Human factors engineers (HFE) will collect data over a 3-month period with a pilot test of data collection and full-scale operational data collection taking place during that time. Baseline measures will include indications of ineffectiveness and inefficiency. In addition, they will use archived data from the checkpoint such as Threat Image Projection (TIP) data and video recordings from the airport security cameras.

This Test and Evaluation Plan (TEP) details the methodology to quantify the effectiveness and efficiency of each essential task performed at the checkpoint. HFEs will develop a passenger checkpoint flow diagram to organize the large set of timing data that they collect. They will also assess the effect of variables such as passenger volume on performance. It is expected that these data will point to possible human factors solutions to alleviate problems associated with the issues of slow flow, threat detection, training deficiencies, and level of screener communication.

1.3 Threat Image Projection

The TIP system permits an assessment of screener proficiency and vigilance while X-ray screening by exposing screeners to threat images (i.e., guns, knives, and bombs) during their normal duty period. Screener decisions are automatically recorded by the TIP system. Besides recording screener proficiency and vigilance, TIP provides on-going training by randomly inserting fictional but realistic threats. This allows screeners to detect and identify various threats that they may not see outside computer-based training.

1.4 Checkpoint Description

Checkpoint Red is the main airport point of entry for NWA's domestic flights. It is located in the Davey (North) terminal just behind the ticket counters. There are four EG&G X-ray machines at this checkpoint, all of which are running TIP software. There are approximately six security cameras throughout the checkpoint, which are owned and operated by Wayne County.

Checkpoint Brown is the major access point to NWA's international flights and is located behind the ticket counter in the international departures building. It has three EG&G X-ray machines running the TIP system. This checkpoint has considerably less passenger traffic and has two security cameras.

1.5 Overview of the Baseline Measures

Most checkpoint operations can be subdivided into a set of discreet tasks performed by screeners and supervisors. Each task serves the overall mission of effectively (deterring and detecting threats) and efficiently (operating with minimum effects on throughput) processing passengers and their baggage. HFEs reviewed previous analyses of checkpoint operations and the Knowledge, Skills, and Abilities (KSAs) involved in performing specific checkpoint tasks (Fobes & Neiderman, 1997; Monichetti, Fobes, & Neiderman, in press). Based upon that review and the need to get particular information relevant to issues of slow flow, security breaches, and threat detection, HFEs developed a set of evaluation checklists. These forms organize the evaluation of a specific checkpoint task by determining how frequently a task is performed, whether task-based KSAs are followed, and the time required to complete each subtask.

HFEs will use these forms to record both real-time information at the checkpoint and review videotapes from the security cameras. They will always record the following additional parameters whenever data are being collected: (1) the checkpoint volume (passengers and bags), (2) the condition of all operating equipment, and (3) the number of staff and supervisors working the checkpoint.

In addition, they will obtain TIP data from the months proceeding and during the baseline test. This will allow evaluation of TIP performance measures, which include the probability of detection (P_d) and the probability of a false alarm (P_{fa}), as well as the signal detection indices of sensitivity (d') and response bias (c).

1.6 Test Overview

1.6.1 Pilot Test

A pilot test of baseline measures will take place at DTW from July 7-14, 1999. HFEs will use this test to evaluate the ability to acquire useful data for each of the variables listed in this document. If useful data cannot be collected, they will modify or delete the variables. Pilot testing will also allow them to modify data collection procedures and test their ability to record time measures and other information within the checkpoint without interfering with the daily operation.

1.7.2 Baseline Data Collection

Actual data collection will occur at Checkpoints Red and Brown from July 21–August 31, 1999. It is anticipated that HFEs will need two data collection sessions to elicit all of the information required for analysis. Prior to these sessions, they will construct a data collection schedule so that they can observe varying levels of passenger volume. After the data collection process, they will analyze the data and write a final report.

1.7 Test Limitations

There are several potential test limitations. First, some of the data that the HFEs will acquire will be from videotape. Therefore, they will not be able to change security camera angles or zoom in or out of certain shots. They may be able to inform DTW personnel of the information they would like to capture, and these persons may be willing to assist the HFEs in obtaining the data. This issue could be resolved during or shortly after the pilot test.

Second, some data collection may require the HFEs to be physically within the checkpoint taking notes. This could cause screeners to be abnormally cautious or vigilant, which may or may not affect the data. The HFEs will guard against this possibility by minimizing their perceived presence and comparing similar data collected from video to the data collected in person.

Another limitation centers on security breaches. There is a good possibility that the HFEs will not observe a security breach while conducting the pilot test or actual data collection activities. They may have access to previous breach information; however, the quality and usefulness of the data remain unknown. Nevertheless, HFEs will still be able to observe the frequency of behavior conducive to a security breach.

2. CRITICAL OPERATIONAL ISSUES AND CRITERIA

The FAA has identified three categories of critical problems that need to be addressed in constructing the baseline description of checkpoint operations at DTW. These are threat detection, security breaches, and flow rate of passengers through the checkpoint. Factors that may contribute to these problems will be investigated including erroneous and improper procedures, resources and staff deployed at the checkpoint, physical checkpoint layout, and the volume of passengers that use the checkpoint. Critical Operational Issues and Criteria (COICs) have been identified as key contributing factors to each of the critical problems. Measures of Performance (MOPs) will be used to evaluate the issues and Appendix A contains a summary of these issues and their MOPs.

2.1 Issue 1. Threat Detection for Individuals

Are checkpoint procedures effective and are staffing and equipment adequate to prevent passengers from carrying threats through the checkpoint?

2.1.1 Criterion 1-1 Investigative in Nature

MOP 1-1-1 Type and frequency of errors in front magnetometer procedures

MOP 1-1-2 Type and frequency of errors in secondary magnetometer procedures

MOP 1-1-3 Type and frequency of errors in divestment procedures

MOP 1-1-4 Type and frequency of errors in hand-wanding procedures

MOP 1-1-5 Type and frequency of errors in pat-down search procedures

MOP 1-1-6 Number of functioning magnetometers

MOP 1-1-7 Number of functioning hand wands

MOP 1-1-8 Number of screeners assigned to magnetometers and hand wands

Data collectors will use a prepared checklist for each passenger-screening position to record all major deviations from standard procedures (see Appendix B). In addition, data collectors will gather information on the number of front and secondary magnetometers and hand wands available to the screeners during data collection events. Data collectors will also record the number of screeners on duty (by position), supervisors, and individuals being screened (see Appendix C). They will observe various times of the day and week to acquire baseline measures for low, medium, and high traffic volumes.

2.2 Issue 2. Threat Detection for Carry-Ons

Are X-ray operators, bag checkers, and trace operators effective in detecting prohibited objects in baggage?

2.2.1 Criterion 2-1 Projected Threats are Effectively Detected

MOP 2-1-1 P_d for TIP data from X-ray machines

MOP 2-1-2 P_{fa} for TIP data from X-ray machines

MOP 2-1-3 d' for TIP data from X-ray machines

MOP 2-1-4 c for TIP data from X-ray machines

MOP 2-1-5 Type and frequency of errors in X-ray operations

MOP 2-1-6 Type and frequency of errors in bag-search procedures

MOP 2-1-7 Type and frequency of errors in trace procedures

HFEs will collect data to evaluate the overall effectiveness of screening bags. They will use the prepared checklist for each bag-screening position to annotate all major deviations from standard procedures (see Appendix B). These positions include the X-ray operator, bag checker, and trace operator.

2.3 Issue 3. Exit Lane Monitoring

Are exit-lane monitors effective in guarding the sterile area?

2.3.1 Criterion 3-1 Investigative in Nature

MOP 3-1-1 Type and frequency of exit lane monitoring errors during real-time observations

MOP 3-1-2 Type and frequency of exit lane monitoring errors during review of prerecorded video

MOP 3-1-3 Number and duration of time the exit lane monitor is apparently less than 100% vigilant (engaged in conversation, reading, or other activities)

MOP 3-1-4 Number and duration of close physical proximity between screened and unscreened individuals

MOP 3-1-5 Circumstances accompanying a breach during real-time observations (if any)

MOP 3-1-6 Circumstances accompanying a breach during review of prerecorded video

Data collectors will obtain information on the vigilance of the exit lane monitor and compare the number of serious errors committed with those immediately before an exit-lane security breach.

They will also record the frequency of errors on prepared checklists specifically for the exit lane position. In addition, they will use the checklist to record the amount of time the exit-lane monitor is inattentive (as measured using a stopwatch). Finally, data collectors will document any physical contact of persons in the public area with those in the sterile area.

2.4 Issue 4. Inspection and the Volume of Individuals and Carry-On Bags

Does passenger and bag volume affect detection of threat objects?

2.4.1 Criterion 4-1 Investigative in Nature

MOP 4-1-1 Type and frequency of errors in front magnetometer procedures with differing volumes of people

MOP 4-1-2 Type and frequency of errors in secondary magnetometer procedures with differing volumes of people

MOP 4-1-3 Type and frequency of errors in hand-wanding procedures with differing volumes of people

MOP 4-1-4 Type and frequency of divestment errors with differing volumes of people

MOP 4-1-5 Type and frequency of pat-down search errors with differing volumes of people

MOP 4-1-6 Number of screeners assigned to magnetometers and hand wands with differing volumes of people

MOP 4-1-7 P_d for TIP data from X-ray machines with differing bag volumes

MOP 4-1-8 P_{fa} for TIP data from X-ray machines with differing bag volumes

MOP 4-1-9 *d'* for TIP data from X-ray machines with differing bag volumes

MOP 4-1-10 c for TIP data from X-ray machines with differing bag volumes

MOP 4-1-11 Type and frequency of bag-search errors with differing bag volumes

MOP 4-1-12 Type and frequency of trace examination errors with differing bag volumes

HFEs will sample low, medium, and high passenger traffic/bag volumes to determine if there are significant differences in screener performance between those levels. They will count screened individuals and bags and compare them to the bag counters on the magnetometers and X-ray machines to verify accuracy. They will also collect data to determine if P_d, P_{fa}, *d'*, and c are affected by the volume of bags being processed.

2.5 Issue 5. Exit Lane Monitoring and the Volume of Individuals

Does passenger volume affect the likelihood of a security breach?

2.5.1 Criterion 5-1 Investigative in Nature

MOP 5-1-1 Type and frequency of exit lane monitoring errors with differing volumes of individuals during real-time observations

MOP 5-1-2 Type and frequency of exit lane monitoring errors with differing volumes of individuals during review of prerecorded video

MOP 5-1-3 Type and frequency of breaches with differing volumes of individuals during review of video records of previous breaches

HFEs will record as many activities leading up to a breach as feasible. To the extent possible (as allowed by prerecorded videotapes), they will record the number of passengers being screened, the number of people in line at each position, the time it takes to get to the front magnetometer, and the average time it takes to get through the checkpoint. They will compare these results with average or normal conditions at the checkpoint.

2.6 Issue 6. Throughput for Individual Screening

Do inefficient passenger-screening procedures contribute to low throughput?

2.6.1 Criterion 6-1 Investigative in Nature

MOP 6-1-1 Amount of time to process each person through the front magnetometer

MOP 6-1-2 Amount of time to process each person through the secondary magnetometer

MOP 6-1-3 Amount of time to process each person with a hand wand

MOP 6-1-4 Amount of time to process each person with pat-down procedures

MOP 6-1-5 Type and frequency of elective procedures such as secondary magnetometer, hand wand, and pat downs

MOP 6-1-6 Type and frequency of inefficiencies in passenger-screening procedures

MOP 6-1-7 Type and frequency of passenger-caused inefficiencies

Data collectors will record the time it takes screeners to clear individuals via the front magnetometer, secondary magnetometer, hand wand, and pat-down activities. Additionally, they will record the percentage of people who alarm at each position and any deviations from the standard operating procedures on the part of the screener.

2.7 Issue 7. Throughput for Carry-On Bag Screening

Do inefficient baggage-screening procedures contribute to low throughput?

2.7.1 Criterion 7-1 Investigative in Nature

MOP 7-1-1 Amount of time for X-ray scanning

MOP 7-1-2 Amount of time for searching bags

MOP 7-1-3 Amount of time for using trace on bags

MOP 7-1-4 Type and frequency of elective procedures such as bag search and trace detection

MOP 7-1-5 Amount of time people wait for their bags

MOP 7-1-6 Type and frequency of inefficiencies in screening, searching, and trace procedures

MOP 7-1-7 Type and frequency of passenger-caused inefficiencies

HFEs will record the time it takes to clear bags at the X-ray machine, bag checking station, and the trace system. As with the previous issue, they will sample varying traffic volumes to get a more complete picture of the bag-clearing process.

In addition, they will document the proportion of bags that require a physical search and the proportion of bags that are subject to trace procedures. They will note major deviations from standard operating procedures and inefficiencies due to a lack of passenger cooperation (purposeful or inadvertent). Finally, they will record gross inefficiencies of the screeners as reflected in unusually long times to perform standard procedures or an unusual frequency of time-consuming procedures.

2.8 Issue 8. Checkpoint Flow

Does checkpoint layout contribute to passenger bottlenecks?

2.8.1 Criterion 8-1 Passengers Go to Inappropriate Places During the Process

MOP 8-1-1 Number of passengers previously screened by the front magnetometer standing in line to unnecessarily be re-screened by the secondary magnetometer or hand wand

MOP 8-1-2 Duration of time previously screened individuals with their screened bags spend within the checkpoint

MOP 8-1-3 Number of individuals asking screeners and supervisors questions

MOP 8-1-4 Route individuals take out of the screening area

HFEs will time how long individuals take to leave the checkpoint after they and their bags have been cleared. Further, they will document the number of passengers who do not promptly leave the checkpoint and note the reason why.

They will also diagram the checkpoint and the flow of passengers. If they are able to watch video segments in a speeded mode, patterns of traffic flow will emerge, and they will discover 'choke points' in the traffic flow.

2.9 Issue 9. Screening Supervision

Does supervision contribute to effective and/or efficient screening procedures?

2.9.1 Criterion 9-1 Investigative in Nature

MOP 9-1-1 Type and frequency of errors in screening procedures corrected by supervisors

MOP 9-1-2 Type and frequency of inefficiencies corrected by supervisors

Data collectors will record errors in screening procedures and efficiencies and the number of times supervisors correct poor screener performance.

2.10 Issue 10. Communication

Is there unnecessary or irrelevant communication between screeners?

2.10.1 Criterion 10-1 Investigative in Nature

MOP 10-1-1 Number of times the X-ray operator converses with the bag checker without a bag being checked

MOP 10-1-2 Number of times the X-ray operator converses while the belt is running

MOP 10-1-3 Number of times the front magnetometer operator converses with the secondary magnetometer operator without an alarm being involved

HFEs will measure the number of times X-ray operators, bag checkers, and front and secondary magnetometer operators engage in unnecessary or irrelevant conversation. In addition, they will record the number of times necessary conversations are conducted while the X-ray machine belt is running and while people continue to go through the magnetometer.

3. BASELINE DATA COLLECTION

3.1 Milestones

Initial Evaluation of Checkpoint	May 11, 1999
Test and Evaluation Plan	May 27, 1999
Pilot Test	July 7-14, 1999
Baseline Data Collection	July 21 – August 31, 1999
Final Report	September 24, 1999

3.2 Pilot Test

HFEs will conduct a pilot test to determine the quantity and quality of data they can collect and the amount of time necessary to complete the data collection process. The results of the pilot test will determine the number of data collectors needed, the feasibility of collecting data described in this TEP, deficiencies in the checklists, and inadequacies in camera locations and angles. If useful data for any of the MOPs cannot be collected, this issue will be resolved. Furthermore, if additional variables not listed in this TEP are deemed useful and can be collected, HFEs will include them in the baseline data collection phase. In addition, the pilot test will allow data collectors to watch different segments of video so that they can develop a scale for which to rate deficiencies and come to some agreement on a common taxonomy.

3.3 Baseline Data Recording

Based on the results of the pilot test, MOPs will be refined so that data collection will be viable. In addition, procedures will have been tested to ensure that data collection will not interfere with the checkpoint operation.

It is important to maintain communication with the Federal Security Manager and DTW personnel to coordinate the availability of equipment that the data collectors require. For example, data collectors expect that an additional monitor will be available in early July that they can use for reviewing videotapes. Also, airport personnel need to know when to expect the data collectors to be on-site so that all necessary logistics can be arranged.

3.3.1 Data Collection Protocols

Each data collection session will involve a minimum of two HFEs. HFEs anticipate that multiple trips to DTW will be required throughout July and August in order to collect data under a variety of conditions and because data collection is anticipated to be intensive.

They will use a minimum of 40 hours of collective checkpoint activity. The standard protocol will be to unobtrusively observe a block of time at the checkpoint to gather checkpoint status (passenger volume, staffing, etc.) and preliminary information about any significant occurrences in real time. The HFEs will then review video recordings of this block of time and fill out a checklist for each screener position. This data collection may require multiple sessions of real-time observation in order to be complete and accurate. If the HFEs cannot adequately record checklist data using video recordings, they will schedule it for real-time recording. The majority of the real-time recording will be attempted at Checkpoint Brown as it is much more conducive to the unobtrusive collection of that type of data.

HFEs will obtain other data to include TIP performance at these and other DTW checkpoints. They will examine all TIP data contemporaneous with real-time data collection. HFEs will particularly note the dates and times of TIP misses. They will check other sources of video and hand-recorded records to look for correlates and causes of these misses. They will examine TIP data at DTW over a period of time that precedes the July–August data collection in order to get the most reliable and complete information about TIP performance. The HFEs will also use available relevant video recordings such as recordings of past breaches, as described in the discussion of COICs (see Section 2).

3.3.2 Data Analyses

HFEs will calculate frequencies of serious errors for all procedures on the checklist forms. They will translate these frequencies into probabilities of serious procedural errors for a particular passenger or bag. Next, they will correlate these data with checkpoint status variables (volume, staff, etc.) to look for important variables that contribute to procedural errors. In addition, they will correlate status variables and frequencies of serious procedural errors at the X-ray operator position with TIP performance to look for important variables that may contribute to threat detection deficiencies.

HFEs will separately analyze frequencies of those procedures that are critical to the prevention of checkpoint breaches to deduce the ideal conditions for both the production and prevention of a checkpoint breach. From these data, they will identify strategies to avoid future breaches.

Finally, they will calculate means and variances in the time to complete each checkpoint procedure and the probability of contingent procedures from the data. They will insert these two types of data into a checkpoint processing model (see Figure 1) to analyze passenger flow and passenger delays under different checkpoint load and staffing conditions.

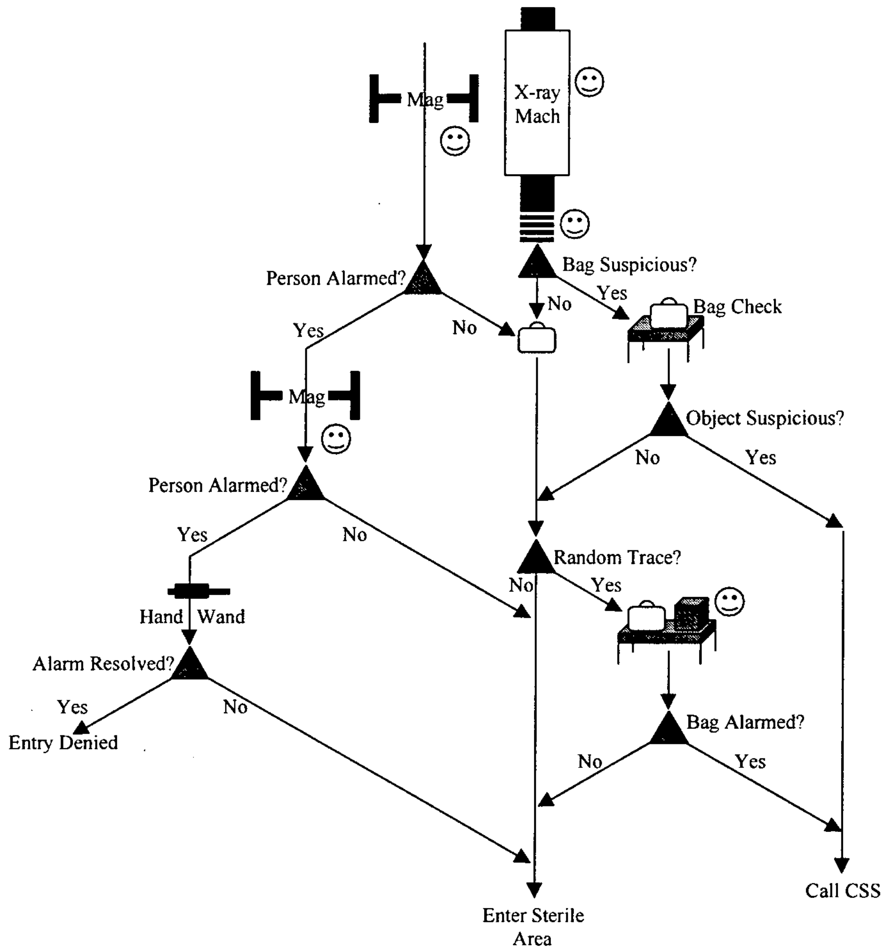

Figure 1. Checkpoint Processing Model

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APPENDIX A

Critical Issues and Associated Measures of Performance

Issue 1. Threat Detection for Individuals

Type and frequency of errors in front magnetometer procedures

Type and frequency of errors in secondary magnetometer procedures

Type and frequency of errors in divestment procedures

Type and frequency of errors in hand-wanding procedures

Type and frequency of errors in pat-down search procedures

Number of functioning magnetometers

Number of functioning hand wands

Number of screeners assigned to magnetometers and hand wands

Issue 2. Threat Detection for Carry-Ons

P_d for TIP data from X-ray machines

P_{fa} for TIP data from X-ray machines

d' for TIP data from X-ray machines

c for TIP data from X-ray machines

Type and frequency of errors in X-ray operations

Type and frequency of errors in bag-search procedures

Type and frequency of errors in trace procedures

Issue 3. Exit Lane Monitoring

Type and frequency of exit lane monitoring errors during real-time observations

Type and frequency of exit lane monitoring errors during review of prerecorded video

Number and duration of time the exit lane monitor being apparently less than 100% vigilant (engaged in conversation, reading, or otherwise)

Number and duration of close physical proximities between screened and unscreened individuals

Circumstances accompanying a breach during real-time observations (if any)

Circumstances accompanying a breach during review of prerecorded video

Issue 4. Inspection and the Volume of Individuals and Carry-ons

Type and frequency of errors in forward magnetometer procedures with differing volumes of people

Type and frequency of errors in secondary magnetometer procedures with differing volumes of people

Type and frequency of errors in hand-wanding procedures with differing volumes of people

Type and frequency of divestment errors with differing volumes of people

Type and frequency of pat-down search errors with differing volumes of people

Number of screeners assigned to magnetometers and hand wands with differing volumes of people

P_d for TIP data from X-ray machines with differing bag volumes

P_{fa} for TIP data from X-ray machines with differing bag volumes

d' for TIP data from X-ray machines with differing bag volumes

c for TIP data from X-ray machines with differing bag volumes

Type and frequency of bag-search errors with differing bag volumes

Type and frequency of trace examination errors with differing bag volumes

Issue 5. Exit Lane Monitoring and the Volume of Individuals

Type and frequency of exit lane monitoring errors with differing volumes of individuals during real-time observations

Type and frequency of exit lane monitoring errors with differing volumes of individuals during review of prerecorded video

Type and frequency of breaches with differing volumes of individuals during review of video records of previous breaches

Issue 6. Throughput for Individual Screening

Amount of time to process each person through front magnetometer

Amount of time to process each person through secondary magnetometer

Amount of time to process each person with hand wand

Amount of time to process each person with pat-down procedures

Type and frequency of elective procedures such as secondary magnetometer, hand wand, and pat downs

Type and frequency of inefficiencies in passenger-screening procedures

Type and frequency of passenger-caused inefficiencies

Issue 7. Throughput for Carry-on Bag Screening

Amount of time for X-ray scanning

Amount of time for searching bags

Amount of time for using trace on bags

Type and frequency of elective procedures such as bag search and trace detection

Amount of time people wait for their bags

Type and frequency of inefficiencies in screening, searching, and trace procedures

Type and frequency of passenger-caused inefficiencies

Issue 8. Checkpoint Flow

Number of passengers previously screened by the front magnetometer standing in line to unnecessarily be re-screened by the secondary magnetometer or hand wand

Duration of time previously screened individuals with their screened bags spend within the checkpoint

Number of individuals asking screeners and supervisors questions

Route individuals take out of the screening area

Issue 9. Screening Supervision

Type and number of errors in screening procedures corrected by supervisors

Type and number of inefficiencies corrected by supervisors

Issue 10. Communication

Number of times the X-ray operator converses with the bag checker without a bag being checked

Number of times the X-ray operator converses while the belt is running

Number of times the front magnetometer operator converses with the secondary magnetometer operator without an alarm being involved

APPENDIX B

Evaluation Checklists for Checkpoint Tasks

Front Magnetometer Checklist

_____________ Month/Day _____________ Start Time _____________ End Time

Procedure	Passenger									
	1	2	3	4	5	6	7	8	9	10
Screener										
Directs passenger to divest										
Directs packages for X-raying										
Directs passenger appropriately through the magnetometer										
Monitors alarm status of magnetometer										
Searches the divest tray										
Transitions passenger to the next step										
Passenger										
Places all metal objects in divest tray										
Moves appropriately through the magnetometer										
Retrieves belongings from the divest										
Moves smoothly to the next step										
Supervision										
Intervenes effectively when required										
Monitors screener's performance										

Specific Comments

Secondary Magnetometer Checklist

_______________ Month/Day _______________ Start Time _______________ End Time

Procedure	Passenger									
	1	2	3	4	5	6	7	8	9	10
Screener										
Directs passenger to divest										
Directs passenger appropriately through the magnetometer										
Monitors alarm status of magnetometer										
Directs passenger for hand wand procedures										
Follows correct hand wand procedures										
Searches the divest tray										
Directs passenger to the exit										
Passenger										
Places additional metal objects in divest tray										
Moves appropriately through the magnetometer										
Retrieves belongings from the divest										
Follows hand wand directions										
Supervision										
Intervenes effectively when required										
Monitors screener's performance										

Specific Comments

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Bag Check Checklist

________________ Month/Day ________________ Start Time ________________ End Time

Procedure	Passenger									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Screener										
Bag checker's physical placement										
Communicate need for a bag check to the passenger										
Understands which part of bag to check										
Follows appropriate bag checking procedures										
Passenger										
Understands the need for the bag check										
Consents to the bag check										

Specific Comments

Exit Lane Checklist

____________________ Month/Day ____________________ Start Time ____________________ End Time

Procedure	Passenger									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Screener										
Orients self to potential breach point										
Separates screened passengers from unscreened passengers										
Percentage of time spent talking to passengers										
Percentage of time spent talking to other screeners										
Reacts correctly to breach										
Passenger										
Understands they cannot enter through the exit lane										
Supervision										
Intervenes effectively when required										
Monitors screener's performance										

Specific Comments

X-ray Operator Checklist

______________ Month/Day ______________ Start Time ______________ End Time

Procedure	Passenger									
	1	2	3	4	5	6	7	8	9	10
Screener										
Orients self to X-ray monitor										
Percentage of time spent talking to other screeners										
Supervision										
Intervenes effectively when required										
Monitors screener's performance										

Specific Comments

Trace Operator Checklist

______________ Month/Day ______________ Start Time ______________ End Time

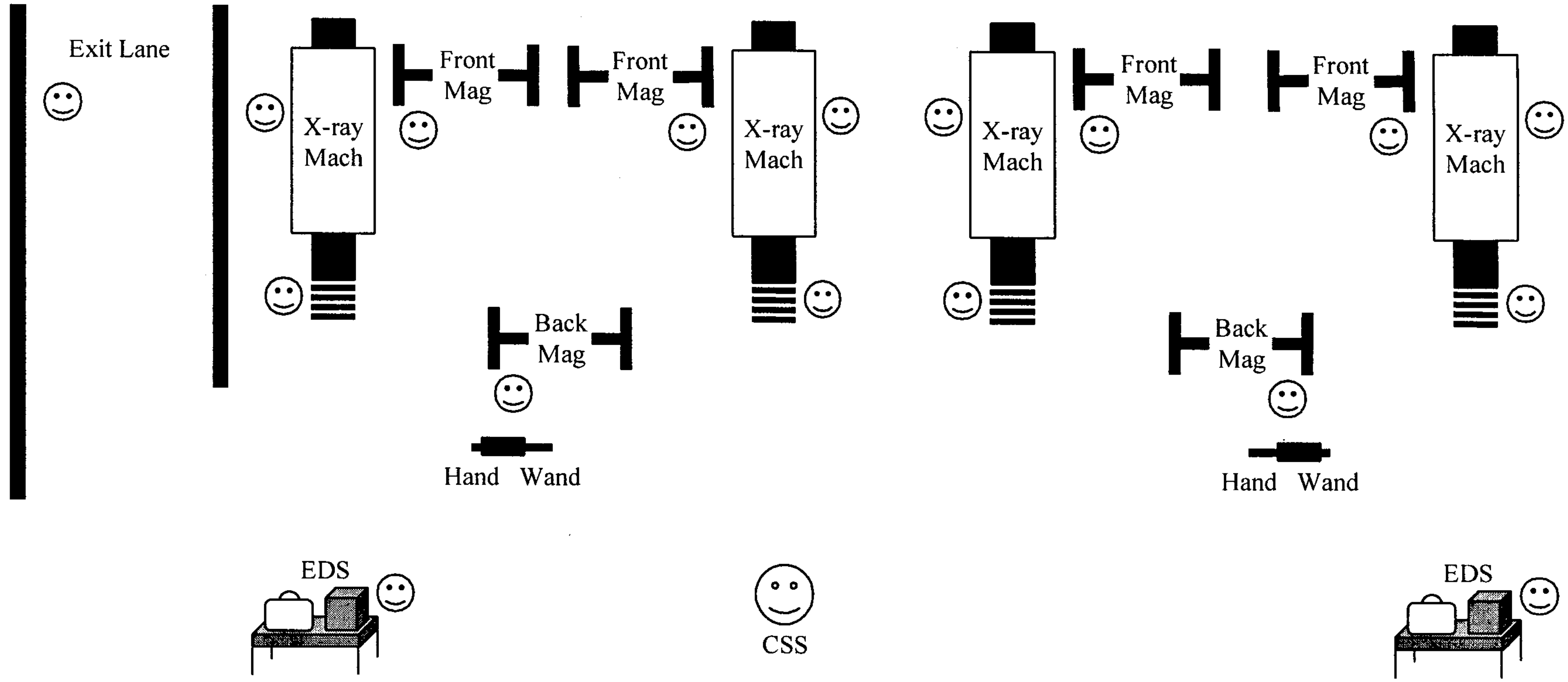
Procedure	Passenger									
	1	2	3	4	5	6	7	8	9	10
Screener										
Handles passenger's bag correctly										
Swabs bag correctly										
Inserts swab into trace machine correctly										
Responds to alarm correctly										
Table clean										
Only bag on table is being checked										
Supervision										
Intervenes effectively when required										
Monitors screener's performance										

Specific Comments

APPENDIX C

Checkpoint Status Data Collection Form

Checkpoint Status Data Collection Form



Data Collection Information

Month/day: ____________
Start time: ____________
End time: ____________

Bag Information

Bag count: ____________
Bag checks: ____________
Trace checks: ____________

Passenger Information

Passenger count: ____________
Alarms front mag: ____________
Alarms back mag: ____________
Alarms hand wand: ____________

Please complete the data collection, bag, and passenger information. Place an X on each screener position icon and each piece of operating equipment (include the number, if more than 1).