Air Entry/Exit Re-engineering (AEER)

International Biometrics Performance Conference
National Institute of Standards and Technology

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Homeland Security Advanced Research Projects Agency
Science and Technology Directorate
Agenda

• Drivers for Entry/Exit Transformation
• Air Entry/Exit Re-engineering (AEER) Framework
• Challenges and Risks
• Integrated Path Forward
• Accomplishments
• Test & Evaluation Strategy
• Draft Evaluation Criteria
• Iris Device Qualification Test (IDQT)
• Notional CONOPs
• Test & Evaluation Capability
• DHS Level I Acquisition Process
Drivers for Entry / Exit Transformation

Issues
- Increased traveler volume and wait times
- Incomplete information on traveler departures
- Legislative mandate for biometric exit not met
- Air threat remains a priority

Although current legislation focuses on biometric exit, improvements must be made to the end-to-end process, from entry to exit, in order to be most effective.

Air Passengers
- Total air passenger volume is up over 21% compared to FY 09.
- Air travel expected to grow 4% - 5% annually for the next several years.
Apex AEER Framework

Objectives
• Enhance current air entry operations
• Develop a cost-effective biometric air exit solution
• Integrate into existing air operations

Strategy

Build Phase
• Execute air entry/exit operational survey and analysis
• Identify operational requirements and capability gaps
• Perform economic impact analysis
• Identify biometric and non-biometric solution sets

Test & Transition Phase
• Establish Maryland Test Facility (MdTF)
• Technology qualification and process improvement
• Solution development, testing and evaluation
• Business case development

CBP Ownership Phase
• Conduct field trial of air entry and exit solutions
• Transition solutions to operators

Stakeholders

Government
• CBP Port of Entry Operators
• Office of Biometric Identity Management
• DHS Privacy Office
• DHS Office of Policy
• National Institute of Standards and Technology (NIST)

Air Associations
• Airlines for America
• Airports Council International-North America
• International Air Transport Association
• US-Travel Association

Congress
• House Committee on Homeland Security
• Senate Committee on Homeland Security and Governmental Affairs
• House and Senate Appropriations Committees

Apex AEER Team

Congress

Air Associations

Government

Strategy

Build Phase

Test & Transition Phase

CBP Ownership Phase
Apex AEER Challenges and Risks

- Need to consider solutions that “Do No Harm” to current throughput and airline boarding times, and minimize airport infrastructure requirements
- Need to ensure compliance with current DHS Privacy Regulations
- Generalized recommendations based on airports surveyed
- Significant collaboration with various air travel industry stakeholders, but limited engagement with some stakeholders
- Potential changes in legislative requirements could significantly impact project scope and schedule
- Need to ensure compliance with established processes and schedules for DHS acquisitions (i.e. cannot accelerate by sole sourcing)
Integrated Path Forward

Activities:
• Continue to engage with airports, and international partners (e.g. UK, Netherlands, etc.) to identify best practices and lessons learned from implemented systems and gather passenger facilitation data
• Collaborate with industry stakeholders to refine biometric air exit CONOPs

Activities:
• Validate biometric air entry/exit CONOPs and technologies with scenario based testing
• Complete airport entry/exit analytical tools and document for transition to CBP
• Conduct performance and cost/benefit analysis of biographic and biometric exit
• Select biometric technology candidates for field evaluation

Activities:
• Conduct field evaluation of air entry and exit technology solutions at selected airport(s)

Phase 1
Operational Survey and Analysis
Econ Impact Analysis
Operational Biometric Test Bed

Phase 2
Laboratory Testing
Scenario Based Testing
Acquisition Documentation

Phase 3
Stakeholder Engagement & Technology Foraging
Field Trial Deployed
Piloting and Operational Evaluation
Apex AEER Accomplishments

Operational Analysis
- Completed Airport Operational Surveys visits (JFK, LAX, ORD/MDW, MIA, SFO, LAS, ATL) and documented findings in As-Is Operational Survey Report
- Developed a repeatable survey methodology with tools and applied it to airport environment
- Mapped existing Entry Processes
- Assessed Biometric Exit Options
- Drafted entry and exit capability gap assessment, including targeted areas for potential solutions

Economic Analysis
- Identified financial implications of current capability gaps for air entry
- Performed literature review of past U.S. entry/exit efforts
- Researched cost information pertaining to potential entry and exit solutions
Apex AEER Accomplishments

**Biometric Technology Market Survey**
- Canvassed commercially viable biometric devices
- Completed initial device capabilities and maturity report

**Testing**
- Established NIST Oversight role
- Conducted tech foraging and testing in collaboration with NIST
- Developed Iris Device Qualification Test (IDQT) in conjunction with NIST. IDQT is designed to measure peak imaging performance, and removes the “human factor” in laboratory qualification and testing
- Developed an Omnibus Test and Evaluation Plan
- Prepared draft Human Subject Test Protocol for IRB submission

**Technology and Test Capability**
- Site selected in Upper Marlboro, MD
- Completed Test Bed architectural drawings; submitted drawings to PG County Permit Office for approval
Stakeholder Engagement

- Serve as Vice-chair of International Air Transport Association (IATA) Passenger Experience - Biometrics Multidisciplinary Group

- Engaged air industry stakeholders to discuss project goals, gather operational requirements, and address potential concerns

- Conducted air entry/exit webinar with Airports Council International-North America (ACI-NA) to discuss notional CONOPs

- Completed January 2014 ACI-NA, Airlines for America and U.S. Travel Association working session to further discuss pros and cons of notional CONOPs
### Test & Evaluation Strategy

<table>
<thead>
<tr>
<th>Test &amp; Evaluation</th>
<th>Laboratory Tests</th>
<th>Scenario-based Tests</th>
<th>Field Trials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Laboratory Tests</strong></td>
<td>• Ensure biometric devices can perform with current air entry/exit operations&lt;br&gt;• Determine biometric-device applicability for each CONOP</td>
<td><strong>Scenario-based Tests</strong>&lt;br&gt;• Assess CONOPS performance&lt;br&gt;• Assess human-to-system issues in air entry/exit processes&lt;br&gt;• Model potential impacts to operational processes</td>
<td><strong>Field Trials</strong>&lt;br&gt;• Evaluate systems performance&lt;br&gt;• Identify and mitigate observed impacts to operational processes</td>
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**Iris Capture Process**

**Fingerprint Capture within the FIS**
## Draft Evaluation Criteria

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<thead>
<tr>
<th>Laboratory Tests</th>
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<th>Field Trials</th>
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</thead>
<tbody>
<tr>
<td>SDK/API Integration</td>
<td>CONOPS Integration</td>
<td>Systems Integration</td>
</tr>
<tr>
<td>Data Standards Conformance</td>
<td>Transaction Time/Throughput</td>
<td>Biographic/Biometric Matching Performance</td>
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<td>Biometric Data Quality</td>
<td>Usability</td>
<td>Aircraft Turn Time</td>
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<td>Third Party Certification/Test Review</td>
<td>Biometric Performance</td>
<td>Airport Connection Time</td>
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<tr>
<td>Capture Conditions Assessment</td>
<td>Exception Handling</td>
<td>Gate Utilization</td>
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<tr>
<td>Biometric Capture Assessment (FTA, FTP, acquisition time)</td>
<td>Network Bandwidth and Latency</td>
<td>Operations Impact Assessment</td>
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<td>Interoperability/Intraoperability</td>
<td>Footprint and Weight</td>
<td>Traveler Experience and Satisfaction</td>
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<td>Staffing Levels</td>
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Iris Device Qualification Test (IDQT)

• Developed by DHS S&T Directorate and NIST

• Provide evaluation and qualification tests of iris cameras, to support down selection decisions of devices prior to human-in-the-loop testing for US Government applications.

• Develop “Appendix F-like” iris device qualification testing tools and procedures which:
  - Minimize biases between devices
  - Minimize modification to intended device operation on real human subjects
  - Measure “peak” imaging performance… degradation from realistic operations should be revealed in subsequent evaluation stages
  - Should be simple enough to be practically conducted by a third party testing facility
Notional Biometrics Self-Boarding Gate
Notional Centralized Capture (ABC)
Notional Irregular/Mobile Operations
Notional Passenger Loading Bridge
Maryland Test Facility (MdTF) - Controlled environment for laboratory and scenario-based testing to evaluate biometric technologies and other operational processes under simulated airport entry and exit conditions

- Over 25,000 sq. ft. of office and laboratory space
- Designed to support 3 tests and 50 test subjects concurrently
DHS Level I Acquisition Process

- Deliberate acquisition process reduces risk and increases oversight

- Apex AEER *outputs inform each phase* of a future CBP acquisition process and, as a result, provide the component with a “jump start” that could compress elements of the schedule.

<table>
<thead>
<tr>
<th>Phase 1: Need</th>
<th>Phase 2: Analyze / Select</th>
<th>Phase 3: Obtain</th>
<th>Phase 4: Produce / Deploy/ Support</th>
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<tbody>
<tr>
<td><strong>Major Activities</strong></td>
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<tr>
<td>Determine Need</td>
<td>Solution Engineering</td>
<td>Requirements Definition</td>
<td>Acquisition activities</td>
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<td>Site Surveys</td>
<td>Laboratory Testing</td>
<td>Design/Development</td>
<td>RFP Process</td>
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<td>Data Collection</td>
<td>Scenario Testing</td>
<td>Integration and Field Testing</td>
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<td><strong>Goal:</strong> Program need is validated; solution set investigation</td>
<td><strong>Goal:</strong> Tech approved as best of competing solutions (performance, costs, &amp; risks.)</td>
<td><strong>Goal:</strong> Specific capabilities tested; program is approved to go into production</td>
<td><strong>Goal:</strong> Production capability rolled out to first airport after contract award</td>
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Questions?