Apex AEER – Evaluating Biometric Exit Concepts of Operations

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CONOPS Configurations

- FIS Entry
- Passenger Loading Bridge (PLB)
- Centralized Capture
- Exit Boarding Gate
Target Performance Goals

- Should biometrically verify 97% of in-scope travelers

- Should “do no harm” to existing operations
  - Ex: To board a 300 passenger aircraft in under 40 minutes, each transaction must take 8 seconds or less

- Minimize staffing requirements
Success Criteria – Biometric Match Accuracy (Effectiveness)

- Percentage of individuals properly verified at an exit station

- Real time 1:1 (with token)
  - Match results presented to subject before end of transaction
  - Same day matching

- N:N post-processing
  - Bulk matching run after the completion of a sequence
  - Allowed for matches that did not occur in real time (i.e. interoperability, different day matching, multiple algorithms...)
Success Criteria – Transaction Times (Efficiency)

- Time delta between token scan and successful biometric match
- Transaction times used to infer throughput
Success Criteria – Public Satisfaction

- Level of participant acceptance
- Modified System Usability Scale (mSUS)
- Likert Scale
- Calculated a 0-100 score; higher the better

AEER Post Test Interview Questions
AEER Scenario Test Sequence #2

Band Number: _____________.

Exit Gate

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Image of Device & Gate
Data Gathering Techniques

Beam Breaks

Environmental Sensors

Audio/Video Recording

Surveys
The Maryland Test Facility
The Maryland Test Facility
Test Participants

- 1551 volunteers recruited for the Scenario Evaluation
- Blocked on age, gender, race/ethnicity and eye color
- Demographically matched to traveling public
- Over 50 different countries of origin represented
Sequence 1
“Initial Characterization of FIS Entry Booths and Self-Service Portals”

Sequence 2
“Screening Additional Biometric Modalities and Methods at a Self-Service Portal”

Sequence 3
“Evaluate the Impact of Signage and Process at a Self-Service Portal”

Sequence 4
“Evaluate FIS Entry Podiums, Evaluate Optimized PLB, Evaluate Impact of Signage and Feedback at a Self-Service Portal”
Sequence 1

- Defined and characterized entry and exit CONOP configurations

- Human factors; examined learning
  - Controlled experience with each technology
  - Used scenarios multiple times
Both finger methods performed comparably well, warranted investigation into additional finger methods.

Performance could improve if usability optimizations were made to the standoff iris method.

User positioned iris posed usability challenges (Sirotin).

Minimal learning effect.
Sequence 2

- Introduced two additional finger methods
- Integrated usability optimizations to standoff iris
- Preliminarily examined the passenger loading bridge configuration and an additional passive face method
Able to differentiate performance between finger methods

Additional usability optimizations for the non-contact finger could yield performance improvements

Usability optimizations to standoff iris improved performance
Sequence 3

- Compared different levels of signage/feedback
- Enhanced instructional cues vs. limited instructional cues
Enhanced instructional cues have a notable, positive effect on system performance.
Examined the presence of audio cues as an additional method of feedback

Examined the presence/absence of text within presented signage and feedback
The presence of audio and text improved system performance
Some collection methods may be viable for airport operations

- High biometric verification accuracy and short transaction times due to ample feedback and the accommodation of both naïve and returning volunteers

Success: 97%

Fail to Match: 2%

Fail to Acquire: 1%
Some collection methods may not be viable for airport operations
- Poor biometric verification accuracy due to high failure to acquire rates for naïve subjects
- The scenarios that did not meet the targeted performance levels were mainly due to usability issues

Instruction cues and process play an important role in biometric collection
- Must convey clear understanding of needed action
Select combinations of CONOP configuration, biometric modality/method and traveler process can meet a 97% biometric true accept rate and produce average boarding transaction times to support boarding 300 passengers in 40 minutes, for in-scope departing travelers.
Thank you.

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