Entry-Exit System: Progress, Challenges, and Outlook

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BIPARTISAN POLICY CENTER

Immigration Task Force

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Executive Summary

About 40 percent of unauthorized immigrants entered the country legally but remained after their legal status expired. Entry-exit systems were originally conceived as a tool to identify overstays—in other words, to track when foreign nationals enter the country and whether they leave in accordance with the terms of their admission. A complete entry-exit system would track all arrivals and departures at all land, air, and sea ports of entry (POE).

Over the past 18 years, Congress passed several laws requiring the implementation of an entry-exit system that does not inhibit the free flow of legitimate commerce and travel. After the events of September 11, 2001, an entry-exit system was also viewed as a national security asset. In response, Congress added biometric identifiers (such as fingerprints) to the statutory requirements, in addition to previously-required biographic identifiers (such as names and birthdates).

Progress

The entry capability is fully deployed. Historically, millions of travelers admitted to the United States each year were not subject to any sort of document check; today, Customs and Border Protection (CBP) screens 100 percent of entering travelers. Nearly all noncitizens entering at air and sea ports are now subject to ten-fingerprint biometric enrollment. At land borders, CBP collects biometrics from nearly all foreigners who are not from Canada or Mexico.

Table E-1. Current state of entry-exit implementation.

		LAND	AIR	SEA
ENTRY	Biographic	Noncitizens via document validation at Customs and Border Protection (CBP) primary inspection.	Noncitizens via carrier transmission of manifest data. Data validity confirmed at CBP primary inspection.	Noncitizens via carrier transmission of manifest data. Data validity confirmed at CBP primary inspection.
	Biometric	Noncitizens (except most Canadians and Mexicans) via fingerprint and photograph collection at CBP secondary inspection.	Noncitizens via fingerprint and photograph collection at CBP primary inspection.	Noncitizens via fingerprint and photograph collection at CBP primary inspection.
EXIT	Biographic	*Northern border*: Noncitizens via data exchange with Canada. *Southern border*: Voluntary return of form I-94.	Noncitizens via carrier transmission of manifest data.	Noncitizens via carrier transmission of manifest data.
	Biometric	None.	None.	None.

The exit capability is not complete. Exit systems are more challenging because the United States did not construct its land, air, or sea POE infrastructure with departure inspections in mind. DHS operates a complete biographic system in the air and sea environments, and through a new data-exchange partnership with Canada, collects biographic exit data on the northern land border. At the southern land border, no systematic or mandatory exit collection exists. This is a large gap, as about 45 percent of all entry inspections—land, air, or sea—occur at the southern land border.

Challenges

Significant challenges stand in the way of completing the exit system, particularly for vehicles exiting at land borders. Insufficient space on the U.S. side of the border precludes construction of an exit infrastructure that would be similar to the entry process at most POEs. Factor in personnel costs and logistical constraints, as well as the impact on travel and commerce, and it quickly becomes clear that a "mirror" infrastructure is impractical for tracking travelers who exit the country by land. DHS is working to establish a data-sharing partnership with Mexico similar to the current partnership with Canada. Unlike Canada, however, Mexico does not collect data on all inbound travelers or have the infrastructure to do so. Other possible methods of completing the land exit system face compliance concerns and appear vulnerable to fraud.

At airports, seaports, and land pedestrian crossings, the necessary technology is available and a biometric solution appears within reach. However, only real-world testing can prove a solution's viability. Previous DHS pilots provided valuable information, but matches based on the biometric data collected were *less* accurate than what DHS currently achieves with biographic data. DHS is currently engaged in another round of technical and logistical assessments, with a goal of piloting new approaches based on a variety of new technologies in 2015.

Implications

Improvements to law enforcement ultimately determine an entry-exit system's value for both immigration and national security purposes. Because the entry capability is complete, analysis of the potential benefits focus on completing the exit system, including the value of biographic versus biometric data.

With respect to immigration, exit data would make some enforcement practices more efficient. Notably, however, exit records would provide little benefit for the removal of current overstays encountered through routine contact with law enforcement—the dominant mechanism by which unauthorized immigrants are currently located and removed. Law enforcement officers do not need exit records to determine whether an individual in custody has exited the United States. The potential benefits of an exit system for immigration enforcement break down as follows:

- **Statistical purposes**. An entry-exit system can generate statistics that help the government determine the effectiveness of its enforcement efforts, the size of the

overstay population, and country eligibility for special admission programs like the Visa Waiver Program. Biographic data would be sufficient for these purposes.

- **Denial of admission or visas**. The ability of DHS and the U.S. Department of State (DOS) to deny admission or visas to people who overstayed in the past would improve. Biometrics would enhance this capability by increasing confidence in these denials.

- **More efficient enforcement**. A complete exit system would reduce the need to pursue leads for individuals who already departed or adjusted status. Compared to biographic capability, biometrics would add a modest amount of additional efficiency through more accurate matches.

- **Additional interior enforcement.** In theory, DHS could use an accurate overstay identification capability as part of stepped-up interior enforcement. However, although exit records would indicate that individuals had not left the country, they would not help law enforcement locate the individual, nor would they ensure the substantial increase in enforcement resources that such a strategy would require.

For criminals and terrorists, the entry capability is most important because it enables the Department of State (DOS) and CBP to ensure that known dangerous individuals never enter the country in the first place. Depending on the accompanying immigration enforcement strategy, exit capability would also enable DHS to sweep up some dangerous individuals whose malicious intent is not known at the time of entry. The major potential benefit of exit records is information about whether a dangerous criminal or terrorist has left the country. In order for this information to be trustworthy, however, confidence in it would have to be extraordinarily high—if the system was too susceptible to fraud, criminals could disguise their presence in the country by creating a false record of exit.

Based on our review of the entry-exit system's current state of implementation, challenges, and options for moving forward, several key observations can be made:

- Biometric identifiers have greater potential for accuracy than biographic, but this benefit has not been proven in real-world settings. Additional testing and piloting will be needed to prove capability.

- Exit records offer little value for overstays who come into contact with law enforcement—the dominant way unauthorized immigrants are currently identified and removed. The key benefits of exit records would be to (1) enable the government to deny future visas or admission on the basis of past overstays and (2) improve the efficiency of enforcement by reducing the number of dead-end overstay investigations for individuals who already left the country. A biographic system could provide the bulk of these benefits.

- The southern land border presents a significant barrier to completing the exit system. These challenges will be difficult to overcome in the near- or medium-term.

- If DHS were to implement a biometric exit system before all logistical and technical questions are answered, it would be unlikely to provide the full benefits it is designed to achieve.

Introduction

Discussions about preventing unauthorized immigration often focus on the U.S. border with Mexico—and more specifically, securing the areas between legal ports of entry (POE). Equally relevant to border security are the POEs themselves, where legal entry of people and goods occurs under the direction of U.S. Customs and Border Protection (CBP)—the agency charged with securing America's borders. Between the POEs, CBP's Border Patrol officers mostly focus on preventing illegal entries and illicit trade. At the ports themselves, however, CBP must balance its prevention and security efforts with another imperative: to facilitate the efficient flow of commerce and travel.

About 40 percent of the unauthorized immigrant population originally entered the country legally through a land, air, or sea port. Subsequently, these individuals overstayed their authorized period of admission, falling out of legal status. Overstays are often referred to as "visa overstays" or "visa overstayers." Including the term "visa" is technically incorrect because (1) many visitors are admitted without visas and (2) DHS inspectors, not visas, ultimately determine an individual's authorized period of admission.[1]

Automated entry-exit tracking was originally conceived as a tool for immigration control and enforcement. In 1981, the Select Commission on Immigration and Refugee Policy recommended "a fully automated system of nonimmigrant document control … to allow prompt tracking of aliens and to verify their departure."[2] The first legal requirement for an entry-exit system was enacted in 1996.[3] After the events of September 11, 2001, entry-exit tracking also became viewed as a national security asset. The 9/11 Commission recommended that DHS, "properly supported by Congress, should complete, as quickly as possible, a biometric entry-exit screening system, including a single system for speeding qualified travelers."[4] Soon thereafter, biometric identifiers (such as fingerprints, photographs, or iris scans) became part of the entry-exit mandate. Previously, only biographic data (text data including names and birthdates) were required.

An entry-exit system's essential function is to match foreign visitors' arrival records to subsequent departure records. If the system included all arrivals and all departures, DHS could determine whether and when individuals depart the country and identify those who overstay their period of admission.

In order to establish a high level of confidence in the entry-exit data, the system would have to cover all land, air, and sea POEs. The more POEs or travelers are omitted from entry or exit tracking, the less confident DHS can be that an individual actually overstayed. Today, biometric entry capability is fully deployed, and biographic exit capability is deployed everywhere but the land border with Mexico, where vehicle travelers depart the country at speed and no systematic or mandatory collection occurs. This is a large gap, since about 45 percent of all entry inspections—land, air, or sea—occur at the southwest land border.[5]

The southwest land border presents the greatest challenge to completing the entry-exit system. Land POEs have about five entry lanes for each exit lane, and a variety of

challenges, most notably insufficient space and economic impacts, prevent the construction of an exit infrastructure that "mirrors" the entry system. Other potential southern border solutions may be years away.

At airports and seaports, a biometric solution appears technologically feasible. A large gap exists, however, between technological feasibility and real-world implementation. In the air and sea environments, DHS is still working to develop and test a concept of operations that fulfills biometric identifiers' considerable potential to produce accurate matches, while minimizing impacts to the already crowded travel environment. Implementing a system that is likely to work as intended will require further research and development, followed by an iterative rollout that enables DHS to apply early lessons to later adopters.

This report describes the progress, challenges, and potential approaches for implementing biometric and biographic entry-exit capabilities at America's POEs. It observes that although a biometric exit capability has considerable potential that fully justifies its pursuit, the enforcement benefits may be less significant than commonly believed, especially for immigration purposes.

Background

The Overstay Population

People may overstay their terms of admission for a variety of reasons, ranging from work to family reunification to the desire to engage in criminal or terrorist activity. Available estimates contend that overstays make up a significant share of the unauthorized immigrant population. The oft-cited statistic that 40 percent of unauthorized immigrants are overstays is a ballpark average of several estimates published over time, most recently by the Pew Hispanic Center in 2006 (Table 1).

Table 1. Estimates of the overstay population.

YEAR*	SOURCE	NUMBER OF OVERSTAYS	SHARE OF UNAUTHORIZED IMMIGRANTS
1990	INS[6]	1.4 million	39%
1996	INS[7]	2.1 million	41%
2000	INS[8]	2.3 million	33%
2002-2004	GAO[9]	Not estimated	27-57%
2006	Pew Hispanic Center[10]	4.5 to 6 million	40-50%

* Year indicates the year to which the estimate applies, not the year of publication.

Little information is available about characteristics of the overstay population, and the population estimates above rely on old data. The INS and Pew estimates in Table 1 all rely on a 1992 INS estimate of overstay rates by country, which were projected forward using per-country estimates of the unauthorized immigrant population.[11] The Government Accountability Office (GAO) used three extant data sources to estimate the population: self-identified former overstays in a 2002 survey of more than 1,000 green card holders (31 percent), sweeps for unauthorized workers with access to critical infrastructure (27 percent), and an operation that identified unauthorized workers at a retail chain (57 percent).[12] Despite their weaknesses, these are the best available estimates.

Legislative Overview

An automated entry-exit system was first mandated by the Illegal Immigration Reform and Immigrant Responsibility Act of 1996 (IIRIRA). The FY1999 Omnibus Consolidated and Emergency Supplemental Appropriations Act added a requirement that the entry-exit system "not significantly disrupt trade, tourism, or other legitimate cross-border traffic at land border ports of entry."[13] The Data Management Improvement Act of 2000 (DMIA) replaced these initial entry-exit requirements in their entirety, mandating implementation of an entry-exit system at airports and seaports by the end of 2003, at the 50 highest-volume

land POEs by the end of 2004, and all remaining POEs by the end of 2005. DMIA also stipulated that its requirements could not be used to justify new documentary or data-collection requirements for any person.[14]

Requirements for biometric identification were introduced after the September 11 attacks raised concerns over the reliability of biographic data for identity verification. The 9/11 Commission recommended a biometric entry-exit solution, but also advised that a fully biometric system was not feasible in the near term. Where biometrics are unavailable, the Commission suggested the use of biographic data: "While the gradual introduction of biometric identifiers will help, that process will take years, and a name match will always be useful."[15]

The Enhanced Border Security and Visa Entry Reform Act of 2002 required all POEs to be equipped for biometric authentication of all entry documents issued to foreigners, again accompanied by a requirement that the technological upgrades facilitate "the flow of commerce and persons at ports of entry."[16] This system was administratively named the United States Visitor and Immigrant Status Indicator Technology (US-VISIT) by the Immigration and Naturalization Service (INS). Following the 2003 creation of DHS and corresponding abolishment of the INS, US-VISIT was transferred to DHS. The Intelligence Reform and Terrorism Prevention Act of 2004 (IRTPA) required biometric exit data collection from all individuals who provided biometric entry data under US-VISIT.[17] IRTPA also required DHS to inspect passports or other secure travel documents for all travelers, including U.S. citizens.

Summary of Implementation

DHS implemented biometric entry largely in accordance with statutory deadlines, with full implementation at all but two POEs by the end of 2005.[18] However, exit tracking capability has posed more of a challenge. Exit capability is currently limited to biographic data and is not collected at the southern land border. Table 2 summarizes the current extent of entry-exit implementation, which the following sections describe in detail.

Table 2. Current extent of entry-exit implementation.

		LAND	AIR	SEA
ENTRY	Biographic	Noncitizens via document validation at CBP primary inspection.	Noncitizens via carrier transmission of manifest data. Data validity confirmed at CBP primary inspection.	Noncitizens via carrier transmission of manifest data. Data validity confirmed at CBP primary inspection.
	Biometric	Noncitizens (except most Canadians and Mexicans) via fingerprint and photograph collection at CBP secondary inspection.	Noncitizens via fingerprint and photograph collection at CBP primary inspection.	Noncitizens via fingerprint and photograph collection at CBP primary inspection.
EXIT	Biographic	*Northern border*: Noncitizens via data exchange with Canada. *Southern border*: Voluntary return of form I-94.	Noncitizens via carrier transmission of manifest data.	Noncitizens via carrier transmission of manifest data.
	Biometric	None.	None.	None.

Note: Although data are collected for most noncitizens, some travelers are exempt. For more information on exceptions, please see the "Land Ports" and "Airports and Seaports" sections.

Overstay Analysis and Enforcement

Congress recently reorganized DHS's entry-exit-related functions. From FY 2008 to FY 2012, the US-VISIT program was coordinated out of the National Protection and Programs Directorate, and in FY 2006 and FY 2007, it was a standalone office within DHS.[19]

For FY 2013, Congress realigned US-VISIT's functions, placing all operational responsibility for the entry-exit and overstay identification missions within the appropriate operational components. The overall mission of managing and coordinating the collection of biographic and biometric entry and exit data was transferred to a new Entry/Exit Transformation Office within CBP, the agency charged with securing and managing the nation's borders. Responsibility for identifying overstays through overstay analysis was transferred to Immigration and Customs Enforcement (ICE), the agency that conducts interior immigration enforcement. The remaining US-VISIT operations were moved to the new Office of Biometric Identity Management.[20] These functions include maintaining and operating the biometric database, conducting biometric matching operations for DHS and other agencies that access the biometric database, and managing biometric watch lists.

Within ICE, responsibility for overstay analysis lies within the Homeland Security Investigations (HSI) directorate. To identify an overstay, HSI's Overstay Analysis Unit (OAU) needs two key pieces of information: (1) the date the person's legal status expired and (2) evidence that confirms whether and when the person exited the country. The most obvious evidence to confirm exit is the exit record itself—determining whether people *who have already left the country* departed on time. For this population, a previous overstay may disqualify them from receiving a visa, using the Visa Waiver Program, or being

admitted to the United States in the future. Under the Immigration and Nationality Act (INA), more than 180 days of illegal presence is punishable by a three-year bar against re-entering the country, and more than 365 days of illegal presence is punishable by a ten-year bar.[21] In addition, under the INA, the valid visa of an individual who overstays their period of admission is automatically deemed void and the individual must apply for a new visa in their home country.[22]

To identify potential in-country overstays, OAU starts by using a variety of algorithms to match arrival records to corresponding departure records. According to DHS, about 20 to 25 percent of arrival records cannot be linked to a departure record.[23] An "unmatched arrival record" indicates one of three possibilities: (1) the individual is an overstay, (2) the individual lawfully extended their stay or changed to another legal status, or (3) the individual departed the country without a record of exit. The last group may be due to data errors or departure through a port where exit data is not currently collected (see Table 2).

To sort through these possibilities, OAU provides those unmatched arrival records to the Counterterrorism and Criminal Exploitation Unit (CTCEU). CTCEU reviews the leads, closing out instances in which other information indicates that the individual left the country, legally extended their stay, or adjusted to another immigrant or nonimmigrant status. The remaining individuals are potential overstays. CTCEU prioritizes these leads based on potential threats to national security and public safety. It forwards high-priority leads to HSI field offices for investigation, and sends non-priority records to Enforcement and Removal Operations (ERO) for routine enforcement action.[24]

Based on data obtained by the GAO, Table 3 summarizes the outcomes of CTCEU processing of unmatched arrival records between 2004 and 2012. CTCEU closed nearly two-thirds of the potential overstay records (unmatched arrival records) on the basis of automated checks that confirmed subsequent departure or adjustment of status. About 6 percent of the remaining potential overstays were assigned to HSI field offices for investigation. GAO did not report an outcome for about 5,000 of the leads assigned to HSI field offices, presumably because these investigations had not been closed. Of the cases with a reported outcome, about 23 percent of investigations resulted in arrest, 49 percent had departed the country or were in a legal status, and 28 percent were unresolved after all viable leads were exhausted (i.e., ICE could not locate the

Table 3. CTCEU processing of potential overstays, FY 2004-2012.

Records imported	2,260,900
Records processed†	2,211,600
Closed records	1,447,000
Non-priority records	700,200
Nonviable leads	19,900
Viable leads assigned to field offices	44,500
Arrests	9,000
All leads exhausted	11,100
Departed	9,900
In-status	9,700
Unknown*†	4,800

Source: GAO-13-683.

Note: GAO specified that the number of arrests was approximate. GAO provided exact figures for the "All leads exhausted," "Departed," and "In-status" categories. All other categories were rounded to the nearest 100.

* This likely represents the number of investigations that were not closed. For more information, see endnote 25.

† Calculated.

individual or confirm their exit). These figures are nearly identical to those calculated from a 2011 GAO report, which reported only on closed investigations for 2004-2010.[25]

Databases and Interoperability

At least a dozen interconnected databases play a role in recording entry-exit data and screening foreigners at POEs and consular offices abroad. Central to entry-exit is the Arrival and Departure Information System (ADIS), the main database DHS uses to identify overstays. ADIS contains records on more than 280 million unique foreign travelers, which include biographic arrival and departure information as well as Fingerprint Identification Numbers (FIN).[26] Based on FINs, ADIS interfaces with the Automated Biometric Identification System (IDENT), which contains fingerprint and photograph data. IDENT contained 161 million unique records in FY 2013, up from 95 million in FY 2008.[27] In turn, ADIS and IDENT interface with several other databases that provide travel and criminal history data to CBP officers at POEs, consular officers abroad, and law enforcement agencies.

Efforts to make databases interoperable have been critical to DHS efforts to enhance entry and exit screening over the past decade. In 2003, in partnership with the DMIA Task Force, the Los Alamos National Laboratory analyzed 50 key data systems from DHS, DOS, DOJ, and other agencies relevant to U.S. border management operations, including 14 data systems that contained biometric data. Less than half of these 50 systems were deemed adequately integrated.[28]

DHS efforts to enhance interoperability have yielded significant progress. After an 11-year process, DHS fully integrated IDENT with the FBI's national fingerprint and criminal history system, the Integrated Automated Fingerprint Identification System, and deployed this capability at all CBP and Border Patrol locations in 2010.[29] In April 2013, ADIS began automatically receiving complete information from the Student and Exchange Visitor Information System (SEVIS), enabling ICE's overstay analysis efforts to more fully and accurately account for whether foreign students have violated the terms of their stay. Recent improvements in ADIS-IDENT interoperability also allow more complete matching of individual entry records with changes of status.[30] In September 2013, DHS reported its intention to move all overstay case management work to a single platform in mid-2014.[31]

These and other improvements greatly enhanced the ability of DHS, DOS, and other agencies to obtain accurate and current information regarding whether an individual has overstayed or otherwise violated their terms of stay. This informs enforcement decisions as well as future visa and admissions decisions (by consular and CBP officers, respectively).

Facilitating Commerce and Travel

The entry-exit mandate inherently sits in tension with another key DHS responsibility: facilitating legitimate commerce and travel. DHS's mandate is not just to construct a biometric entry-exit system, but to construct one that avoids adverse impacts on commerce and travel. In 2013, U.S. trade with Canada and Mexico was valued at about $1.14 trillion,

and CBP conducted more than 240 million inspections at land borders alone.[32] Meanwhile, international tourists spent more than $180 billion in the United States in 2013.[33] Entry or exit data-collection processes that substantially impede legitimate cross-border traffic would, in turn, cause substantial economic harm.

Existing POEs are already strained. The challenge is especially great at Land POEs, where most entry and exit points were constructed during the 1960s or earlier—an era with far less cross-border traffic and fewer inspection requirements.[34] GAO has attributed weaknesses in CBP's inspections to staffing shortages, and CBP's staffing model has identified a need for 3,811 additional officers. The resulting delays harm the economy. Bloomberg Government analysts estimated that existing delays at the southern border cost the economy $7.8 billion in 2011; another study found that delays at California land POEs cost the United States $3.9 billion in economic output and more than 30,000 jobs in 2008.[35] Meanwhile, the U.S. Department of Commerce projects a 20 percent increase in international visitors to the United States between 2013 and 2018.[36]

In its report, the 9/11 Commission cited concerns about impacts on legitimate trade and travel, contending that "[o]ur border screening system should check people efficiently and welcome friends." Reflecting the importance of these concerns, trusted traveler programs were the first named aspect of the biometric entry-exit system described by the Commission: "The Department of Homeland Security, properly supported by the Congress, should complete, as quickly as possible, a biometric entry-exit system, *including a single system for speeding qualified travelers*" (emphasis added).[37]

DHS substantially expanded trusted traveler programs in recent years (Figure 1). Trusted traveler programs offer expedited processing for pre-screened, low-risk passengers. The number of admissions through trusted traveler programs nearly doubled between FY 2010 and FY 2013, as did the share of all POE admissions through a trusted traveler program (from 4.5 percent to 7.9 percent).[38] Between January 2013 and April 2014 alone, total membership increased by more than one million, or 67 percent. These programs are essential to DHS efforts to expedite and expand entry data collection at land POEs.

Figure 1. Trusted traveler admissions and membership, FY 2005–2014.
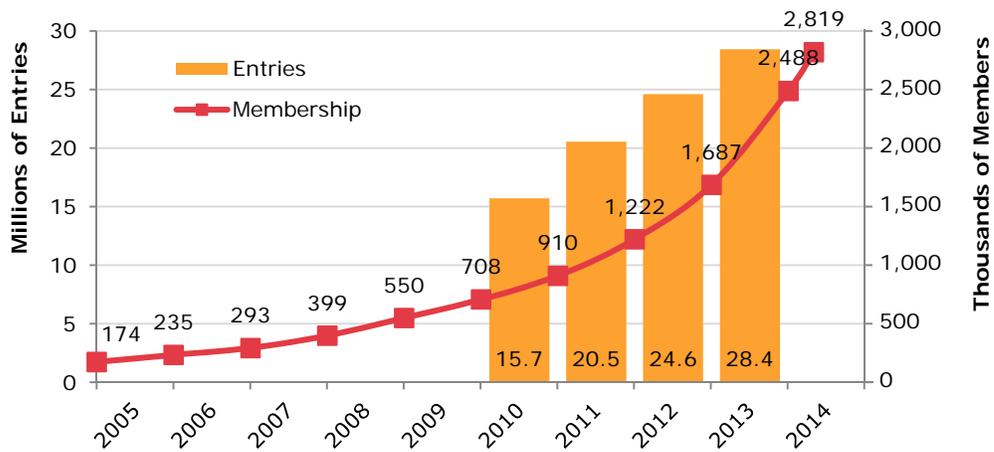
Source: CBP.[39]

Note: The number of members applies to January 1 of the year except the second point in 2014, which represents April 24, 2014. All entry statistics apply to the fiscal year. Table 4 contains by-program membership statistics.

DHS currently administers four trusted traveler programs: NEXUS, SENTRI, FAST, and Global Entry. A single data system, the Global Enrollment System, handles the enrollment and vetting process for the four programs. Each program requires a similar application process, featuring background checks, a personal interview with a CBP officer, and a ten-fingerprint law enforcement check.[40] Every 24 hours, CBP conducts recurrent vetting checks against FBI databases and revokes the membership of anyone whose eligibility has changed. Table 4 provides more detail regarding each program's characteristics.

Table 4. Trusted traveler programs.

	Applicable to	Air	Land	Membership	
Global Entry	- U.S. citizens and lawful permanent residents, Dutch citizens, South Korean citizens, Mexican nationals. - Air POEs and preclearance facilities.	- Expedited processing at 44 airports (34 U.S., 8 Canadian preclearance, 2 Ireland preclearance). - Use automated kiosks. - Present machine-readable documents. - Fingerprints verify traveler identity.	Not applicable. Global entry only available at air POEs.	Pre-2009 1/1/2009 1/1/2010 1/1/2011 1/1/2012 1/1/2013 1/1/2014 4/24/2014	0 5,218 30,855 100,334 246,217 511,946 1,103,918 1,352,535
NEXUS (not an acronym)	- Citizens or permanent residents of the U.S. or Canada. (CBP, "Nexus Eligibility and Fees") - Travel between the U.S. and Canada. - Air, land, and sea* POEs.	- Same benefits as Global Entry. - Use automated kiosks. - Present machine-readable documents. - Iris scans verify traveler identity at Canadian airports; fingerprints at U.S. airports.	- RFID-enabled card identifies travelers. - Access to express lanes at 20 northern border POEs. - Average processing time, FY2013: 19 seconds per vehicle (vs. 49 seconds for general lanes).	1/1/2005 1/1/2006 1/1/2007 1/1/2008 1/1/2009 1/1/2010 1/1/2011 1/1/2012 1/1/2013 1/1/2014 4/24/2014	74,851 94,911 113,437 158,564 263,995 376,243 490,621 624,443 780,521 938,144 1,006,832
SENTRI Secure Electronic Network for Traveler's Rapid Inspection	- Not limited to any particular nationality. - Land POEs between the U.S. and Mexico (19% of all cross southwest border traffic in FY2013).	Not applicable. SENTRI available only at Land POEs.	- RFID-enabled card identifies travelers. - Access to express lanes at 10 southern border POEs. - Average processing time, FY2013: 22 seconds per vehicle (vs. 64 seconds for general lanes).	1/1/2005 1/1/2006 1/1/2007 1/1/2008 1/1/2009 1/1/2010 1/1/2011 1/1/2012 1/1/2013 1/1/2014 4/24/2014	76,030 81,988 109,831 156,237 186,024 208,567 238,523 272,681 316,290 367,910 380,408
FAST Free and Secure Trade	- Cargo equivalent of SENTRI, NEXUS. - Commercial carriers and truck drivers at US-Canada and US-Mexico land borders.	Not applicable. FAST only available at Land POEs.	- Transponder technology identifies travelers. - Access to express lanes at 17 northern and 17 southern border POEs.	1/1/2005 1/1/2006 1/1/2007 1/1/2008 1/1/2009 1/1/2010 1/1/2011 1/1/2012 1/1/2013 1/1/2014 4/24/2014	23,424 57,664 70,124 84,127 94,387 92,680 80,557 78,637 77,751 77,987 79,704

Source: DHS. [41]
*NEXUS benefits at Sea POEs are similar to those at Air POEs.

Land Ports

Over the past ten years, DHS greatly increased its capacity to collect entry data from travelers at land ports. Land POEs process commercial and passenger vehicle and pedestrian traffic. In FY 2012, vehicles constituted about five-sixths of land POE traffic.[42] Biometric entry capability was deployed for nearly all non-Canadians and Mexicans at all but two land POEs by the end of 2005, in accordance with the statutory deadline.[43] For individuals not subject to biometric enrollment, universal document inspection has been deployed through the Western Hemisphere Travel Initiative (WHTI), which enables biographic data collection on all foreign travelers entering through land POEs.

On the northern border, the United States deployed a biographic exit capability in July 2013 under the Beyond the Border Action Plan,[44] which established a partnership wherein Canada's entry data is used as the United States' exit data. This data exchange is possible because Canada has entry inspection facilities at every location on the shared land border where travelers depart the United States.

On the southern border, departures are not tracked, with the exception of people who return form I-94[*] out of their own initiative. Mexico does not maintain similar facilities to Canada for inspecting arriving individuals at land borders, meaning that a despite ongoing negotiations to establish a similar partnership, sharing data on the southern border would require additional infrastructure.

There are key challenges to constructing the infrastructure on the U.S. side that would be needed to duplicate or "mirror" the entry process (i.e., conduct inspections similar to those that occur on entry). The two other most-cited potential solutions—at-speed radio frequency identification (RFID) and cross-border kiosks—each present hurdles that would make near-term implementation of an adequate southern border exit solution very difficult.

Progress

ENTRY

DHS collects biometric entry data (fingerprints and photographs) during secondary inspections at 154 land POEs. Secondary inspection applies to all individuals who require nonimmigrant visas to enter the United States, individuals who arouse suspicion, and a small sample of randomly selected individuals. Most Canadians and Mexicans arriving from contiguous territory (i.e., their home country) do not require a visa to enter if they present a valid passport, trusted traveler card, or a Border Crossing Card (BCC).[45] This excludes a large majority of visitors from biometric enrollment. Between FY 2010 and FY 2013, about 14 percent of individuals arriving at land ports were subject to secondary inspection.[46] This is consistent with the 9/11 Commission's entry-exit vision. The Commission wrote that,

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[*] Traditionally, form I-94 was the arrival/departure record issued to certain noncitizens. Travelers were supposed to return this form upon departure, but compliance was low, particularly at land POEs. In 2013, CBP stopped issuing paper I-94s to entrants at airports and seaports, switching to electronic records. Travelers who need proof of admission may now access and print a copy of their entry record online at cbp.gov/i94.

"programs to speed known travelers should be a higher priority, permitting inspectors to focus on greater risk. The daily commuter should not be subject to the same measures as first-time travelers. … The solution, requiring more research and development, is likely to combine radio frequency technology with biometric identifiers."[47]

DHS has also significantly improved screening and biographic data collection for the 86 percent of travelers who are subject only to primary inspection. Until 2009, U.S. citizens could enter the country based on a verbal declaration of citizenship; Canadians were not subject to strict identity requirements.[49] Though drivers' travel documents were generally scanned, passengers' documents were not consistently checked, and BCCs for Mexican nationals were not generally scanned for vehicle traffic.[50] The 9/11 commission identified this as a key vulnerability.[51]

Pursuant to the Commission's recommendations, in June 2009, WHTI required all travelers entering the United States, including U.S. citizens, to present proof of citizenship or travel authorization using biometrically verifiable documents such as passports, passport cards, trusted traveler program cards, enhanced driver licenses, or BCCs.[52] The verification capability enables CBP officers to scan the document and retrieve data from the source.[53] Officers compare this information with the document in hand, and compare the picture with the individual presenting the identity. Under WHTI, RFID chips are now included in a variety of identification documents, including passport cards, enhanced driver licenses, trusted traveler cards, enhanced permanent resident cards, and BCCs.[54] The Land Border Integration program leverages WHTI capabilities in other areas, including pedestrian entry traffic.[55]

Treatment of Pedestrian Traffic

Pedestrians are subject to the same documentary requirements as vehicle travelers, but the logistics are quite different. In fact, the logistics for pedestrian inspections at land POEs are more similar to airports and seaports than they are to land vehicle inspections.[48] Therefore, while this section reviews progress on pedestrian entry and exit processing, the "Airports and Seaports" section below sheds more light on potential approaches for collecting pedestrian exit data.

Even though land pedestrian exit solutions are considered with airports and seaports, the state of implementation is not the same. Unlike airports and seaports, no mandatory exit capability exists for land pedestrians at the southern border.

Today, WHTI and expanded trusted-traveler programs (see above) enable CBP to record land border entries more completely than ever before. Since 2010, DHS has inspected biometrically verifiable travel documents from 100 percent of land entrants.[56] About 98 percent of land border travelers are subject to law enforcement queries, compared with just 5 percent in 2005.[57] WHTI and trusted traveler programs played a large role in making this possible. By FY 2013, nearly 23 million RFID-enabled documents were in the hands of travelers, and 50 percent of law enforcement queries were processed through RFID (Figure 2).

For both vehicles and pedestrians, Ready Lanes and dedicated trusted traveler lanes are equipped to process travelers with RFID-enabled documents. As Ready Lane vehicles approach CBP inspection booths, the RFID chips signal CBP officers' computers to pull up

traveler information. This enables CBP officers to focus their full attention on the individuals in the vehicle (as opposed to scanning documents).[58] New Active Lane Management technology helps CBP deploy this capability efficiently by enabling it to switch lanes between RFID-enabled and general processing. For pedestrians, Ready Lane kiosks process about 60 percent of pedestrian traffic at the seven locations in which they have been deployed, and about 33 percent of overall southwest border pedestrian traffic. Compared with the general pedestrian lanes, Ready Lane kiosks reduce average wait times from 17 minutes to 7 minutes.[59]

Figure 2. RFID document deployment under WHTI, FY 2009-2013.
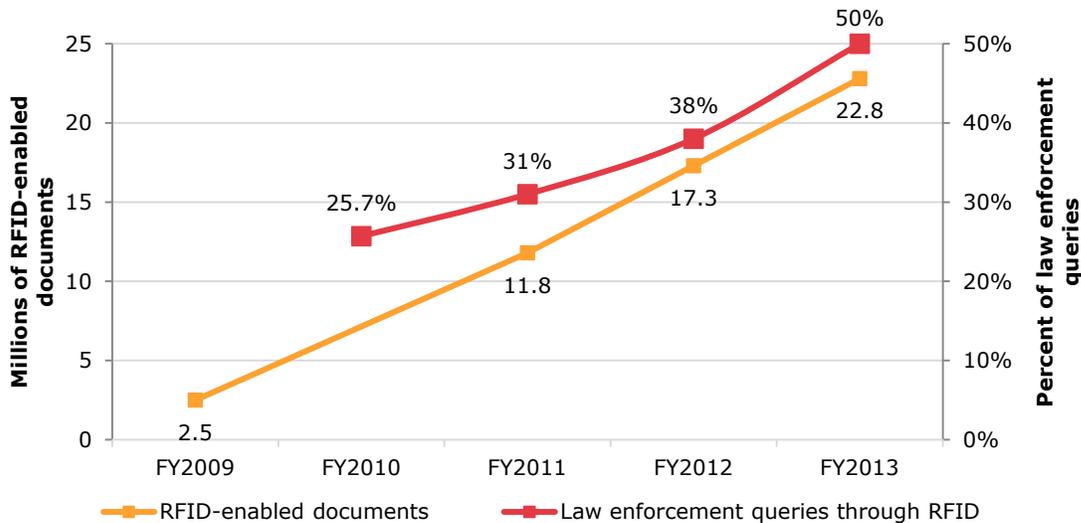
Source: DHS.[60]

EXIT

At land POEs, infrastructure does not exist on the U.S. side of the border to track the exit of travelers with biographic or biometric data. As described in detail below, DHS has judged that building an infrastructure that would duplicate or "mirror" the entry process would not be possible at many POEs due to a lack of space. Where space exists, constructing this infrastructure would involve major land acquisition and extensive environmental assessments. Due to these challenges, as well as concerns over cost and the impact on trade and travel, DHS has focused on other land border exit options.

At the northern border, the United States uses Canada's entry data as U.S. exit data through the Beyond the Border data-sharing partnership. Data-sharing launched as a four-POE pilot in October 2012 and expanded to all major shared POEs in July 2013.[61] Between July 2013 and September 2013, DHS was able to match more than 98 percent of Canadian records to an existing U.S. entry record; by comparison, DHS can match about 97 percent of exit records it collects to a U.S. entry record.[62] Currently, Beyond the Border only shares data for non-U.S. and non-Canadian citizens. According to CBP, the exchange will cover all travelers, including U.S. and Canadian citizens, by June 30, 2014.[63]

Since 2013, CBP's Southern Border Biographic Exit Initiative has investigated data-sharing with Mexico.[64] Unlike Canada, Mexico does not collect data on all entrants or have the infrastructure to do so. Currently, U.S. exit data collection at the southern border is limited

to individuals who return the exit portion of form I-94 at their own initiative.[65] Traditionally, form I-94 was issued to all foreign travelers entering the United States. In 2013, DHS discontinued the use of paper I-94s at airports and seaports, switching to electronic records.[66] Travelers who need proof of admission now access and print the record online.

Vehicle Exit: Options and Challenges

Due to infrastructure challenges, space constraints, and the need to facilitate commerce, stakeholders are in near-universal agreement that vehicle traffic at land borders presents the greatest challenge to completing an entry-exit system. To date, the leading options for completing the exit system are data-sharing partnerships with Canada and Mexico, kiosks located on the other side of the border, and at-speed RFID collection. Table 5 summarizes the main challenges to implementing comprehensive exit capabilities at land borders, which are explored in more detail below.

Table 5. Land exit options and key challenges.

SOLUTION	KEY ADVANTAGES	KEY CHALLENGES
Mirror infrastructure	- Mimicking the entry infrastructure would capture equivalent exit data.	- Insufficient space precludes this option at most land ports. - Time-intensive land acquisition, environmental assessments, and operational planning would delay implementation. - Impact on commerce.
Data-sharing partnerships with Canada and Mexico	- No new U.S. infrastructure requirements. - If Mexico collected all of the same entry data as the U.S. and Canada, all exits from the U.S. would be recorded.	- Mexico does not collect the needed data or have the infrastructure to do so. - Mexico's data systems are currently not compatible. - Requires negotiating international agreements for the sharing of biographic data (with Mexico) and/or biometric data (with Mexico and Canada). - Impact on commerce would be less than under a mirror system, but would still require more inspections than occur now (at the Mexican border).
Cross-border kiosks	- Travelers would not have to stop for border inspection, avoiding adverse impacts on commerce. - Little to no POE expansion required.	- Challenge in ensuring compliance. - Negotiating and coordinating with foreign governments for placement, maintenance, and security of kiosks. - Reliability of kiosk operation (a) in harsh climates and (b) without CBP presence. - Kiosk user-friendliness. - Verifying that exit records are genuine.
At-speed RFID	- Travelers would not have to stop, avoiding adverse impacts on commerce. - Little to no POE expansion required.	- Challenge in ensuring compliance. - Would require issuance of RFID-enabled documents for all entrants at all POEs. - Technological hurdles, including (a) ensuring RFID readers will detect documents regardless of the document's location within the vehicle and (b) collection of RFID information for vehicles with more than one passenger. - Verifying that exit records are genuine.

MIRROR INFRASTRUCTURE

In theory, DHS could collect exit data by "mirroring" the process for individuals entering the country. Unlike most European border crossings, the United States did not construct its POEs with exit screening in mind,[67] and no infrastructure currently exists for tracking individual exiting passengers.[†] Vehicles currently exit the United States at speed, and the ratio of entry lanes to exit lanes is about 5:1.[68] A mirror solution would require DHS to build an equivalent number of lanes and inspection booths, with equivalent staffing, as now exists for the entry process. In 2005, DHS concluded that a mirror process would be "an infeasible alternative for numerous reasons, including but not limited to the additional staffing demands, new infrastructure requirements, and potential trade and commercial impacts."[69]

Insufficient space exists at land POEs to build a vehicle lane infrastructure that mirrors the entry system at every land POE. Most land entry and exit points were constructed during the 1960s or earlier, an era with far less cross-border traffic and fewer inspection requirements.[70] The most precise and current estimate of the lack of space was reported by the DMIA Task Force in December 2003. At that time, 117 (70 percent) of the nation's 166 land POEs had less than 75 percent of the space required to build a mirror infrastructure, including 64 (39 percent) that had less than 25 percent of the required space.[71] Even where adequate space exists for the POE infrastructure itself, the impact on the surrounding area is also an important consideration. At some POEs, even a small line for exit traffic would quickly have deleterious effects on traffic flows. For example, at the Detroit-Windsor Tunnel, "even if only a few vehicles were to be stopped at exit stations … departing vehicles would quickly back up onto the main streets of downtown Detroit."[72]

When US-VISIT officials presented a cost estimate for establishing a mirror system in 2003, congressional staff balked at the cost, and no further planning was pursued.[73] In order to pursue such a system now, a years-long process of operational assessments, land acquisition, and environmental assessments would need to occur before additional lanes and related infrastructure could be constructed.[74] Federal agencies control 820 (41 percent) of the 1,989 linear miles along the U.S.-Mexico border; this land includes sensitive ecosystems that would require time-intensive environmental impact assessments.[75] The remaining southern border land and much of the land along the northern border is privately held, requiring a "massive land acquisition for expanded [POE] plaza space."[76] Complicating this land acquisition, many POEs are situated next to commercial warehouses or buildings engaged in cross-border commerce.[77]

If a mirror infrastructure and exit process were established, other considerations would include staffing requirements and the impact on commerce. CBP reports that it has insufficient staff to manage entries; creating an outbound inspection system would require CBP to hire and train thousands of new agents. On the commercial side, because no exit inspection process currently exists, any amount of wait time would impede commerce when compared with the status quo.

[†] CBP, as part of its strategy to limit the smuggling of contraband, has built infrastructure at some outbound locations along the US-Mexico border, such as license plate readers at the DeConcini, New Mexico, POE, and in other locations. However, these operations generally do not inspect all vehicles or all passengers.

Some observers have proposed that "[t]he backbone of the solution for vehicular traffic would be trusted traveler RFID technology that exists at entry replicated in exit lanes" and that such a solution could be implemented "with little port infrastructure change."[78] While RFID does enable faster inspections for trusted travelers, current trusted traveler programs do not completely avoid the need for inspections—they simply expedite them. Vehicles still stop for passengers to present their documents to inspectors. Therefore, any solution that mimicked current trusted traveler programs would also require reconfiguring lanes, building booths, and paying staff.

AT-SPEED RFID

An at-speed RFID system would attempt to collect all the necessary data from travelers while minimizing the impact of potential delays of other exit solutions. Under this scenario, entering travelers would be issued RFID-enabled documents that could be read as travelers drove out of the country, without the vehicle slowing down. The infrastructure costs to support this option would involve the placement of RFID readers along all exit lanes at each land POE, and due to the automated nature of the process, personnel costs would be small relative to the above-described mirror system. This solution implicates three key factors: (1) accurately capturing RFID signals at speed, (2) universal deployment of RFID-enabled travel documents for all entering passengers for whom entry-exit data is required, and (3) verifying that the individuals, and not just their RFID-enabled document, actually exited the country.

Regarding the first point, DHS reported on its piloting of at-speed passive RFID capture in January 2005.[79] Although the results were not uniformly negative (or positive), the pilot did raise questions about the reliability of at-speed RFID capture. One reader technology, which clearly outperformed the others, detected 100 percent of tags that were placed on the seats, dashboard, or near the window. However, reliability declined if the RFID card was held between two fingers or placed in the glove box, and none of the four reader technologies could detect the RFID signal if the card was in the driver's pocket. DHS concluded that "some level of active participation by the traveler may be required" if RFID tags are to be read properly.

Even if compliance can be assured, other situations harmed reliability. RFID tags could not be read with any degree of reliability when multiple RFID documents were present in the vehicle. DHS reported that "when holding multiple passports (two or four) at the same time, the ability to read the tags, depending on the vendor, dropped from 30 to zero percent."[80] Reliability also declined for buses and for vehicles with tinted windows. Vehicle speed was not a major factor. While RFID technology may have improved to the point that none of these obstacles remain, further testing that addresses these and other obstacles is necessary before at-speed RFID capture can be considered reliable for exit purposes— especially given the level of accuracy that would be necessary to use exit data for enforcement purposes.

Second, the at-speed RFID solution would require DHS to issue an RFID-enabled document to all entering passengers, including air and sea entrants. This would likely require DHS to reinstate some version of physical I-94 documents at air and sea POEs, which were discontinued in 2013.[81] Further, it would require all travelers to remain in possession of

their RFID-enabled document until after departure, similar to the requirement for travelers to retain possession of the bottom half of paper I-94s.

Finally, DHS would need to ensure that the actual people, and not just their RFID-enabled document, left the country. CBP officers have long reported instances of people turning in another individual's I-94.[82] In the past, US-VISIT officials suggested that this problem could be solved by issuing RFID-enabled entry-exit cards with a built-in fingerprint reader technology. Passengers would place their fingers on the fingerprint reading section of the card as they passed the RFID readers. If successful, such devices could read an individual's biometrics at speed, thereby confirming that the document belonged to a traveler in the vehicle.

Although good data do not exist on the success of at-speed biometric reads, a number of potential challenges can reasonably be identified. First, the introduction of at-speed biometric scans would heighten compliance concerns associated with at-speed RFID by complicating the process. Second, DHS would need to consider the cost of deploying such technology. Third, DHS would need to ensure that drivers could safely and reliably complete the process while operating a vehicle at high speed. Finally, although at-speed biometric scans would likely create an additional deterrent effect, they would remain susceptible to the creation of false exit records by determined individuals. Over a decade ago, such systems could be defrauded through the use of fake fingers.[83]

UNMANNED CROSS-BORDER KIOSKS

DHS and others have suggested the possibility of collecting exit data using unmanned kiosks in Canada or Mexico. These kiosks could be placed at U.S. embassies or consulates, or at another location mutually selected by the two governments involved. Compliance could be encouraged by giving incentives to individuals, countries, and (where applicable) employers. For example, individuals could be barred from future entry if they did not visit a kiosk, countries could be threatened with consequences such as exclusion from the Visa Waiver Program, and employers of temporary workers could be required to post a bond that could only be collected once their worker visited a kiosk.[84]

DHS piloted a kiosk-based approach at the San Luis, Arizona, and Douglas, Arizona, POEs from December 2009 to September 2011.[85] Under the pilots, H-2A and H-2B temporary workers entering at either port were required to exit from one of those two ports and register their exit using kiosks. Participants were required to provide biographic information by scanning their visa or passport (or, if that failed, by entering the information manually), as well as a four-fingerprint biometric check. Additionally, participants were required to turn in Form I-94 at a lock box attached to the kiosk.[86]

DHS canceled the pilot in September 2011. Quantitative data on the program were not published, but in its notice of cancelation, CBP noted several challenges:

- Participants "had trouble understanding the requirements and using the kiosks."

- The pilot was designed to be automated, but CBP field personnel spent "considerable time and resources" assisting participants.

- Kiosks were "unreliable … due in large part to the harsh desert climate." Elsewhere, it has been reported that kiosks melted in the sun.[87]

- The departure area's layout "limited CBP's ability to ensure compliance."

According to CBP, the pilot "reinforced the need to gain a full understanding of the covered population's skill sets in order to craft effective public information materials and to utilize appropriate technology that will support a high degree of compliance." Additionally, CBP stated that in future pilots, it will seek to ensure that kiosk hardware and software can withstand harsh border climates.[88]

Other challenges exist as well. In 2005, DHS ruled cross-border kiosks infeasible "due to various political, coordination, and timing challenges of implementing the [exit] solution in another country."[89] The compliance issues with a pilot program that took place at POEs would seem to imply that larger compliance challenges for a system that required travelers to stop long after departing the country. Additionally, such a system may burden frequent travelers, which could discourage them from conducting business in or with the United States. Finally, as with at-speed RFID, unmanned cross-border kiosks could be susceptible to the creation of false records of exit, as well as sabotage or vandalism.

These challenges are not necessarily insurmountable. Kiosk placement in secure indoor locations could alleviate climate and vandalism concerns. Based on DHS's experience with Ready Lanes and other trusted traveler programs, kiosk usability could be improved. Supervision of the process could reduce the potential for fraud, although at greater expense. However, each of these solutions brings its own set of infrastructure requirements, staffing needs, and logistical challenges. For example, placing the kiosks indoors would require DHS to secure remote facilities, hire staff, and negotiate the logistics with foreign governments. Most importantly, if compliance cannot be ensured, the system would not function properly. Solutions that require the traveler to go out of their way (i.e., to another location) to record their exit are likely to have much lower compliance rates.

DATA-SHARING

A U.S.-Mexico data-sharing agreement modeled after the Beyond the Border partnership with Canada has been offered as a promising land exit solution. DHS is currently seeking to develop such a program with Mexico.[90] Unfortunately, Mexico does not currently have the physical infrastructure needed to collect entry data from every traveler entering from the United States, and DHS officials believe that integrating with Mexican data systems is likely to be more difficult than it was to integrate with Canada.[91]

Though DHS officials believe an operational Beyond the Border equivalent with Mexico is likely "years away,"[92] CBP launched the Southern Border Biographic Exit Initiative in 2013 to explore the possibility.[93] It is possible that a large financial commitment from the U.S. government could help overcome Mexico's present lack of data-collection capability. Chappell Lawson, a former CBP Director of Policy and Planning, told *The New York Times* in May 2013 that money was the critical issue in the negotiations.[94]

Under Beyond the Border, DHS obtains only biographic crossing data on travelers from Canada. Canada has been collecting fingerprints from refugee claimants and deportees since

1993, but only began collecting fingerprints from certain temporary visitors in 2013.[95] Mexico does not collect biometric data from travelers entering at the land border. Biometric data-sharing with either Canada or Mexico would require (1) the expansion or development of biometric collection capabilities by those countries and (2) the negotiation of new international agreements for the exchange of the biometric data.

Data-sharing with Canada has had negligible impact on travel and commerce, since all travelers are already required to stop at Canadian inspection plazas upon entry. The situation with Mexico is different. Mexico does not currently have formal entry inspections at all entry ports. In those locations where it does conduct entry inspections, it does not collect data from every traveler, instead randomly selecting a portion of travelers for inspection. Because a mirror system would require Mexico to increase the quality and quantity of its entry inspections, a data-sharing approach on the southern border would almost certainly have some adverse impact on commerce. However, the impact would be less than that of a mirror system built on the U.S. side of the border, which would require all travelers to stop on their way out of the United States regardless of whether they will be required to stop again once they enter Mexico.

Outlook

Each option presents obstacles that could prevent DHS from implementing biographic exit capability at the southern land border within the next few years. Even at POEs where space to mirror the entry infrastructure does exist, the process of planning, acquiring land, and conducting environmental assessments would prevent the project from commencing immediately. The at-speed RFID and kiosk approaches raise important questions regarding traveler compliance and the authenticity of exit records. Extensive piloting would be needed to determine whether these options are viable.

Data-sharing with Mexico offers a potential long-term solution. With the launch of the Southern Border Biographic Exit Initiative, it is the solution DHS is currently pursuing most vigorously. This solution would require substantial construction of new infrastructure on the Mexican side of the border in conjunction with an overhaul of data standards, and could be contingent on a substantial financial commitment from the United States. At least initially, such data-sharing would be limited to biographic data, as is currently the case with Canada. Until Canada and Mexico begin extensive biometric data collection from travelers, data-sharing agreements will not secure such data.

Combined approaches could address some of the shortcomings of any individual approach. For example, the United States could build as much infrastructure as possible on its side of the border, complemented by data-sharing agreements with Mexico. Single purpose and one-way POEs could speed commercial traffic through key corridors, augmented by remote kiosk check-ins for classes of nonimmigrant visa holders whose compliance could be counted upon. The implementation of any mixed solution will still involve the identification of adequate technology, thorough testing, and an operational assessment at every land POE.

For any solution, the impact on travel and commerce is also a key consideration. Implementing any new process would have some adverse impact on commerce compared with the status quo. In light of statutory mandates to facilitate legitimate travel and commerce, any land exit solution will require a determination of the level of economic impact that is acceptable.

Regardless of which approach is selected at land borders, biometric enrollment may be limited to foreign nationals that are not from Canada or Mexico. Currently, about 14 percent of incoming travelers are subject to biometric collection, with almost all of the remaining 86 percent being Americans, Canadians, or Mexicans. For these 86 percent of travelers, CBP officers compare the travel document photo with the person presenting the document, but no automated biometric check occurs. Although the 9/11 Commission recommended a "fully biometric" system, it was explicit that frequent travelers should not be subject to the same requirements as other travelers.

Given the current landscape, it seems unlikely that DHS could complete a land exit system on the border within the next few years. Implementing a biometric land exit system would take even longer.

Airports and Seaports

At airports and seaports, DHS currently operates a complete biographic entry-exit system that covers nearly all non-U.S. citizens. Additionally, DHS collects biometric data from nearly all non-U.S. citizens at the point of entry. However, DHS has not deployed biometric collection at the point of departure. Although the prospects for implementing biometric exit at air and sea POEs appear much better than prospects at the land borders, substantial logistical questions remain.

Treatment of Airports, Seaports, and Land Pedestrians

Conventionally, analyses of entry-exit solutions lump together airports, seaports, and land port pedestrians. For example, DHS evaluated the same set of solutions for airports and seaports for its 2008 proposed rule, and the DMIA Task Force noted that "[a] pedestrian inspection is very similar to one conducted in an air- or seaport."[96] Pedestrians constitute about one-sixth of land entries.[97]

Following this convention, this section's discussion of air, sea, and land pedestrian exit solutions focuses on airports. While the key considerations and technological requirements are similar, important differences may render some airport solutions more or less suitable. Among these differences:

- Unlike airports and seaports, most land POE crossers are from the United States or the neighboring country, including frequent crossers engaging in commerce. These individuals are typically familiar with inspection procedures.[98]

- As described above in the "Land Ports" section, there is no current exit infrastructure at land POEs, including for pedestrians. By contrast, biographic manifest data already constitute a complete air and sea exit system.

- Land pedestrian solutions must be suited to the deployed environment, including extreme outdoor conditions.

- TSA checkpoints do not exist at land or sea POEs.

- Compared to air and land POEs, most commercial seaports are not as well-suited for traditional inspection facilities. Although some seaports with cruise ship traffic boast inspection facilities very similar to those found in airports, seaport inspections are often conducted on ships or on the dock. Seaport solutions could require heavier use of mobile technology and/or the construction of additional land-based facilities.[99]

Progress

DHS currently operates a biographic entry-exit system based on carrier manifest data for air and sea ports. In both environments, before the aircraft or vessel departs for the United States, CBP uses the Advance Passenger Information System (APIS) to collect biographic manifest data on both passengers and crews.[100] These same data are collected for departing

international flights and vessels and matched to entry records. Manifest data collection became mandatory in 2008 and compliance is near 100 percent.[101] All travelers, including U.S. citizens, are included in the APIS data, but ADIS contains filters that aim to eliminate all data that pertain to U.S. citizens.[102] Additionally, based on information travelers provide when purchasing a ticket, air carriers submit Passenger Name Record (PNR) data to DHS up to 72 hours before departure.[103] According to CBP's FY 2013 Comprehensive Exit Plan, DHS is working to develop a similar capability in the sea environment.[104] Although PNR data are not imported into ADIS, they are used to confirm possible matches in APIS data.

Upon arrival at a U.S. air or sea POE, nearly all non-U.S. citizens are required to undergo biometric screening during primary inspection. DHS first deployed most aspects of this capability at 115 airports and 14 seaports in January 2004.[105] During primary inspection upon first entry, each individual's fingerprints and photograph are screened and stored in DHS data systems. Exceptions exist for Canadians arriving for business or pleasure, lawful permanent residents on cruises that begin and end in the United States, individuals younger than 14 or older than 79, and certain individuals on A, C, G, or NATO visas.[106] When the individual arrives with a visa issued at a U.S. embassy or consulate abroad, the collected biometric data is compared with that taken at the time of visa issuance. For returning travelers, the system compares the collected biometric data with that on file to make a match. The entire biometric database is regularly run against law enforcement and counter-terrorism systems to generate lookouts as appropriate. Until 2013, DHS also issued paper I-94 forms that travelers were required to surrender upon departure. Today, the forms are generated electronically, and individuals can access and print them remotely as needed.[107]

Biometric Exit: Options and Challenges

In May 2012, DHS concluded that based on previous pilots and available technology, the building blocks of biometric air exit are available, and that recent advances in traveler facilitation methods could help make the process more efficient.[108] However, the assessment also identified questions and challenges that have yet to be worked out through further analysis and testing. Once viable technologies and collection processes have been identified, the process will need to be tailored to each collection point's unique characteristics. As DHS Assistant Secretary for Policy David Heyman explained in March 2014, "It's not just a matter of getting a technology and using it, you need a concept of operations. You need to know it will work."[109]

CARRIER INVOLVEMENT

Over the past several years, the question of whether private carriers or DHS personnel should be responsible for collecting biometric air exit data has been a significant source of delays and controversy. In an October 2010 DHS memo identifying the three main obstacles to biometric air exit capabilities, two related to the dispute over whether carriers or DHS should collect the data.[110] In 2008, a proposed rule requiring airlines to collect departing foreign nationals' fingerprints and transmit them to DHS met fierce resistance from air carriers, and Congress subsequently overturned it through legislation.[111] In 2009, DHS conducted air exit pilots in Atlanta and Detroit, but could not test carrier collection scenarios because no airline was willing to participate.[112] In addition to airline resistance, DHS's

Regulatory Impact Analysis of the 2008 rule found that "carrier collection has the lowest degree of privacy of all alternatives since the biometric data must be collected by a private company and then transferred to the Government."[113]

Consensus seems to have emerged that air carriers should not be responsible for the collection of biometric exit data. In November 2013, two stakeholders on polar opposite ends of the immigration debate—the U.S. Chamber of Commerce (in a letter) and the Center for Immigration Studies (in testimony)—each described their opposition to carrier involvement to the House Judiciary Committee.[114] Although DHS has not explicitly ruled out carrier involvement, its FY 2013 Comprehensive Exit Plan suggests that it shares this concern: "the pilot programs reinforced the principle that impacts should be minimized on the airlines and travel authorities."[115]

CHECK-IN COUNTER COLLECTION

DHS has considered airline check-in counters as a possible location for biometric data collection, but increasingly, it appears that this option may be untenable. The expansion of online, mobile, and kiosk-based check-in has eliminated the need for many passengers to ever visit the check-in counter. Carrier personnel would likely have to conduct the biometric collection, raising the concerns regarding privacy and burdens on private industry described above. Finally, check-in counter collection would appear to create the greatest risk that an individual would create a false record of exit by checking in but not subsequently boarding the plane.

TSA CHECKPOINTS OR DEPARTURE GATES

The two most viable collection points for biometric air exit data appear to be at (1) TSA security checkpoints or (2) departure gates. In summer 2009, DHS piloted a TSA approach at Atlanta's Hartsfield-Jackson International Airport and a CBP at-gate approach at Detroit's Wayne County Airport. Based in large part on the results of those pilots, this section describes several key considerations for the TSA and at-gate approaches. Table 6 summarizes these challenges, and the following paragraphs discuss each in more detail.

TSA's large existing presence at U.S. airports is an advantage. TSA controls inspections at 450 federalized airports, including every airport with departing international flights, mostly with its own personnel but also through a handful of Screening Partnership Program agreements with private companies.[116] Deploying biometric exit capability at TSA checkpoints would still have infrastructure and personnel impacts, but no federal agency maintains a widespread presence at departure gates. If CBP were to staff a system that deployed at-gate collection nationwide, it would have to expand its presence. Currently, CBP only conducts inspections at airports with international arrivals, which excludes many small and medium sized airports that have international departures but no arrivals.[117] In 2009, 228 U.S. airports had outbound international flights, about twice the number at which CBP operates biometric entry screening.[118]

On the other hand, the TSA approach would be more vulnerable to the creation of false exit records. If exit records were collected at the TSA checkpoint, travelers could simply pass through security and then leave the departure area without boarding.[119] This vulnerability could be reduced if, unlike in the Atlanta pilot, TSA collected flight information alongside

Table 6. Key considerations for at-gate and TSA approaches.

	AT-GATE	TSA CHECKPOINT
False exit records	Less vulnerable due to proximity to the point of departure.	More vulnerable due to potential for travelers to not actually board their flight.
Space constraints	Case-by-case. The optimal collection point would need to be identified at each departure gate.	Case-by-case. Would require re-engineering TSA checkpoints in a space efficient manner at each location.
Airport coverage	Screening infrastructure is not currently deployed at the gate. CBP only maintains a presence at airports receiving international arrivals, and about twice as many airports generate international departures.	TSA maintains a presence at almost all U.S. airports.
Compliance	All travelers must board the plane, making at-gate collection an ideal way to ensure compliance.	Nearly all travelers go through TSA checkpoints. However, about 27 percent of foreigners leaving the U.S. undergo TSA screening at a domestic-only airport, before connecting to an international flight. This complicates logistics and could require exit screening at airports that do not service international departures.
Personnel costs	Depending on configuration, it is possible that fewer airports would be covered, but the solutions could be more labor intensive if they are staffed with CBP officers.	Significant. More airports would likely need to be covered, but efficiencies could be created through integration into the existing screening process.
Filtering passengers	Both options would require development of an efficient process to reliably sort passengers based on who is required to provide biometric data. Previous DHS pilots found that this requires substantial traveler interaction with DHS personnel.	
Impact on travel	2009 pilots suggest that an at-gate solution would have a smaller impact on traveler wait times.	2009 pilots suggest that a TSA checkpoint solution would have a larger impact on traveler wait times.

biometric and biographic data. That information could be matched biographically against the same flight manifests that power our current air and sea exit systems. Given the narrowed pool of travelers and the low probability that an individual would check in and not board the flight, these matches could likely detect such manipulation.

At-gate collection would almost certainly be less vulnerable to false exit records. The 2009 pilots found that the at-gate approach produced a higher level of confidence of departure.[120] However, the extent of that advantage would depend on the precise location and security of the process. For example, unmanned kiosks in central locations in the departure area would minimize personnel costs but would not guarantee exit or compliance. By contrast, mobile device based enrollment immediately in front of or on the jetway could be highly secure and would have high compliance rates, but would be much more expensive to implement. Based on a comparison between its 2004-2007 air/sea pilots and its 2009 air pilots, DHS determined that compliance is much higher when collection takes place at a point the

traveler must visit during the course of their departure, such as TSA inspections or the jetway.[121]

Compared to a TSA collection, the logistics of ensuring compliance may be less complicated under an at-gate approach. According to DHS's 2008 Regulatory Impact Analysis, about 27 percent of foreigners departing the United States on international flights connect to the international airport from a purely domestic airport.[122] This means that a TSA checkpoint collection approach could have to implement one of two strategies: (1) deploy biometric exit capability at purely domestic airports or (2) require foreigners to exit the departure area at the international airport and go through TSA screening again. The first possibility would create security vulnerabilities including an increased likelihood of false exit records, and the second could create delays that adversely impact international travel. It is possible that the second option could be combined with an expedited process for the second TSA inspection, which would reduce the extent to which the TSA checkpoint approach simplifies logistics. DHS's 2009 Atlanta (TSA) pilot did not consider these cases because it did not include individuals whose flight did not originate in Atlanta.[123]

Regardless of the solution selected—TSA checkpoints, at-gate collection, or another approach—implementing biometric exit capability at airports could come with significant infrastructure changes and personnel costs. DHS's 2009 report on air exit pilots concluded that "national deployment … would have a significant impact on staffing regardless of the biometric air exit location."[124] DHS's 2008 Regulatory Impact Analysis concluded that a TSA process would require more staff than an at-gate process, but this result must be interpreted within the context that the TSA scenario required much wider airport coverage than the at-gate scenario.[125]

The impact on travelers is also relevant to any approach. In the 2009 pilots, the at-gate process caused a "negligible change in average boarding flow time per passenger" because the collection occurred during time that passengers would otherwise spend waiting to board.[126] However, the at-gate pilot's design restricted collection to time allocated by carriers. For six of the 97 flights, CBP did not complete the collection within this timeframe for logistical reasons. The TSA approach increased security check flow time by 128 seconds for travelers subject to US-VISIT and 17 seconds for those not subject to US-VISIT (Table 7).

For the actual process of collecting biometric and biographic data, the two technologies tested at the gate had processing times of 30 seconds (for the "portable" technology) and 49 seconds (for the "mobile" technology"), while the TSA approach, which exclusively used the "mobile" technology, had an average processing time of 68 seconds (Table 7). It should be noted, however, that CBP officers involved in the pilots had more experience processing the relevant travel documents and with conducting inspections of that type. DHS's report on the pilots advises that training and familiarity with the procedures could help close the gap between the at-gate and TSA processing times.

In the TSA approach, individuals not subject to US-VISIT had increased wait times due to the need to screen passengers to identify whether or not they were required to provide biometric data. The logistics of efficiently and accurately sorting passengers will be a challenge for any exit solution—in the 2009 pilots, this was a "critical step" that "require[d]

Table 7. Key characteristics and results of 2009 air exit pilots.

KEY NUMBERS	CBP at Gate		TSA
Travelers checked for eligibility	27,111		476,168
Travelers processed through US-VISIT	9,448		20,296
Labor cost per traveler processed	$7.54		$9.79
Watch list hits	44		131
Suspected overstays	60		90
Impact on passenger wait times			
Subject to US-VISIT	"Negligible"		128 sec.
Not subject to US-VISIT			17 sec.
PROCESSING TIME (SECONDS)	CBP-Portable	CBP-Mobile	TSA-Mobile
Overall	30 sec.	49	68
Document preparation & return	8	10	16
Biographic and biometric collection	21	39	51
Successful 1st biographic & biometric attempt*	24	41	57
Successful 1st biographic, re-attempt biometric*	41	64	109
Successful 1st biometric, re-swipe biographic*	54	75	77
Re-attempt biographic & biometric*	71	98	129
COLLECTION PERFORMANCE	CBP-Portable	CBP-Mobile	TSA-Mobile
Biometrically confirmed entry-exit matches			
By collection point	85.1%		81.0%
Overall	82.3%		
Percent of fingerprint images rated "good" quality			
By collection technology	68%	73%	
Overall	72%		
Swipes per traveler processed			
Biometric	1.2		
Biographic	1.2		

Source: DHS.[127]

* Calculated using overall average time for document preparation and return, plus biometric and biographic collection times by scenario.

extensive interaction with travelers including asking questions … and reviewing a variety of travel documents."[128]

While the results of DHS's 2009 pilots are informative, they were not designed to provide decisive evidence that one option is superior to the other. Among the limitations:

- The pilots covered two airports over a one month period.

- The pilots did not measure the impact on flight departure times.

- The pilots are a guide to decision-making, not a projection of national deployment. DHS's report qualified the findings by stating that they "offer insight into the operational impact within the stipulated design of the piloted processes; they do not serve as a projection of national deployment."[129]

- The TSA pilot did not track which flights passengers would board.

- The at-gate pilot did not complete collection if it would extend past the time allotted by carriers. This occurred for six of the 97 flights because of factors like "late connections, gate changes, travelers requiring special assistance, weather, and catering."[130] Such exclusions could not occur in a full deployment.

- The at-gate pilot did not include all crew members because they boarded the plane early. In cases where crew was captured, officers had downtime while they waited for general boarding.[131]

- The at-gate pilot did not randomly select flights, instead opting for flights with a large share of individuals subject to US-VISIT.[132] This would likely increase the chance that the pilot would have an adverse impact on traveler wait times (which it did not), but would also make the pilots appear more cost-efficient in terms of labor hours and costs.

Outlook

In May 2012, DHS's internal assessment of air exit pilots and available technology concluded that the building blocks for biometric air exit capability are available. To that end, DHS completed operational surveys of ten major international airports in 2013 in preparation for pilot testing that it hopes to begin in 2015.[133] In the interim, DHS plans to test a variety of biometric and operational concepts at a new mock airport facility in Landover, MD; as of February 2014, the facility was scheduled to open in April 2014.[134] According to Colleen Manaher, director of CBP's Entry/Exit Transformation Office, DHS is targeting an air exit solution that is non-intrusive, transparent, and collect the needed data within one to three seconds.[135] If feasible, CBP aims to deploy a biometric air exit capability in the 2016-2018 range.[136]

Compared to its 2009 pilots, which took averages of 30 to 68 seconds to collect biographic and biometric data (Table 7), DHS's goal for a biometric air exit solution are very ambitious. However, new and emerging biometric technologies may be up to the task. In order to achieve a one-to-three second processing time, these collections would need to be "passive," meaning that they would collect data without active participation from the user. New "on the move" iris or facial recognition technology would seem to have the potential to achieve this objective.[137] According to a presentation from the DHS Science and Technology Directorate in April 2014, the following approaches are among those DHS will test at the new Landover facility:[138]

- *Biometric self-boarding gate:* Passengers self-scan their biometrics before passing through the gate onto the jetway. This would be an automated version of the at-gate solution.

- *Centralized capture:* Passengers would provide biometrics at a central location they must pass through on their way to the departure gate. This could be analogous to the TSA solution or could be deployed at a centralized location on the concourse.

- *Mobile operations:* DHS personnel would use mobile scanners to collect biometrics at the gate, at a central location, or some combination of the two.

- *Loading bridge:* Facial recognition software would capture biometrics as passengers walk down the jetway. This approach is an example of passive biometric collection.

This presentation and DHS's one-to-three second goal suggest that DHS is considering non-fingerprint solutions—namely, facial and iris recognition. If DHS selects a non-fingerprint solution, current fingerprint-based entry capabilities would need to be overhauled as well. Fortunately, fingerprint matching and technology has also improved over the years.[139] New touchless fingerprint readers can complete scans more quickly and accurately than previous models.[140]

Advancements in biometric technology are promising, but operational deployment takes more than simply identifying a technically feasible solution. In the 2009 pilots, for example, just 82 percent of the biometric exit data collected resulted in a biometrically confirmed entry-exit match, and just 72 percent of fingerprint images captured were rated "good" quality (Table 7). Biometric technologies have potential to produce highly accurate matches, but the 2009 pilots did not live up to that potential. This illustrates that even as our ability to capture and match biometric identifiers improves, only real-life deployments can conclusively demonstrate whether a technology will work.

Logistics, not raw technological capability, appear to be the largest barrier to biometric data collection for exiting travelers at air, sea, and land pedestrian crossings. Each POE has unique characteristics and constraints that DHS will need to account for as it deploys biometric collection capabilities. Tovah LaDier, the managing director of the International Biometrics and Identification Association (IBIA), offered a particularly pointed explanation of the logistical challenges at a February 2014 panel:

> There is little doubt that you could put together the biometric technology, the back end system, et cetera in about a year. … The issue is really the logistics for deployment. They are very complex and they vary by whatever land, sea, or airports you're talking about. … We believe strongly that you need a staged rollout. It can't be any other way. The idea that you could do something in two years is fantasy at this point. … The staged rollout, however long it takes … can mitigate risks and inform subsequent stages, and can accommodate the unique requirements of different transportation modes and port configurations.[141]

The state of current progress and options for deployment suggests that an approach based on immediate and inflexible deadlines may not succeed. A deployment strategy that maximized the chances of success would likely need to proceed in stages, including technological assessments (currently underway), extensive piloting (planned for 2015), and a gradual rollout wherein early experiences inform national deployment. This sort of deployment process could maximize the likelihood that the system functions as intended and achieves its goals.

Implications for Enforcement

Ultimately, the value of an entry-exit system hinges on the extent to which it meets statutory goals to improve (1) immigration enforcement and (2) law enforcement against criminals and terrorists. For both areas, this section reviews the key situations in which a complete exit capability could provide a benefit, the potential for biometrics to add value over biographics, and what may be feasible to implement in the next several years. Because the biometric entry capability is already in place, this discussion focuses on exit capabilities.

Immigration Enforcement

From an immigration enforcement perspective, the potential benefits of a comprehensive and accurate entry-exit system fall into two key categories: (1) timely and accurate statistics on the overstay population and (2) improved ability to identify individual overstays. On the first point, estimates of the overstay population that are more precise, current, and accurate would help DHS and other stakeholders assess the overall effectiveness of DHS's overstay enforcement efforts. Additionally, country-by-country overstay statistics would be useful for evaluating the security of different visa categories and non-visa admissions, such as country eligibility for the Visa Waiver Program. For these statistical purposes, the small improvement in accuracy biometrics could offer over biographic data would be unlikely to add significant value relative to the cost of deployment.

On the second point, improving DHS's ability to identify individual overstays also has some potential to improve immigration enforcement, depending on the circumstance:

- *Routine interior enforcement*. For individuals who have already been located through contact with law enforcement, exit data are not necessary to determine that the individual is an overstay. Physical presence, not the lack of an exit record, is the best evidence that the individual did not leave the United States in accordance with the terms of their admission. Exit data would, however, help DHS know whether an individual it encounters had overstayed in the past, left the country, and come back.

- *More efficient enforcement*. A complete exit system would reduce the need to pursue leads for individuals who already departed or adjusted status.

- *Denial of admission or visas*. The ability of DHS and DOS to deny admission or visas to people who overstayed in the past would be enhanced. This could be the most significant benefit of an exit capability.

- *Additional interior enforcement*. A comprehensive exit system would open the door for more enforcement based purely on the fact that individuals have been identified as overstays. Such a strategy would also require realigning existing interior enforcement priorities and allocating significant additional enforcement resources.

ROUTINE INTERIOR ENFORCEMENT

It has been argued that complete entry-exit information could help ICE identify overstays during the course of routine enforcement, namely when individuals come into contact with law enforcement through screening programs like Secure Communities. This is true for individuals who overstayed in the past, left the country with an exit record, and managed to re-enter legally (short periods of overstay are not necessarily a bar to future re-entry). However, for individuals who overstayed their current period of admission, exit data are not necessary to confirm overstay status. The individual's physical presence would give ICE definitive knowledge that he or she had not exited the country. Law enforcement only needs access to information about whether a person has legal status (i.e., linked data about arrivals, adjustments of status, or extensions of legal periods of stay) to determine whether they are an overstay. In fact, in order for exit records to properly determine whether an individual had overstayed, this sort of status information must be fully integrated anyway.

Therefore, for any current overstay whose physical presence in the United States has already been confirmed, an exit record is redundant. This means that, cost-benefit analysis of an exit capability should not suppose that it would significantly improve routine interior enforcement through contact with law enforcement—the dominant means by which all types of unauthorized immigrants, including overstays, are currently identified and removed.

MORE EFFICIENT INTERIOR ENFORCEMENT

A complete entry-exit system would have more accurate matching, reducing DHS's need to review potential overstay leads that turn out to be false positives. About one quarter of the leads HSI investigated between 2004 and 2012 were individuals who had already departed the country (Table 8). Reducing the need to pursue potential overstays that had already departed the country would free up those enforcement resources for other priorities. The largest category of leads in 2004-2012, however, was cases for which ICE could not locate the individual and all leads were exhausted. It is unclear how much reallocated resource efficiencies from improved exit matching would assist with these cases.

Table 8. ICE overstay investigation outcomes, FY 2004-2012.

OUTCOME	#	%	VALUE ADDED BY EXIT
Arrested	9,000	23%	**None.** Successful investigation.
Departed: Already departed the country.	9,900	25%	**Significant.** Collecting and accurately matching exit data would reduce the need to pursue these leads. Biographic collection would match the large majority of cases. A fully functioning biometric system would be more accurate.
In-status: Extended their stay or switched to another legal status.	9,700	24%	**None.** Determined using information on status and period of stay.
All leads exhausted: Cannot be located.	11,100	28%	**Some.** ICE believes these individuals are in the country but cannot locate them. However, some portion of these people may have departed the country, and some may depart while ICE is trying to locate them. Exit data would add value for in cases where the individual departed (see above).

Source: Table 3.

A fully biometric system would be better at figuring out which immigrants departed than a biographic-only system, but those gains may be marginal. Under the current system, which utilizes only biographic data, about 97 percent of departure records are successfully matched to a previous arrival record. A fully functioning biometric system has the potential improve upon this system in two ways. First, because biometric identifiers are unique features of a person, they could make matches more accurate. Though DHS has significantly improved its biographic matching capabilities over the years, biometric identifiers have potential to improve accuracy within the 97 percent of records that are currently matched. Second, for the same reason, a biometric system would have potential to match some of the remaining 3 percent of exit records that cannot currently be matched to a prior entry record. Under a biographic system, continued improvement to name-matching algorithms and related processes may also be able to eliminate some of these presently-unmatched records.

ADDITIONAL INTERIOR ENFORCEMENT

Complete exit records could in theory enable ICE to proactively seek out, apprehend, and deport individual overstays who had not been previously identified to ICE through contact with law enforcement. Currently, ICE's limited resources require the agency to prioritize which potential overstays it investigates—based on Table 3's statistics, ICE currently investigates about 6 percent of identified potential overstays, and relies on routine interior enforcement to identify the rest. In this area, the key benefit of fully functioning biometric versus biographic would be the same as that described in the preceding paragraph: improved accuracy would reduce the need for dead-end investigations.

It is important not to equate the identification of overstays with the location and removal of overstays. Entry-exit records that allowed DHS to identify all overstays would not (1) assist in locating or apprehending overstays, (2) track individuals who have violated the terms of their admission (e.g., student visa violators), or (3) allocate additional resources to immigration enforcement (aside from what could be gained through more efficient enforcement). It has long been recognized that investigations and improved tracking of individuals while they are in the country, not entry-exit records, are the means by which overstays are located.[142] At the point of entry, visitors to the United States only provide the first address at which they plan to stay, which is of little use to investigators by the time the individual becomes an overstay, perhaps months or years later. This is a key reason why currently, the most common outcome of an overstay investigation is "all leads exhausted" (Table 3)—the address information provided at entry is not all that useful. Although statute requires individuals to notify DHS of changes in address, compliance is low, and the penalty has not been enforced since the early 1970s.[143] Individuals seeking to avoid detection are especially unlikely to remain at the address they initially provided to the government or report changes. Moreover, it should be reiterated that improvements to this sort of tracking would not come from the entry-exit system.

In sum, entry-exit improves DHS's ability to *identify* overstays, but any significant improvements to DHS's ability to *locate* overstays will be achieved outside the process of collecting entry and exit records. Thus, any enforcement strategy that uses entry-exit

records to seek out and remove overstays should include the cost of additional investigative resources and tracking capabilities in the cost/benefit analysis.

DENIAL OF VISAS OR ADMISSION

During the application and admissions process, more complete information on whether or not individuals previously overstayed would enable CBP and consular officers to deny more applicants on this basis. Biometric capability could make these matches more accurate, increasing confidence in denials based on past illegal presence. Overstays would likely respond to this incentive in some combination of ways: (1) becoming less likely to overstay, (2) attempting to defraud the system by creating a false record of exit, or (3) not departing the United States for fear of being denied re-entry. In large part due to current progress on entry-exit implementation, the number of visas denied by consular officers due to past illegal presence increased more than 400 percent between FY 2003 and FY 2013.[144]

The third point, that an entry-exit system could encourage people to overstay for longer periods of time (or indefinitely), is a potential unintended consequence. It is well-documented that increased border enforcement has discouraged unauthorized border crossers from leaving the United States, for fear that they will not be able to re-enter in the future.[145] In this way, border enforcement seems to have encouraged unauthorized immigrants to become permanent residents, breaking the cycle of "circular migration" that once characterized the movement of unauthorized workers. Thus, unless accompanied by additional enforcement measures, a complete entry-exit system could accidentally encourage the overstay population to become larger and more permanent.

The extent to which individuals respond by creating false exit records would depend on the system's degree of susceptibility to fraud. Analogous to the document fraud and migrant smuggling industries, if a regulation creates an incentive to defraud a system and leaves open an easy way to carry out such fraud, entrepreneurs would certainly capitalize on this new market and assist individuals who wish to carry it out. No aggregate statistics are available, but CBP officers report cases where individuals were found to have turned in someone else's I-94.[146]

One would expect that, in general, ordinary individuals without malicious or criminal intent would (a) find it less worthwhile to create a fraudulent exit record and (b) have less access to the means to do so. A biographic system may be a sufficient deterrent for this category of individuals, and for a large share of the "well-meaning" unauthorized population, other enforcement measures could render it redundant. For example, employment verification could accomplish the same deterrent effect for unauthorized immigrants who are working in the United States. Therefore, in general, the incentive to create false exit records would likely be greatest for criminals and terrorists who hope to remain in the country undetected. As discussed in the following subsection, the exit system would have to attain an extraordinary level of integrity for exit records to be useful in law enforcement against this class of overstays.

Criminal and Terrorist Enforcement

For enforcement against criminals and terrorists, an entry-exit system could offer benefits for two broad categories of dangerous individuals: (1) those whose intentions are not known, but could still be subject to immigration enforcement (2) those that appear in criminal databases and terrorist watch lists.

INCIDENTAL ENFORCEMENT AGAINST UNKNOWN MALICIOUS ACTORS

It is possible that some criminals and terrorists could be removed from the United States for overstaying even if the government does not realize the full extent of their illegal activities. More regularized immigration enforcement against overstays who have not come into contact with law enforcement would be bound to sweep up some number of criminals and terrorists who otherwise succeeded in maintaining a low profile. However, as described above, the United States would have to overhaul its immigration enforcement priorities, create complementary investigative and tracking capabilities to locate overstays, and fund substantial increases in enforcement resources to cover these changes.

Similarly, criminals and terrorists may be identified because they otherwise violated the terms of their visa—for example, foreign students who do not remain in school. Locating and deporting these individuals improves security. Here, exit records would add value by helping DHS determine whether the visa violator has exited the country (unless, as described below, the individual purposely "cloaked" their presence by creating a false record of exit). However, entry and exit records would not create the actual ability to know that the individual violated the terms of their visa. DHS accomplishes this through monitoring programs like SEVIS, which tracks foreign students enrolled in U.S. postsecondary institutions.

KNOWN CRIMINALS AND TERRORISTS

Since September 11, the widespread deployment of improved entry screening has greatly increased the chances that known criminals and terrorists will be denied entry. Today, nearly every person entering the United States is subject to document screening, and nearly every nonimmigrant visa holder or Visa Waiver Program participant is subject to biometric entry screening. These entry screenings include checks against law enforcement databases and terrorist watch lists. Today, it is much less likely that known criminals and terrorists will be legally admitted to the United States.

The value of exit screening for this category of individuals is less clear. If an individual's criminal or terrorist intentions are already known to U.S. authorities at the point of entry, that is where the individual would be denied. If authorities become aware of an individual's criminal or terrorist ties after that person has been admitted, the lack of an exit record would not help law enforcement locate the individual. However, the lack of an exit record could help authorities determine whether the individual was still in the country, and therefore whether the lead was worth pursuing.

Thus, for known criminals and terrorists, the key potential benefit of an exit record is knowledge about whether or not a person of interest left the country. Critics of the present lack of a complete exit system have suggested that if the United States had an exit

capability, federal law enforcement could use the presence or lack of an exit record to determine whether to pursue a suspected terrorist—namely, two 9/11 hijackers who were watch listed in August 2001.[147] In order for exit records to be trusted in this manner, the government would need an extraordinary level of confidence in the integrity of the system at all exit points. If criminals and terrorists knew that law enforcement would not pursue them if they created a false exit record, they would have an extraordinary incentive to "cloak" themselves by defrauding the system.

Although the prospect for false records of exit would not eliminate the deterrent effect of an exit system, it is clear that the system would have to be remarkably secure to be trusted as proof that dangerous criminals have actually left the country. As this is the key benefit exit records are supposed to provide in relation to criminal and terrorist enforcement, the extent of the system's vulnerability to false records is critical. In the land environment, the immediately available options for exit tracking appear susceptible to these problems. As such, implementing a biometric exit system before completing the necessary development, planning, and operational testing would almost certainly reduce or eliminate the key advantage the entry-exit system is meant to provide in relation to criminals and terrorists.

Biometric vs. Biographic

In theory, an exit system based on fully biometric identification would create two key advantages over a fully biographic system: more accurate matches and less fraud. Biometrics could create more accurate matches because they are unique features of a person. Name misspellings, multiple identities, and other classes of data errors all make biographic data more susceptible to error; biometric data, if properly implemented, would eliminate these problems. According to CBP, biographic matches "provide significant evidence that the traveler is genuine, but biometrics should offer a greater degree of assurance."[148] Currently, about 97 percent of biographic exit records are matched to entry records. A fully functioning biometric system has the potential improve upon this system by making the matches that do occur more accurate and by eliminating some of the remaining 3 percent that cannot currently be matched. Although DHS is improving its biographic matching, biometrics clearly have a higher ceiling for accuracy.

For many of the same reasons, a system that collected biometric exit data from most noncitizen travelers upon exit could be much less susceptible to fraud. However, this theoretical benefit will not be gained if the solution that is actually implemented falls short of that goal. For criminals and terrorists determined to evade detection, implementing an underdeveloped system would undercut the key benefit that exit data are meant to provide in this area: confidence that an individual's exit record actually proves that they left the country.

Although biometric data have a higher ceiling for accuracy than biographic, biographic data retain significant value for three key reasons: (1) biographic is better than nothing, (2) DHS does not yet have the capability to maximize biometrics' potential for accuracy, and (3) a biometric solution that covers all land POEs is not on the near horizon. On the first point, DHS has implemented biographic solutions where they are readily available. At present, the entire exit system—carrier manifest data at air and sea, and data-sharing with Canada on

the northern land border—is based on data that someone was already collecting. The 9/11 Commission understood that biometric solutions would take "years" to implement, and advised that in their place, "a name match will always be useful."[149]

Second, although biometric data have a high ceiling for accuracy, DHS pilots have yet to demonstrate that this level of accuracy can be attained. In the 2009 US-VISIT pilots, for example, just 82 percent of biometric exit records were matched to a biometric entry record (Table 7). This is orders of magnitude less accurate than the current biographic system. Undeniably, biometric identification has more *potential* to accurately identify overstays than biographic data, but until DHS can channel this potential into a proven operable solution, it is not clear whether implementing biometric exit collection would add much value.

Third, at land POEs, even comprehensive biographic exit solutions appear to be a long way off. The Beyond the Border partnership with Canada was a huge step, but no near-term solution exists for the southwest border, which handles 45 percent of America's entry inspections.[150]

Based on the preceding discussion, Table 9 summarizes the benefits that biographic and biometric exit could provide for each aspect of enforcement described above. Overall, the value-added calculus shows that while biometric exit is certainly worth pursuing, biographic exit can achieve most of the goals of an entry-exit system. Biometrics would offer no significant benefit for statistical purposes. For routine immigration enforcement based on contact with law enforcement, exit data add little value, whether biometric or biographic. Confirmation of the individual's presence in the United States is the best possible evidence that the individual has not left the country, rendering exit records redundant for this purpose.

Biometric exit data's principal theoretical benefits are to (1) make enforcement more efficient by reducing the need to pursue people who have exited the country, (2) improve the ability of CBP and DOS to deny admission or visas to past overstays, and (3) provide knowledge about whether known criminals and terrorists have left the country. In the first two categories, biographic exit data provide the large majority of the benefits, leaving a relatively small window for biometrics to improve matches. In the third category, reliable information about whether known criminals and terrorists are in the country would be valuable, but the preceding sections show that any solution implemented in the near- or medium-term would likely to be susceptible to fraud. If DHS implemented one of the currently available options, and law enforcement did not pursue leads on individuals for which an exit record existed, the entry-exit system could create both an opportunity and an incentive for criminals and terrorists to "cloak" their presence in the United States through relatively simple fraud.

Table 9. Benefits of biographic and biometric exit by enforcement priority.

ENFORCEMENT ASPECT	BENEFIT OF FULL BIOGRAPHIC EXIT	BIOMETRIC VALUE ADDED
IMMIGRATION ENFORCEMENT		
Estimating the size of the overstay population.	At least 97 percent of records would be matched, generating highly accurate statistics.	Small improvements in accuracy would add little to no value for statistical purposes.
Generating country-by-country overstay statistics to inform decisions about the Visa Waiver Program.	At least 97 percent of records would be matched, generating highly accurate statistics.	Small improvements in accuracy would add little to no value for statistical purposes.
Routine immigration enforcement for individuals already in contact with law enforcement.	Minimal benefit. Physical presence past admission date proves removability. Exit records may provide data on past overstays, but may not be relevant to current status.	None. Physical presence is the best possible evidence that an individual did not exit the country.
More efficient enforcement.	Fewer leads would need to be closed out for individuals who had already exited the country, which would save ICE resources.	Small improvements in accuracy would make enforcement slightly more efficient.
Additional enforcement based solely on overstay identification.	Would identify overstays, but would not locate them. Benefit conditional on significant increase in enforcement resources and change in priorities.	Would identify a relatively small amount of additional overstays. Would not locate them or change enforcement priorities.
Denial of future visas or admission for non-malicious actors.	Maximal benefit. Exit data necessary to determine previous overstays, as basis for future denials. Existence of the system could deter individuals from overstaying.	Higher confidence in visa or admission denials due to past illegal presence. More difficult to defraud the system.
CRIMINAL AND TERRORIST ENFORCEMENT		
Incidental enforcement against unknown malicious actors.	Some additional overstays would be denied future admission or visas. No benefit for routine immigration enforcement.	More difficult to create false records of exit. No currently feasible option is invulnerable.
Known criminals and terrorists.	Information about whether the individual has departed the country. Benefit limited by potential for malicious actors to "cloak" themselves by creating a false record of exit.	More difficult to create false records of exit. No currently feasible option is invulnerable, especially at land borders.

Conclusion

Over the past decade, DHS has made significant progress toward implementing an entry-exit system, deploying a fully biometric entry capability at all POE types and a complete biographic system in the air and sea environments. In 2013, DHS took a major step toward a land exit system through the Beyond the Border partnership with Canada, which provides biographic exit data for the entire northern land border. Despite the need for further piloting and testing, biometric exit appears to be within reach at airports and seaports. The challenge of the land border, however, looms over these efforts. At the U.S.-Mexico border in particular, all available solutions appear to be a long way off.

The state of America's entry-exit capability is a core issue in the ongoing immigration debate. This analysis shows that exit records, and particularly biometric exit records, offer mixed value for enforcement objectives. Perhaps most significantly, exit records offer little or no benefit for instances in which current overstays come into contact with law enforcement—the dominant means by which DHS currently identifies and removes unauthorized immigrants.

For other immigration-related purposes, biographic data can provide the large majority of the benefit that biometrics would provide. This is because biographic entry-exit can match a large majority of records. For statistical purposes, the additional matches from a biometric system would add little to no value. A complete biographic system would make enforcement more efficient by enabling DHS to close out a sizeable majority of suspected overstay cases where the individual had already departed the country. Here, fully functioning biometrics would be superior, but biographics get the system most of the way there. Additionally, exit capability would enable DHS to reliably identify overstays, which would open the door for enforcement against this class of unauthorized immigrants—but only if DHS coupled the exit capability with significant policy changes and large increases in enforcement resources. Again, for such an effort, the small increase in accuracy from biometric data would identify a correspondingly small additional number of overstays.

No one disputes that biometric data have a higher potential for accuracy than biographic, but a large gap between theory and reality stands in the way of this potential. DHS will not be able to reap the theoretical benefits of biometric matching until it achieves that level of accuracy in real-world situations. Unfortunately, the most recent biometric pilots were less accurate than biographic matching. Implementing an unproven or unreliable solution would erode the benefits that biometrics are supposed to provide.

New and emerging technologies offer hope for biometric exit capability at airports and seaports, and down the line, other technologies or negotiations with Mexico may enable DHS to complete the land exit system as well. Until these capabilities are proven, however, expectations for the benefits of completing the exit capability, as well as the timetable for implementation, may need to be tempered. If DHS were to implement a biometric exit system before all logistical and technical questions are answered, it would be unlikely to provide the full benefits it is designed to achieve.

Endnotes

[1] GAO (2003), "Overstay Tracking Is a Key Component of a Layered Defense," GAO-04-170T, available at http://www.gao.gov/products/GAO-04-170T.

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