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# **Biometric Pathway** Transforming Air Travel



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# 1 Introduction

U.S. Customs and Border Protection (CBP) currently uses biographic data – name, date of birth, and passport number – for analyzing and inspecting inbound and outbound travelers, and for recording the arrival and departure of visitors to and from the United States. The passport, Lawful Permanent Resident Card, or visa is the key that unlocks and matches a traveler's record, including travel histories, criminal files, and vetting results, to the traveler being inspected. In 2004, inbound fingerprint collection was added to the biographic identity information in order to match previous encounters, identify multiple travelers using the same biographic information, and conduct biometric watch list checks for visitors arriving into the United States. It has long been proven that fingerprints are a strong law enforcement tool. Accordingly, fingerprints will always serve as the foundation for identity management for the Department of Homeland Security (DHS). However, the current fingerprint system, while effective, is not efficient and does not offer any facilitative benefit; this is due to the current system relying on biographic information to retrieve information from the database to perform a one-to-one biometric match to the traveler and their data.

Fingerprints, as the primary biometric, allow CBP to match all in-scope travelers<sup>1</sup> for biometric exit. However, since the DHS systems were architected to match biographic data first, a read of the passport or other travel document is necessary to commence the validation process, unless a new way of pre-staging and accessing data is developed. In addition, the issues of sorting and segmenting in-scope from out-of-scope travelers in the boarding process is highly staff-intensive. And, like the current fingerprint system, there is no ability to search a photo/traveler against DHS holdings without having biographic data to perform a one-to-one comparison.

In today's threat environment, it is critical to our nation's security to be able to compare photos of national security suspects to DHS holdings. While DHS' gallery of fingerprints is large, it pales in comparison to the number of facial recognition quality photos held in existing data sources, such as the U.S. Passport and Visa databases. The use of face as the primary modality, with the large gallery of available biometrics, removes the need to segment travelers and provides a previously unavailable method to facilitate travel for everyone, not just the smaller population of in-scope travelers for whom fingerprints are available. Additionally, the use of facial recognition does not require the collection of new information; CBP will leverage information travelers have already provided to the U.S. government.

CBP will transform the way it identifies travelers by shifting the key to unlocking a traveler's record from biographic identifiers to biometric ones – primarily a traveler's face – to realize facilitative benefits, while still leveraging the law enforcement benefit of fingerprints without collecting new

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<sup>&</sup>lt;sup>1</sup> "In-scope" traveler is defined as any person who is required by law to provide biometrics upon entry to the United States, pursuant to 8 CFR 235.1(f)(ii).

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information. Pre-staging the existing traveler data upstream in the travel process enables all stakeholders to transform from manual and redundant processes to safer, automated, and seamless traveler movement. CBP can continue to increase security by using a facial biometric to match the traveler to their advanced passenger information, while simultaneously checking the fingerprints on file against the watch list, which decreases our dependency on less reliable paper travel documents, such as passports and visas. This will also continue to facilitate traveler movement by providing partners – airlines, airports, and the Transportation Security Administration (TSA) – with a common and unique biometric key for identifying and matching travelers to their identities, creating a more seamless travel experience.

## 2 Background

#### **Biometric Requirements and History**

In 1996, Congress passed legislation mandating the creation of a biographic entry and exit system. After the 9/11 attacks and the formation of DHS, Congress added biometrics as a requirement of the entry and exit system. The United States Visitor and Immigrant Status Indicator Technology (US-VISIT) office was created to implement a biometric entry and exit system for non-citizens entering and departing the United States. There are currently over 200 million identities in the enrolled in the entry exit system. Given the number of identities in the system and other technical limitations, only rapid biometric-based searching of the watch list<sup>2</sup> is possible. In order to meet the response time requirements, CBP queries, other than those of the watch list, had to be conducted on a one-to-one basis, using the travel document as the search key to identify the exact prints on file. Although this had a significant and positive impact on CBP's law enforcement mission, it added time and complexity to the arrivals process and did little to provide a facilitation benefit.

While the entry system was being deployed and utilized, there was little advancement towards a biometric exit solution. US-VISIT led a number of tests and pilots, but in late 2013, Congress transferred the biometric exit mission to CBP for execution.

#### **Current Biographic System**

To support CBP entry and exit processes, airlines provide advanced biographic information to CBP through the Advance Passenger Information System (APIS). This has enabled CBP to conduct security queries before a passenger arrives into or departs from the United States. While significant advancements have been made in the way CBP collects, processes, and analyzes advanced passenger data, the largest challenge has always been matching the traveler with their specific APIS information and pre-arrival vetting results. In the current process, the Passport is most often utilized

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<sup>&</sup>lt;sup>2</sup> The OBIM watch list is mainly comprised of prior immigration violators, active wants/warrants, prior criminal history, Department of State visa denials, and Department of Defense concerns. Eleven (11) million identities are currently enrolled in the biometric watch list.

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to match the traveler with the advanced passenger information so that the results are made available to the inspecting CBP officer.

## 3 Vision

Working in partnership with the air travel industry, CBP will lead the transformation of air travel using biometrics as the key to enhancing security and unlocking benefits, which will dramatically improve the entire traveler experience. CBP will re-architect data flows and data systems to pre-stage biometric data throughout the travel process.

CBP will use the traveler's face as the primary way of identifying the traveler and facilitating their entry to and exit from the United States, while simultaneously leveraging fingerprints for watch list checks. This will create the opportunity for CBP to transform air travel by enabling all parties in the travel system to match travelers to their data via biometrics, thus unlocking benefits that continue to address CBP's border security mandate and enhance the entire traveler experience.

### 4 Goals

CBP will partner with the air travel industry to deploy a biometric air entry/exit solution that transforms the overall traveler experience. The four primary goals of this large-scale transformation will be to make air travel more:

- Secure Providing increased certainty as to the identity of travelers at multiple points in the travel continuum;
- Simple Eliminating the need for physical document and boarding pass checks;
- Facilitative Establishing a clear and easily understood process that will reduce the potential for major "bottlenecks" within the air travel process; and
- **Compliant** Employing a high integrity, biometric entry and exit system that not only increases CBP's certainty as to the identity of travelers, but also more ably holds accountable those violating terms of their admittance.

# 5 CBP Biometric Pathway

The CBP Biometric Pathway will utilize biometrics to streamline passenger processes throughout the air travel continuum, and will provide airport and airline entities with the opportunity to validate identities against DHS information systems using the data available in the Biometric Pathway. CBP will partner with airlines, airports, and TSA to build a device agnostic backend backbone that allows for private sector investment in front end infrastructure, such as self-service baggage drop off kiosks, facial recognition self-boarding gates, and other equipment; this "backbone" will ultimately enable a biometric-based entry/exit system that provides significant benefits to air travel partners, discussed above, in addition to meeting the congressional mandate for a biometric exit system.

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To successfully achieve the Biometric Pathway, CBP will need to accomplish the following: 1) reengineer and re-design CBP data handling; 2) build a backend communication portal to connect with partners; 3) develop new inbound software that leverages one-to-many biometric searching; and 4) implement a mechanism to provide wayfinding and lane assignments prior to entry. CBP will ensure we meet all legal and privacy requirements as we meet these goals.

#### **Reengineer and redesign CBP data handling**

CBP's current process needs to be updated to sort advanced passenger information differently for both outbound and inbound traveler processing: outbound data by flight and inbound data by airport or terminal. This reorganization will enable the retrieval of all associated biometrics (e.g., photo and fingerprint) from all DHS/CBP biometric holdings (e.g., IDENT, U.S. passport, visa database, Global Entry, and APC kiosks) and segregate them into a smaller, more manageable subset for expedited processing. This will fuse the biometric and biographic information together and allow for the biometric to be the key to matching a traveler with the advanced data. This same architecture will be used to transform the entry process by eliminating the need for token-based searches.

This update to CBP data handling will improve the entry and exit processes by ensuring copies of data are stored in the cloud or on a local server based locally at the airport and terminal. This will also provide robust redundancy protection against system outages, while delivering faster, more reliable CBP processes.

#### Utilize existing information

Privacy is of utmost importance to CBP. Although the Biometric Pathway reengineers and redesigns data handling, it does not require the collection of new information. CBP is able to leverage information travelers have previously provided to the U.S. government to meet the stated goals of the program. Additionally, privacy representatives are an active participant throughout the development of the entry/exit program.

#### Build a backend communication portal to connect with partners

CBP will build a backend communication portal to support TSA, airport, and airline partners in their efforts to use facial images as a single biometric key for identifying and matching travelers to their identities. This portal will provide our partners with the ability to utilize the CBP Biometric Pathway for identity verification at any point in the travel continuum.

In order to give partners the ability to plug-in a wide array of airport and airline devices into the pathway, CBP will publish the specifications of facial and fingerprint matching templates, the communication protocols, and the messaging schema. Airlines and airports will be able to procure their own front-end biometric equipment, which will plug into the CBP biometric pathway using the

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standard protocols. This will enable them to use verified biometrics for check-in, baggage drop, security checkpoints, lounge access, boarding, and other processes.

The result will be an integrated boarding process that may change the way close-out manifests are compiled and finalized.

#### Develop new inbound software that leverages one-to-many biometric searching

To support the reengineering of inbound traveler inspections based on biometrics, CBP will develop a new, inbound software program that leverages the one-to-many biometric search. This software will display pertinent traveler information to the inspecting CBP officer in a fast, efficient, and reliable way simply by matching a photo of the traveler with the staged advanced passenger information held in the airport or terminal data file.

This new software will simplify the inspection process by allowing the officer to focus on the interview while having pertinent information displayed on an easy to read touch screen format. It will also:

- Limit the amount of information an officer has to enter into the computer;
- Revert seamlessly to a passport swipe and name match to the manifest in the event no biometric is matched. The officer can then determine the cause of match failure (e.g., first time visitor, previous Entry Without Inspection (EWI), imposter, etc.); and
- Utilize the existing Unified Passenger (UPAX) platform to ensure data from primary to secondary easily transmits and eliminates the need for duplicate data entry.

# Implement a mechanism to provide wayfinding and lane assignments to the traveler before arrival

Working with airlines and airports, CBP will implement a mechanism to provide wayfinding and lane assignments to the traveler before arriving in the United States. This can be achieved by leveraging existing airline mobile applications or third party applications, or by printing the information on the current boarding pass at check-in. This will create simplified and standardized wayfinding across airports.

By implementing this wayfinding mechanism, CBP will create an opportunity to provide to the traveler customized and tailored information, such as estimated wait times, connecting flight departure and status updates, and specific directions to security checkpoints, baggage claim, and recheck. It will also simplify the process for travelers, reducing the need for airport staffing to provide instructions and to triage passengers into specific lines.

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## 6 CBP Current Biometric Initiatives

CBP's biometric experiments over the past 18 months have helped us determine the critical, optimal, and necessary requirements of a biometric exit system. As a result of these tests, CBP is convinced that the biometric exit solution is a viable and obtainable solution.

<u>1-to-1 Facial Comparison Project</u>: Through the success of the 1:1 project, CBP was able to determine that facial comparison offered a valuable and operationally feasible solution for helping officers biometrically confirm identity with confidence.

<u>Biometric Exit Mobile (BE-Mobile)</u>: At select airports, outbound inspection teams are now using new, hand-held mobile devices to collect biometric information – fingerprints – on specific foreign travelers departing the United States. These devices allow CBP to biometrically record the traveler's departure from the United States and to run the fingerprints against the IDENT biometric database, which provides the CBP officer with watch list hits.

<u>Pedestrian Field Test:</u> At the Otay Mesa, CA border crossing, CBP tested new technologies to collect biographic and biometric – face and iris – data on pedestrians entering and departing the United States. The field test provided information on biometric capture in an outdoor environment using various methods, such as on-the-move, stop-and-look, and kiosk based.

<u>Departure Information System Test (Atlanta)</u>: CBP is utilizing facial comparison technology at a single departure gate at Hartsfield–Jackson Atlanta International Airport to verify the identity of travelers departing the United States. By comparing a picture taken at the gate with photographs of the specific traveler previously captured by DHS and/or the Department of State, CBP is able to biometrically verify the identity of the traveler as they board the plane. CBP is currently working to operationalize this effort by adding a real-time matching response, confirmation that the traveler has departed the United States, and hotlists for travelers who are either EWIs, overstays, or biometric watch list hits. This operationalization, identified as the Departure Verification System (DVS), will help set the framework for biometric exit in the air environment.

## 7 Biometric Pathway Next Steps and Path Forward

CBP's Biometric Pathways vision addresses the end-to-end travel experience from airline check-in, to security screening, to boarding, and includes both the entry into, and the exit from, the United States. All stakeholders, whether government or private sector, have common interests in ensuring the highest levels of both passenger security and traveler facilitation. By utilizing the traveler's biometric identity throughout the air travel continuum, CBP's vision streamlines and eliminates manual practices, creating a more secure, convenient, predictable, and compliant international travel process.

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#### Next Steps

To accomplish this vision, CBP will need to undertake a number of new efforts, including updating and organizing CBP structure, operationalizing the Departure Information Systems Test, and developing a public-private partnership with airlines, airports, and TSA.

<u>Update and Organize Internal CBP\_Structure:</u> CBP will establish the entry/exit program management office, develop robust stakeholder outreach and engagement, and create a cross-functional information technology team in support of the CBP Biometric Pathway.

<u>Operationalize the DVS Test:</u> CBP will operationalize the DVS Test in Atlanta by initiating real time biometric matching at the boarding gate, which will result in a biometric confirmation being written into the TECS crossing record. CBP will also add additional lookout information (e.g., potential EWI's) to the Atlanta Passenger Analysis Unit (PAU) outbound hotlist for review prior to flight departure. The PAU will then determine what enforcement actions, if any, need to be taken. Officers implementing this effort will leverage the existing BE-Mobile program to identify targets encountered at the gate and enable fingerprint verification and close-out of the encounter. Additional testing will be needed to determine scalability.

<u>Upgrade and Re-Architect Network Infrastructure</u>: The vision for biometric air exit requires CBP to add the collection and verification of facial recognition quality photos upon entry. In addition to modifying entry systems, CBP will begin collecting biometric exit transactions and providing biometric matching services at all points within the vision, not just at departure gates. Networks must be enhanced to support the additional bandwidth requirements to add multi-modal biometrics to existing entry transactions and to support new biometric exit transactions.

The development of biometric exit applications includes the application to collect biometric data at the departure gate, interfaces with CBP backend systems, alert capabilities to mobile applications for outbound enforcement teams, and upgrades to targeting applications to comply with new outbound enforcement policies.

<u>Biometric Pathway Port:</u> CBP and the Houston Airport System will partner to showcase the potential for biometrics to transform air travel by overhauling each aspect of the travel process, from checkin to boarding on departure, and from CBP inspection to connecting flight or departure from the airport on arrival.

<u>Vehicle Driver Imaging Simulation:</u> CBP is testing technologies, in collaboration with The Oak Ridge National Laboratory, that capture a driver's image while he or she is inside of a vehicle departing

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the United States at speed. The simulation will determine how often, and under what circumstances and conditions, a facial recognition quality image can be captured.

<u>Cruise Biometric Transformation</u>: CBP and Royal Caribbean Cruise Line (RCCL) are discussing highlevel business transformation opportunities surrounding the use of facial recognition in the embarking and debarking processes for cruise passengers. With this technology, both CBP and RCCL are looking to facilitate travelers' arrivals while enhancing security.

Develop a Public-Private Partnership with Airlines, Airports, and TSA: CBP's move towards facial biometrics and, specifically, developing the methods, standards, and abilities for stakeholder and other DHS partners to interact with CBP via those standards for identity, will provide new collaborative opportunities for the public and private sectors. CBP will leverage and build upon the existing, successful partnerships with U.S. air carriers and U.S. airports to implement a proactive public/private partnership program for stakeholders across the travel continuum to increase collaborative innovation, eliminate and streamline processes, and ultimately drive to achieve the CBP Biometric Pathway vision. These partnerships will build upon the important strides made over the years, and will help stakeholders meet their business needs, all while CBP protects the nation.

Land Border: Biometric exit in the land environment presents significantly greater challenges. While the land environment represents an extensively greater number of travelers crossing the United States border on a daily basis, when compared to the air environment, the travelers who require biometric exit recordation (e.g., third country nationals) account for a very small percentage of those land crossings. Third country nationals departing the United States through land borders account for approximately 1-3% of all land departures, whereas third country nationals departing via air represents approximately 45-55%. To address this, CBP is reviewing the possibility of a self-reporting infrastructure in which third country national travelers will be required to self-report their departure from the United States at the land port of entry through which they are exiting. Those who fail to do so will be flagged as a possible overstay in the Arrival Departure Information System.

#### Path Forward

For too long, many stakeholders in the air travel continuum have tried to improve commercial air travel through projects that address specific areas or processes without making a significant effort towards improving the end-to-end air travel experience. CBP's Biometric Pathway provides an opportunity for CBP, airlines, airports, and government partners to transform their processes by shifting the key to unlocking a traveler's record from biographic identifiers to biometric ones. CBP, its stakeholders, and the traveling public all benefit when security is increased and traveler movement is faster and more seamless.

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