United States Government Accountability Office

GAO

Report to Congressional Committees

February 2007

AVIATION SECURITY

TSA's Staffing Allocation Model Is Useful for Allocating Staff among Airports, but Its Assumptions Should Be Systematically Reassessed

G A O

Accountability * Integrity * Reliability

GAO-07-299

Contents

Letter 1

Results in Brief 5
Background 9
TSA Relies on the Assumptions in Its Staffing Allocation Model, along with Mechanisms for Monitoring Them, to Help Ensure Sufficient TSO Staffing Levels, but Some Key Assumptions Do Not Reflect Operating Conditions 22
TSA's FSDs Are Responsible for Deploying TSO Allocations at their Airports, but Face Workforce and Other Challenges to Effective Deployment 42
Conclusions 58
Recommendations for Executive Action 59
Agency Comments and Our Evaluation 59

Appendix I **Objectives, Scope, and Methodology** 62

Objectives 62
Scope and Methodology 62
Data Reliability 68

Appendix II **Development and Description of TSA's Staffing Allocation Model** 69

TSA's Development of Its Staffing Allocation Model 69
Staffing Allocation Model Components 70
TSA's Use of the Staffing Allocation Model 76

Appendix III **Comments from the Department of Homeland Security** 78

Appendix IV **GAO Contact and Staff Acknowledgments** 84

Related GAO Products 85

Tables

Table 1: Examples of Differences in Screening Operations, at Selected Airports We Visited, That Resulted in Differing TSO Allocations 25

Table 2: Average Peak Wait Times in Minutes, by Airport Category, Fiscal Years 2004-2006 27
Table 3: Summary of Changes to the Staffing Allocation Model Implemented in Fiscal Year 2007 32
Table 4: National Human Resource Initiatives by TSA for Its TSO Workforce 56
Table 5: Airports Visited during Design Phase 63
Table 6: Airports Visited after the Design Phase 64
Table 7: Staffing Allocation Model Assumptions for Fiscal Year 200774

Figures

Figure 1: Commercial Airports by Airport Security Category, as of April 2006 10
Figure 2: Passenger Checkpoint Screening Operation 12
Figure 3: Checked Baggage Screening Operation 14
Figure 4: TSA's Use of the Staffing Allocation Model for Annual TSO Allocations and Scheduling of TSOs for Airports 17
Figure 5: Total TSO Allocation, by Airport Category, for Fiscal Years 2004 through 2007 20
Figure 6: Percentage of Part-Time TSOs by Airport Category, Fiscal Years 2004 through 2006 36
Figure 7: Percent of TSOs Used for Operational Support Functions, along with Average Hours Spent by Them on These Functions, by Airport Category for a 2-Week Period—September 17, 2006, through September 30, 2006 39
Figure 8: Airports' On-Board Status, by Airport Category, Compared to TSO Staffing Allocation, in Full-Time-Equivalent TSOs, as of September 30, 2006 47
Figure 9: Attrition Rates for Full-Time and Part-Time TSOs, Fiscal years 2004 to 2006 49
Figure 10: Average Rate of TSO Absenteeism per 100 TSOs, by Airport Category, for Fiscal Years 2004 - 2006 51
Figure 11: TSA Workman's Compensation Claims for Calendar Years 2004 - 2006, through June 2006 52
Figure 12: TSO Overtime Hours as a Percentage of Total Hours Worked, by Airport Category, during Fiscal Years 2004 - 2006 53

Abbreviations

ADASP	Aviation Direct Access Screening Program
BAO	Bomb Appraisal Officer
BDO	Behavior Detection Officer
DHS	Department of Homeland Security
DTW	Detroit Metropolitan Wayne County Airport
EDS	Explosive Detection System
ETD	Explosive Trace Detection
ETP	Explosives Trace Portal
FSD	Federal Security Director
FTE	full-time equivalent
IND	Indianapolis International Airport
MCO	Orlando International Airport
N/A	not available
OSR	on-screen resolution
SNA	John Wayne Airport
SPOT	Screening Passengers by Observation Technique
TSA	Transportation Security Administration
TSO	Transportation Security Officer

This is a work of the U.S. government and is not subject to copyright protection in the United States. It may be reproduced and distributed in its entirety without further permission from GAO. However, because this work may contain copyrighted images or other material, permission from the copyright holder may be necessary if you wish to reproduce this material separately.

United States Government Accountability Office
Washington, DC 20548

February 28, 2007

The Honorable Daniel K. Inouye
Chairman
The Honorable Ted Stevens
Co-Chairman
Committee on Commerce, Science, and Transportation
United States Senate

The Honorable James L. Oberstar
Chairman
The Honorable John Mica
Ranking Minority Member
Committee on Transportation and Infrastructure
House of Representatives

Over 600 million people travel by air each year in the United States, and the screening of airline passengers and their carry-on and checked baggage is vital to securing our transportation security system. The Aviation and Transportation Security Act, enacted in November 2001, established the Transportation Security Administration (TSA) and significantly changed how passenger and checked baggage screening is conducted in the United States.[1] This act removed screening responsibility from air carriers and the contractors who conducted screening for them, and placed this responsibility with TSA. As a result, TSA hired and deployed about 55,000 federal passenger and baggage Transportation Security Officers (TSO)—formerly known as screeners—to more than 400 airports nationwide based largely on the number of screeners that the air carrier contractors had employed. Since August 2002, however, TSA has

[1] Pub. L. No. 107-71, 115 Stat. 597 (2001).

been statutorily prohibited from exceeding 45,000 full-time equivalent positions available for screening.[2]

TSA's mission is to protect the nation's transportation systems while also ensuring the free movement of people and commerce. To help accomplish its security mission, TSA has established standard operating procedures to ensure that every airline passenger and checked bag undergoes some level of scrutiny to help ensure that objects and devices that may threaten public safety are not taken onboard aircraft. Although, according to TSA officials, these security duties are the primary objective of its screening efforts, it also attempts to minimize the effect on the movement of people and commerce by seeking to keep wait times at airport checkpoints reasonable.

TSA has identified its most important asset in accomplishing its mission as the TSO workforce. TSA deploys TSOs to screen passengers and checked baggage at the nation's more than 400 commercial airports. TSOs, for example, monitor passengers as they walk through metal detectors, examine carry-on items on X-ray machines, and conduct more thorough inspections of passengers selected for additional scrutiny at screening checkpoints. The rapid changes in procedures stemming from the alleged August 2006 terrorist plot to detonate liquid explosives onboard multiple commercial aircraft departing from the United Kingdom and bound for the United States highlights the challenge TSA faces in balancing security with customer service and the vital role TSOs play in ensuring the security of our commercial aviation system.

The Intelligence Reform and Terrorism Prevention Act of 2004, enacted in December 2004, required TSA to develop and submit to the Senate Committee on Commerce, Science, and Transportation, and the House of Representatives Committee on Transportation and Infrastructure, standards for determining the aviation security staffing for all airports at

[2]Beginning in August 2002 and continuing through fiscal year 2003, Congress prohibited TSA from recruiting or hiring personnel that would cause it to exceed a staffing level of 45,000 full-time-permanent positions. See Pub. L. No. 107-206, 116 Stat. 820, 880 (2002); Pub. L. No. 108-7, 117 Stat. 11, 386 (2003). Since fiscal year 2004, Congress has specifically prohibited TSA from recruiting or hiring personnel that would cause it to exceed a staffing level of 45,000 full-time equivalent screeners. See Pub L. No. 108-90, 117 Stat. 1137, 1142 (2003); Pub. L. No. 108-334, 118 Stat. 1298, 1304 (2004); Pub. L. No. 109-90, 119 Stat. 2064, 2070 (2005); and Pub. L. No. 109-295, 120 Stat. 1335, 1363 (2006). One full-time equivalent equals 1 work year or 2,080 non-overtime hours.

which TSA provides or oversees screening services by March 2005.[3] These standards are to provide the necessary levels of aviation security and ensure that the average aviation security related delay experienced by passengers is minimized. TSA submitted these standards, which form the basis of TSA's Staffing Allocation Model on June 22, 2005. The purpose of this optimization model,[4] as identified by TSA, is to estimate the most efficient balance of TSOs needed to ensure security and minimize wait times. Models, in general, are expected to approximate the real world. These approximations must be validated to assure model users that their predictions are credible within the bounds of specific situations, environments, and circumstances.

The Intelligence Reform and Terrorism Prevention Act also mandated that we conduct an analysis of TSA's staffing standards. In particular, the congressional committees to which TSA submitted the staffing standards were interested in how TSA is using the Staffing Allocation Model to identify the number of TSOs needed across the more than 400 commercial airports and how the model ensures that TSA has the right number of TSOs at the right checkpoints at the right times.

This report addresses the following questions: (1) How does TSA ensure that its Staffing Allocation Model provides a sufficient number of TSOs to perform passenger and checked baggage screening at each airport and what challenges has it faced while implementing the model? (2) How does TSA deploy its TSO allocation and what factors affect the model's effectiveness in helping TSA accomplish this deployment?

To address our objectives, we reviewed TSA's report to the specified congressional committees on its staffing standards and technical materials

[3]Pub. L. No. 108-458, § 4023, 118 Stat. 3638, 3723-24 (2004).

[4]An optimization model is a decision-making tool that recommends an answer (the goal to be optimized) based on analyses of information (constraints and decision variables). It consists of three components: (1) the goal to be optimized, (2) constraints, and (3) decision variables. In the case of TSA's Staffing Allocation Model, the goal to be optimized is the minimum number of TSOs to perform the necessary security functions at each airport within the stated wait time goal of 10 minutes. The constraints include passenger and baggage volume, and arrival distributions. The decision variables include the configuration of each airport (concourses, lanes, screening equipment, etc), staffing requirements, etc. TSA officials can alter decision variables to allow the model's outcome to meet the goal. For example, more screening lanes can be opened to meet demand and faster screening equipment could be installed. Decision variables have bounds within which the model must operate; these include, for example, how many lanes currently exist that could be opened.

detailing the staffing allocation model's assumptions,[5] and analyzed relevant legislation. We analyzed screening performance and TSO workforce data, such as passenger wait times, TSO absenteeism rates, TSO attrition rates, TSO overtime usage, TSO injury rates, number of TSOs devoted to administrative duties, and the level of usage of part-time TSOs. We assessed the reliability of these data for fiscal years 2005 and 2006 and concluded that the data were sufficiently reliable for the purposes of this review. We also interviewed officials from various TSA headquarters offices to ascertain the methodology used in developing the Staffing Allocation Model. We reviewed TSA's previous staffing model, examined methods used by TSA for allocating TSOs to the nation's airports, and reviewed TSA's approach to monitoring the performance of the Staffing Allocation Model and obtaining feedback from Federal Security Directors—the top ranking TSA authority responsible for security at each of the nation's commercial airports—on their staffing allocations. We visited 14 airports selected by nonprobability sampling during our review.[6] We visited 6 of the 14 airports during the design phase of our review based on several factors including geographic location and airport category.[7] After completing the design phase of our study, we visited eight additional airports including two airports from each of categories X, I, II, and III. We selected the two airports in each category because they had a similar number of annual passenger boardings, yet had different TSO allocations as determined by the Staffing Allocation Model. We visited each pair of airports in order to determine why the model treated seemingly similar airports differently. At all 14 airports we visited, we met with Federal Security Directors (FSD) and their staffs to discuss their views on how well the airport's TSO staffing allocation takes into account the unique characteristics of the airport and the TSO workforce and to observe

[5]In the context of models, the term assumption means any value in the model that is based on a belief or decision rather than on actual data. The term assumption is generally used with models because the components of a model are assumed to realistically represent events that the model is trying to explain or predict.

[6]Nonprobability sampling is a method of sampling where observations are selected in a manner that is not completely random, usually using specific characteristics of the population as criteria. Results from nonprobability samples cannot be used to make inferences about a population because in a nonprobability sample, some elements of the population being studied have no chance or an unknown chance of being selected as part of the sample.

[7]TSA classifies the commercial airports in the United States into one of five security risk categories (X, I, II, III, and IV). In general, category X airports have the largest number of passenger boardings, and category IV airports have the smallest. Categories X, I, II, and III airports account for more than 90 percent of the nation's air traffic.

passenger and checked baggage screening operations. We also met with representatives from the airport governing authority and at least one of the larger airline operators, based on passenger enplanements,[8] to obtain their perspectives on TSA's implementation of the Staffing Allocation Model and other relevant workforce issues. Because we selected a nonprobability sample of airports to visit, the information we obtained from interviews in our visits to different airports cannot be generalized to all Federal Security Directors, airport managers, and air carriers. We also met with representatives from aviation industry associations to obtain their perspectives on relevant TSA workforce issues.

We conducted our work from January 2006 through January 2007 in accordance with generally accepted government auditing standards. More details about the scope and methodology of our work are presented in appendix I.

Results in Brief

TSA aims to ensure that its Staffing Allocation Model provides a sufficient number of TSOs to perform passenger and checked baggage screening by: (1) building assumptions into its allocation model that are designed to calculate the necessary levels of TSOs to ensure security and minimize wait times, and (2) employing multiple monitoring mechanisms (both headquarters and field driven) for the sufficiency of the model's outputs. However, TSA faces some challenges to effective implementation of the model, primarily in ensuring that the model's key assumptions reflect operating conditions across airports. The model determines the annual TSO allocation for each airport by first considering the workload demands unique to each airport based on an estimate of each airport's peak passenger volume. This input is then processed against certain TSA assumptions about screening passengers and checked baggage—including expected processing rates, required staffing for passenger lanes and baggage equipment based on standard operating procedures, and historical equipment alarm rates.[9] Among the model's key assumptions is that establishing TSO allocations at a level adequate to respond to screening demand on a representative week during each airports' busiest month should allow most passengers on most days to experience 10 minutes or less wait time and should provide enough surplus staffing on

[8] Enplanements are the number of passengers who board a plane.

[9] Alarm rates refer to the number of persons or bags per hour/day that set off an alarm in the screening device and consequently require additional screening.

lower-volume days to sufficiently account for leave, training, and other nonscreening duties during less busy times.[10] Another key assumption is that the appropriate ratio of full-time to part-time TSO staff, expressed in full-time equivalents, is 80 percent to 20 percent; which, in TSA's view, will allow FSDs to schedule TSOs to respond to fluctuating passenger volumes by scheduling part-time TSOs to work only during peak periods—e.g., most business travelers fly in the early morning or late afternoon and are the biggest contributors to these peak volumes. To monitor the sufficiency of the model's allocation outputs, TSA has both field and headquarters-driven mechanisms in place. For example, TSA has established a process for FSDs to request revisions to the assumptions used for their individual airports. According to TSA officials, during the first 2 years of the implementation of the Staffing Allocation Model, TSA granted some, but not all, of FSDs' requests to modify the assumptions used for their individual airports. In addition, TSA plans to conduct an annual review of certain assumptions in the Staffing Allocation Model. Based on the review conducted in 2006, TSA made several changes to the assumptions in the staffing model for fiscal year 2007, including allowances for various forms of leave and training in addition to a variable part-time assumption for each airport. TSA headquarters officials responsible for the model stated that in deciding which assumptions to review in 2006—the first annual review of the model—they considered input they received from FSDs regarding operational conditions at their airports that may not be adequately reflected in the model, along with other data and events that may have a bearing on the validity of the assumptions. However, TSA does not have a mechanism, such as a documented plan, for selecting and prioritizing which assumptions to review each year and for assuring that all assumptions are periodically reviewed to help ensure that they are current with and reflect actual operating conditions. Without a plan for periodically validating all of the assumptions, TSA is at risk of assumptions becoming outdated, which could result in TSO allocations that do not reflect operating conditions. TSA officials responsible for the staffing model acknowledged that while they had a general idea of how they plan to approach future annual reviews of the model, a documented plan would help provide assurance that the assumptions are periodically reviewed and validated. Although at the airports we visited, FSDs reported that the

[10]Screening demand refers to the volume of passenger and nonpassenger traffic expected to require screening at an airport's checkpoint(s) within a specified time period. Screening demand does not include domestic passengers who board connecting flights at airports since they have already been screened at their airport of origin. Therefore, with regard to passengers, screening demand only refers to those who are originating at each airport.

model is a more accurate predictor of staffing needs than TSA's prior staffing model, which took into account fewer factors that affect screening operations, the FSDs and our own analysis identified some assumptions used in the fiscal year 2006 staffing model that did not reflect operating conditions. For example, many airports did not achieve a 20 percent part-time TSO workforce in the first 2 years of the model's implementation. TSA has addressed this problem in fiscal year 2007 by implementing a variable part-time goal based on each airport's part-time to full-time TSO ratio. In addition, some FSDs we visited stated that demand assumptions (using a representative week of airports' busiest months) did not sufficiently provide enough time for leave, training, and other operational support (nonscreening) duties. TSA officials acknowledged that they had not performed analysis to determine the reliability of this assumption. Also, FSDs stated the model for fiscal year 2006 did not specifically account for time away from screening to perform operational support duties, such as payroll processing. Although TSA officials told us that they have included an allowance for operational support duties in the 2007 Staffing Allocation Model, TSA has not determined under what circumstances it is appropriate to use TSOs to perform operational support functions or provided FSDs with guidance on when TSOs can be used this way. Without establishing such guidance, FSDs may over rely on TSOs to perform operational support functions. Overreliance on TSO staff for operational support could undermine TSA's investment in their specialized screening skills, reduce their on-the-job training opportunities, and constrain flexibility in scheduling them for the most efficient use of available resources.

TSA has vested its FSDs with responsibility for deploying and managing to their TSO allocation in light of local circumstances, including those that might affect scheduling and pose challenges to most efficiently deploying their resource allocations. Specifically, FSDs are responsible for ensuring that the right number of TSOs are deployed to the right screening areas at the right times to meet airport screening needs. These needs can vary widely throughout the day because some airports experience greater levels of air traffic at some times of the day as compared with other times. After receiving the annual staffing allocation from TSA headquarters, FSDs must prepare work schedules, which may include use of the Staffing Allocation Model's optional scheduling tool, to deploy TSO staff to meet screening demand. However, FSDs we interviewed identified several challenges they faced in deploying their TSO workforce. These challenges involve factors outside the model's determination of overall TSO staffing levels and affect FSDs' ability to effectively deploy their TSO staff regardless of their allocation. Specifically, FSDs cited difficulties in

achieving a 20 percent part-time TSO workforce, which the model has identified as the optimal ratio for scheduling efficiency; recruiting and retaining sufficient TSOs (both full-time and part-time) to reach their full allocations as determined by the model; staffing checkpoints appropriately given that some TSOs are unavailable due to absenteeism and injuries; and managing competing demands on TSOs' time, particularly with regard to operational support functions sometimes performed by TSOs and TSO training requirements. FSDs also had to manage around physical infrastructure limitations at some airports, such as lack of room for additional lanes or baggage check areas despite demand levels that would justify such added capacity. TSA headquarters officials and FSDs we interviewed reported having several efforts underway to help address challenges they face in deploying the TSO workforce. For example, TSA headquarters has several nationwide efforts underway to address hiring and retention of TSO staff (including part-time), absenteeism, injuries, and competing demands on TSO time. TSA officials at individual airports we visited are also working to address these challenges. For example, 6 of the 14 FSDs we interviewed said they implemented local initiatives, such as injury prevention committees and safe lifting demonstrations to help reduce the number of on-the-job injuries. Given that many of TSA's workforce initiatives were only recently implemented or are in the planning stages, we could not assess the extent to which these initiatives achieved the intended results. TSA human capital officials told us that they plan to evaluate the effects of their workforce initiatives and use the results of the evaluations to make any needed changes to their approach.

To assist TSA in its efforts to identify TSO staffing levels that reasonably reflect the operating conditions at individual airports and to help ensure that TSOs are effectively utilized, we are recommending that TSA (1) establish a formal, documented plan for reviewing all of the assumptions in the Staffing Allocation Model on a periodic basis to ensure that the assumptions result in TSO staffing allocations that accurately reflect operating conditions that may change over time; and (2) establish a policy for when TSOs can be used to provide operational support.

We provided a draft copy of this report to DHS for review. DHS, in its written comments, concurred with our findings and recommendations, and stated that the findings and recommendations are constructive and useful. DHS described some actions TSA has initiated to implement these recommendations, including working to develop a policy that would define when TSOs might be used to provide operational support. The full text of DHS's comments, as well as additional comments from TSA

regarding the agency's workforce management initiatives, is included in appendix III.

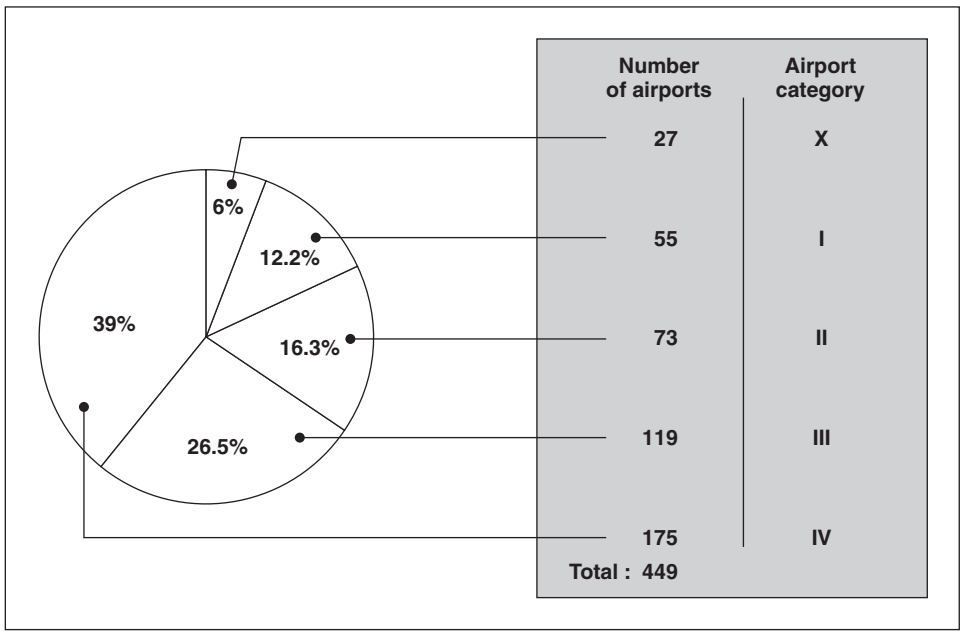
Background

Our Nation's Commercial Airports

There are more than 400 airports in the United States at which TSA provides or oversees passenger and checked baggage screening. These airports, often referred to as the nation's "commercial" airports, each contain one or more passenger screening checkpoints, and each checkpoint is composed of one or more screening lanes.[11] In addition, airports have one or more baggage screening areas, either in airport lobbies or baggage makeup areas where baggage is sorted for loading onto aircraft. As of October 31, 2006, the nation's commercial airports contained a total of 761 checkpoints and 2,002 screening lanes at which passengers are screened. These airports can vary dramatically, not just in terms of passenger and flight volume, but in other characteristics, including physical size and layout. Figure 1 identifies the number of commercial airports by airport security category, as of April 2006.

[11] According to TSA, the total number of commercial airports regulated for security in the United States varies depending on various factors such as the type and level of commercial operations that an aircraft operator conducts at that particular airport, the time of year or season where a particular airport is located, and the economic stability of that airport's region.

Figure 1: Commercial Airports by Airport Security Category, as of April 2006



Source: GAO analysis of TSA data.

Federal Security Directors (FSD) are the ranking TSA authorities responsible for leading and coordinating TSA security activities at the nation's commercial airports. TSA had 122 FSD positions at commercial airports nationwide, as of October 2006. Although an FSD is responsible for security at every commercial airport, not every airport has an FSD dedicated solely to that airport. Most category X airports have an FSD responsible for that airport alone. Other smaller airports are arranged in a "hub and spoke" configuration, in which an FSD is located at or near a hub airport but also has responsibility over one or more spoke airports of the same or smaller size.

Performance of Screening Functions at Commercial Airports

Passenger screening is a process by which authorized personnel inspect individuals and property to deter and prevent the carriage of any unauthorized explosive, incendiary, weapon, or other dangerous item aboard an aircraft or into a sterile area.[12] Passenger screening personnel

[12] TSOs conduct passenger and baggage screening at all but six commercial airports. These six airports have opted out of federal screening and, instead, utilize screeners employed by private screening companies under contract to TSA to perform these services.

must inspect individuals for prohibited items at designated screening locations.[13] There are four screening functions at passenger screening checkpoints. As shown in figure 2, the four passenger screening functions are:

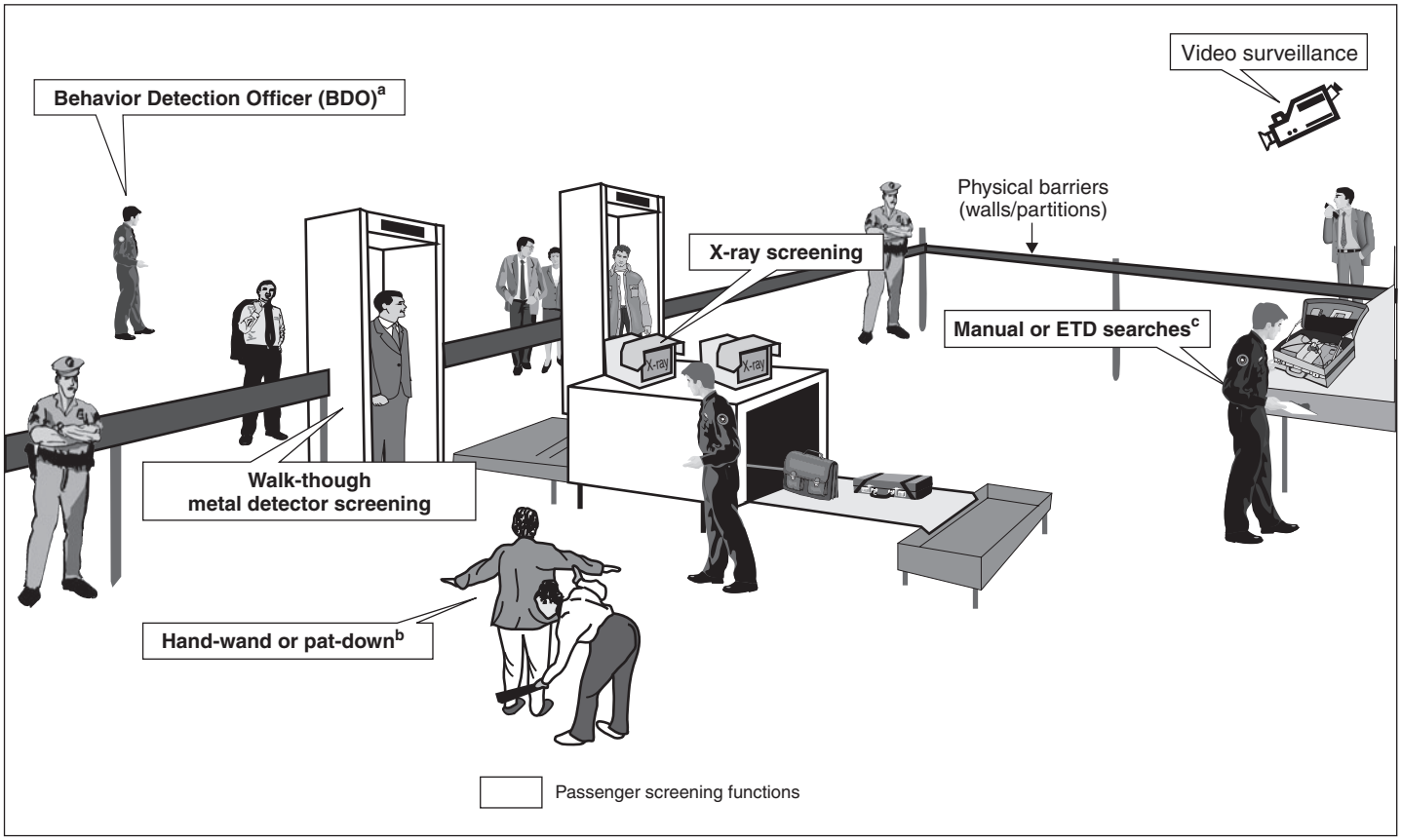
- X-ray screening of property,
- walk-through metal detector screening of individuals,
- hand-wand or pat-down screening of individuals, and
- physical search of property and trace detection for explosives.

Typically, passengers are only subjected to X-ray screening of their carry-on items and screening by the walk through metal detector. Passengers who set off the alarm on the X-ray machine or the walk through metal detector or who are designated as selectees—that is, passengers selected by a computer-assisted passenger prescreening system[14] or another TSA-approved process to receive additional screening—are screened by hand-wand or pat-down and have their carry-on items screened for explosives traces, or they are physically searched.

[13] Sterile areas are located within the terminal where passengers are provided access to boarding aircraft. Access to these areas is controlled by screening personnel at checkpoints where they conduct physical screening of individuals and their accessible property for weapons, explosives, and other prohibited items. Screeners must deny passage beyond the screening location (into the sterile area) to any individual or property that has not been screened or inspected in accordance with law, regulation, and passenger screening standard operating procedures.

[14] The computer-assisted passenger prescreening system is a system that, based on information obtained from airline reservation systems, identifies passengers that may pose a higher risk to aviation security. These higher-risk passengers and their baggage are subject to additional screening.

Figure 2: Passenger Checkpoint Screening Operation



Source: GAO and Nova Development Corporation.

Note: Bomb Appraisal Officers are available to respond to unresolved alarms at the checkpoint that involve possible explosive devices. The Bomb Appraisal Officer may contact appropriate law enforcement or Bomb Squad officials if review indicates possible or imminent danger, in which case the officer ensures that the security checkpoint is cleared. The officer approves reopening of security lane(s) if no threat is posed.

[a]Behavior Detection Officers are TSOs specially trained to detect suspicious behavior in individuals approaching the checkpoint. Should the BDO observe such behavior, he or she may refer the individual for individual screening or to a law enforcement officer.

[b]The hand-wand or pat-down is conducted if a passenger is identified or randomly selected for additional screening because he or she met certain criteria or alarmed the walk-through metal detector.

[c]Manual or ETD searches of accessible property occur if the passenger is identified or randomly selected for additional screening or if the TSO identified a potential prohibited item on X-ray.

Checked baggage screening is a process by which authorized security screening personnel inspect checked baggage to deter, detect, and prevent the carriage of any unauthorized explosive, incendiary, or weapon

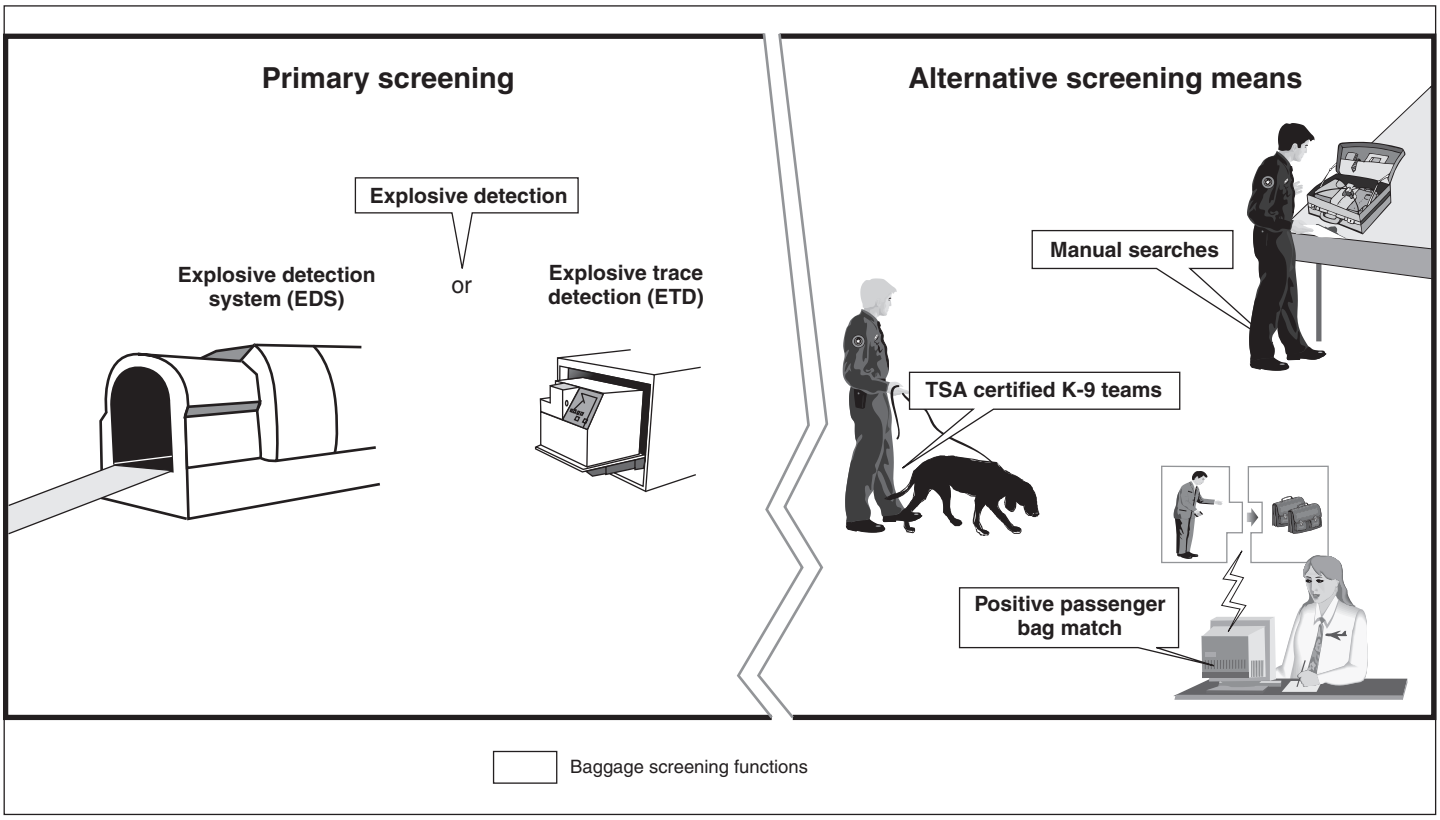
onboard an aircraft. As shown in figure 3, checked baggage screening is accomplished through the use of explosive detection systems[15] or explosive trace detection systems,[16] and through the use of alternative means, such as manual searches, canine teams, and positive passenger bag match,[17] when the explosive detection or explosive trace detection systems are unavailable.

[15] Explosive detection systems use probing radiation to examine objects inside baggage and identify the characteristic signatures of threat explosives. This equipment operates in an automated mode.

[16] Explosive trace detection works by detecting vapors and residues of explosives. Human operators collect samples by rubbing bags with swabs, which are chemically analyzed to identify any traces of explosive materials.

[17] Positive passenger bag match requires that passengers be on the same aircraft as their checked baggage. According to TSA, this procedure is rarely used.

Figure 3: Checked Baggage Screening Operation



Source: GAO and Nova Development Corporation.

History of TSO Staffing Levels and Staffing Models

The Aviation and Transportation Security Act mandated that TSA assume responsibility for passenger and checked baggage screening at the nation's airports using federal employees within 1 year of enactment.[18] By November 2002, TSA had fully deployed a federal passenger and checked baggage TSO workforce of about 55,000 full-time equivalents to the nation's commercial airports. This level of TSOs needed to conduct passenger and checked baggage screening was identified by a consultant, relying largely on the number of private sector screeners that had been in place prior to TSA. Subsequently, TSA decided to develop a staffing model

[18] See Pub. L. No. 107-71, § 110(b)-(c), 115 Stat. at 614-16 (enacted on November 19, 2001). See also 49 U.S.C. § 44901(a).

to more effectively determine the appropriate number of TSOs needed at the nation's airports. TSA developed a demand driven model—a model based on flight schedules, connecting flight data, passenger loads,[19] passenger arrival distribution curves,[20] and number of passenger bags along with throughput rates for processing the passengers and bags—in an effort to make screening operations more efficient.[21] This model identified a TSO staffing level of 49,600 full-time equivalents based, in part, on the need for 5.5 TSOs per passenger screening lane. The DHS Appropriations Act, 2004, enacted in October 2003, however, imposed a 45,000 full-time-equivalent cap specific to the number of TSOs.[22]

In May 2003, TSA set out to develop a tool to better define aviation security staffing requirements at airports nationwide by accounting for changes in screening technology, operating conditions, and airline operations. The result of this effort is the Staffing Allocation Model—an optimization model that seeks, within certain TSA constraints,[23] to estimate the most efficient balance of TSOs needed to ensure security and minimize wait times.

As shown in figure 4, TSA uses the staffing allocation model to generate (1) an annual full-time-equivalent total for each airport, known as an "annual allocation run," and (2) TSO work schedules throughout the course of the year, known as a "production, or scheduling, run." To

[19]According to TSA, historical data on the number of passengers on each flight are known as "load factors" or passenger loads. Using historic data on passenger load factors, TSA estimated the number of passengers to be screened at each airport.

[20]According to TSA, the rate at which passengers arrive at security checkpoints in anticipation of specific flights, is known as "passenger arrival distribution curves." These distribution curves show, based on historical data, how many passengers will arrive for the flights at different intervals of time prior to the flight.

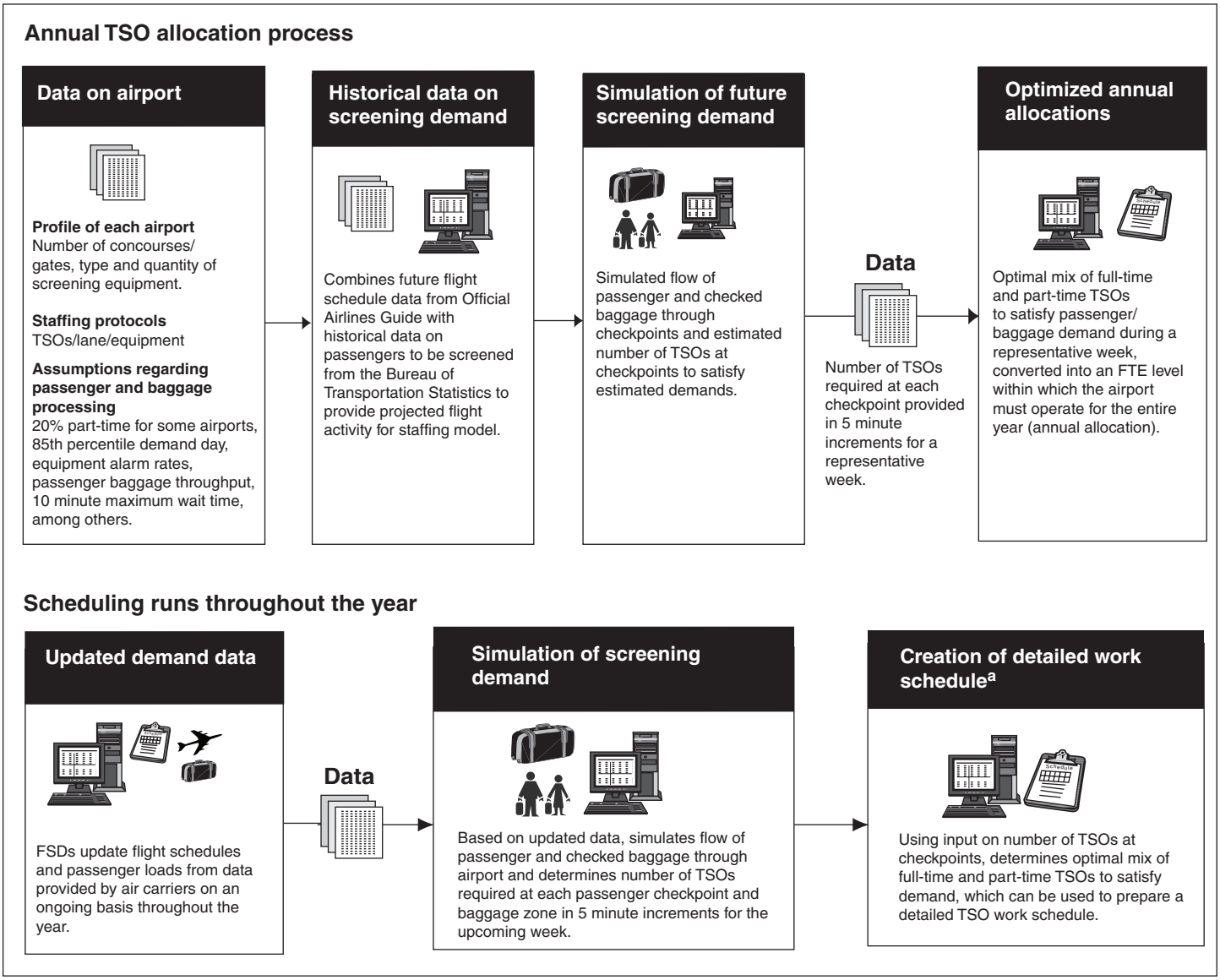
[21]We were limited in the extent to which we could assess TSA's prior staffing models because the TSA personnel responsible for overseeing the development of the earlier model are no longer employed by TSA and limited documentation on the models was available.

[22]According to TSA, private screeners do not count against the 45,000 full-time-equivalent ceiling. TSA currently contracts private screening companies to perform passenger and checked baggage screening at six commercial airports as part of its Screening Partnership Program, which allows commercial airports to opt to use private screeners in lieu of TSOs. TSA provides private screening companies with their full-time-equivalent levels based on the levels identified by the staffing allocation model. See GAO-06-166.

[23]Some of the constraints include the number of checkpoints and screening lanes at an airport, and the distribution of arriving and departing flights throughout the day.

determine the annual full-time-equivalent total for each airport, FSDs must first provide input to the model on their airports' passenger and checked baggage screening configuration. FSDs also provide input to the model on their airports' busiest month for screening demand based on originating passenger load factors. This "peak month" determination forms the basis of one of the model's key operating parameters used to compute each airport's full-time-equivalent staffing allocation. Specifically, for determination of an airport's annual full-time equivalent level, the model assumes a screening demand based on the average demand day during the airport's peak month. This assumption is linked to TSA's 10-minute wait time goal for processing passengers and baggage through security. According to TSA officials, the use of the average peak demand day is intended to ensure that, on an annual basis, 85 percent or more of the total passengers screened in U.S. airports will not have to wait more than 10 minutes to be screened. Once the peak month is selected for each airport, TSA performs the annual allocation run on a representative week within the peak month.

Figure 4: TSA's Use of the Staffing Allocation Model for Annual TSO Allocations and Scheduling of TSOs for Airports



Source: GAO, based on discussions with TSA officials.

[a]Use of the model's scheduling component is optional, and some FSD offices create detailed work schedules using other methods.

After receiving and reviewing the inputs and assumptions for each airport, TSA runs the Staffing Allocation Model to determine each airport's full-time equivalent level for the upcoming year.[24] During the run, the model takes each airport's configuration and peak month screening demand input, combines it with the assumptions regarding baggage and passenger processing, and uses these factors to simulate the flow of passengers and baggage through an airport's screening areas to provide work force requirements. Then it calculates the total number of TSOs required (expressed in full-time equivalents) for the year based on the results of running the model for the representative week of the peak month. This representative week FTE level is used to calculate the annual FTE estimate for the airport.

After receiving their annual full-time-equivalent allocation, TSA staff at individual airports may periodically run the model throughout the year. As shown in figure 4, during these "scheduling" runs, FSD staff may use the model's optional scheduling tool to determine work schedules for TSO staff that will satisfy screening demand on a day-to-day basis.[25] Similar to the annual allocation runs, TSA also inputs various historic data into the model during the scheduling runs. This input includes originating passenger load factors, estimates of number of bags per passenger, and passenger arrival distribution curves.

In order to formulate TSO work schedules, the model monitors the passenger arrival patterns and recommends opening and closing lanes at passenger checkpoints to accommodate the demand. The optional scheduling software recommends a mix of full-time and part-time TSOs to satisfy the workforce requirements based on projected screening demand.

According to TSA officials responsible for the staffing allocation model, TSA first ran the Staffing Allocation Model in August 2004 for fiscal year 2005. The model, which did not yet contain complete data on each airport, identified a TSO full-time-equivalent level of 47,865 across all airports. To reach the congressionally-mandated limit of 45,000 full-time-equivalent

[24] TSA has established assumptions in the model that are largely uniform for all airports while recognizing that slight variances may exist due to differing conditions among airports.

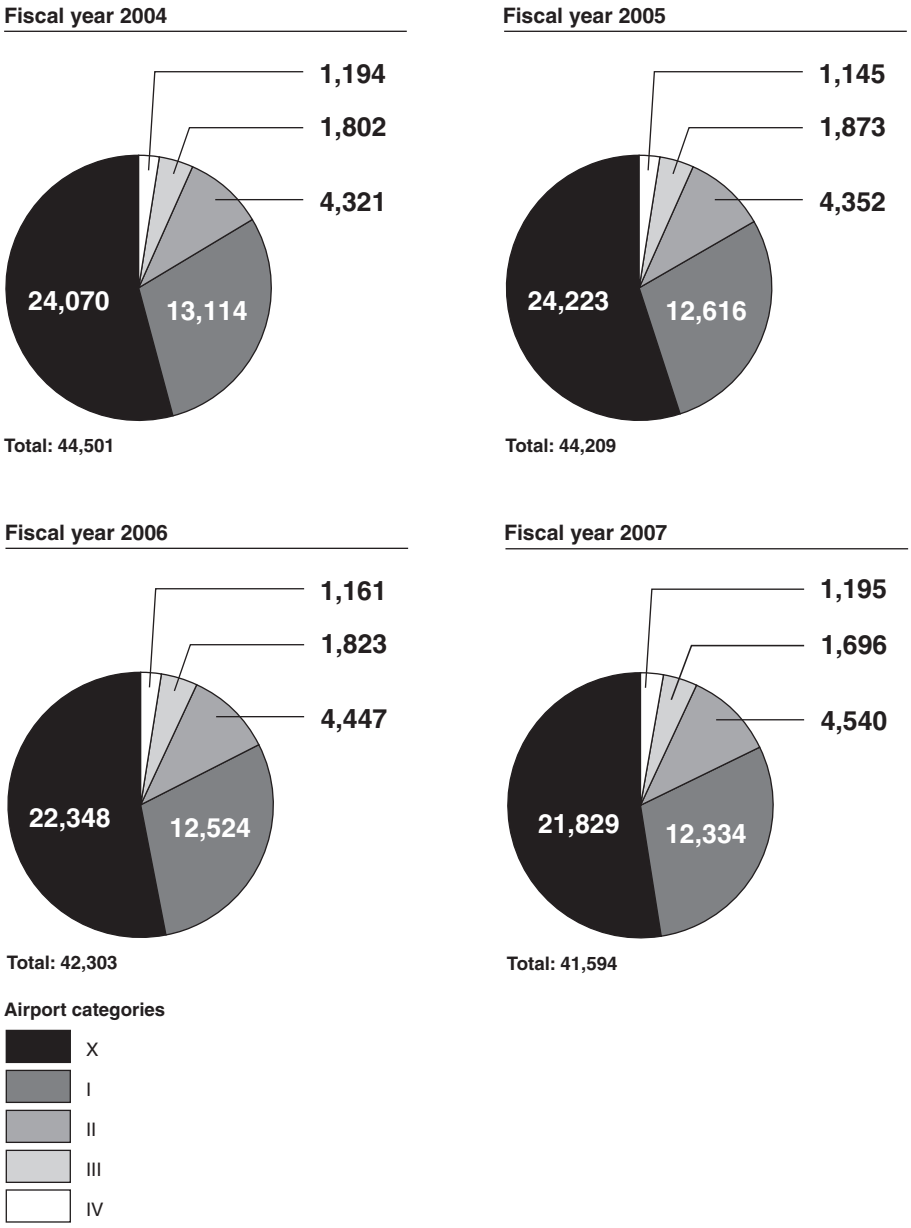
[25] FSDs may choose to use the Staffing Allocation Model's optional scheduling tool or an alternative method to prepare work schedules for their TSOs. In some cases, FSDs and their staff may choose to use the scheduling tool as is, modify its output, or use a scheduling method completely independent of the scheduling tool.

TSOs, TSA applied a 7 percent reduction to the staffing levels identified by the model across all airport categories. TSA officials stated that they subsequently questioned this approach given that smaller (category III and IV) airports have significantly fewer TSOs and, therefore, were more significantly impacted by the 7 percent reduction in full-time equivalent positions.

According to TSA officials, because the Staffing Allocation Model was not centrally hosted[26] and did not contain complete data, the model may have over-estimated the required FTEs for fiscal year 2005. TSA determined that in August 2005, the Staffing Allocation Model contained complete and accurate data on each airport and the agency used it to identify TSO FTE allocations for each airport, and the output reflecting the total number of FTEs required—42,303—required no adjustment to fall within the congressionally-mandated limit of 45,000 TSO FTEs. According to TSA officials, when TSA ran the model, it did so without imposing a limitation on the maximum number of full-time-equivalent TSOs, including either the 45,000 congressional limit or any budgetary limits. TSA informed FSDs of their TSO full-time-equivalent allocations in October 2005. Figure 6 shows the total TSO allocation, by airport category, for fiscal year 2004—the year prior to implementation of the staffing allocation model—through fiscal year 2007.

[26]According to TSA officials, "centrally hosted" refers to the fact that the Staffing Allocation Model was not maintained on a database server accessible by both headquarters and field TSA personnel. Instead, in fiscal year 2005, TSA personnel at each airport ran the model on standalone computers. Therefore, TSA headquarters' oversight of inputs to the model by field personnel was not as effective prior to the advent of central hosting in fiscal year 2006.

Figure 5: Total TSO Allocation, by Airport Category, for Fiscal Years 2004 through 2007



Source: GAO analysis of TSA data.

Note: The allocations in this figure reflect federal TSOs only and do not include private screeners employed at the 6 airports across the nation utilizing these personnel.

FSDs, air carrier representatives, and airport operators we interviewed at the 14 airports we visited stated that TSA's efforts to allocate a sufficient number of TSOs to screen passengers and checked baggage and minimize wait times have improved over the years. These officials stated that passenger and checked baggage screening has become more efficient as TSA has matured and gained a better understanding of the airport operating environment, and frequent travelers have become more familiar with the screening process.

TSA's Use of the National Screening Force, Reserve TSO Full-Time Equivalents, and Private Screeners for Certain Screening Needs

TSA sets aside TSO full-time equivalents for needs outside of those considered by the Staffing Allocation Model in the annual allocation run for all airports. In order to handle short-term extraordinary needs at airports, TSA has established the National Screening Force of 615 TSOs who can be sent to airports to augment local TSO staff during periods of unusually high passenger volume. In addition, certain airports may, during the course of the year, experience significant changes to their screening operations (e.g., arrival of a new airline, opening of a new terminal, etc.). For these airports, TSA established a reserve of 329 TSO full-time equivalents for fiscal year 2006 that can be used to augment the existing force. This allocation approach allowed TSA to stay within the 43,000 full-time-equivalent TSO budgetary limit for fiscal year 2006—a staffing level that TSA's Assistant Secretary stated is sufficient to provide passenger and checked baggage screening.[27]

Lastly, TSA allows certain airports to hire private contract screeners in lieu of TSOs. Under the Screening Partnership Program,[28] six airports have applied to TSA and received approval to hire private contract screener forces as of fiscal year 2006. Despite the fact that these airports do not use federal screeners, TSA still used the Staffing Allocation Model to

[27]Appropriations received by TSA in fiscal year 2006 were sufficient to employ up to 43,000 full-time equivalent TSOs.

[28]The Aviation and Transportation Security Act established TSA and assigned TSA with the responsibility of building a federal workforce to conduct screening of airline passengers and their checked baggage. See 49 U.S.C. §§ 114(a), 44901(a). ATSA also required that TSA allow commercial airports to apply to TSA to transition from a federal to a private screener workforce. See § 44920. To support this effort, TSA created the Screening Partnership Program to allow all commercial airports an opportunity to apply to TSA for permission to use qualified private screening contractors and private screeners. There are currently 6 airports participating in the Screening Partnership Program, including Jackson Hole, Kansas City International, Greater Rochester International, San Francisco International, Sioux Falls Regional, and Tupelo Regional.

determine the full-time equivalent screening staff at each of these airports for fiscal year 2006. These staffing levels, as determined by the model, served as a limit on the number of private screeners that the private screening contractors could employ. According to TSA, the 1,702 total full-time equivalent staffing allocation at these airports does not count against TSA's nationwide ceiling of 45,000 full-time equivalents for TSO staff.

TSA Relies on the Assumptions in Its Staffing Allocation Model, along with Mechanisms for Monitoring Them, to Help Ensure Sufficient TSO Staffing Levels, but Some Key Assumptions Do Not Reflect Operating Conditions

TSA aims to ensure that its Staffing Allocation Model provides a sufficient number of TSOs to perform passenger and checked baggage screening by: (1) building assumptions into its allocation model that are designed to calculate the necessary levels of TSOs to ensure security and minimize wait times, and (2) employing multiple monitoring mechanisms for the sufficiency of the model's outputs. TSA's staffing allocation model determined the fiscal years 2005 and 2006 TSO staffing level for each airport based on built-in assumptions designed to ensure the necessary levels of security and to minimize wait times—such as assumptions regarding processing of passengers and baggage through security checkpoints and information about each airport's baseline configuration—e.g., physical infrastructure. During the first 2 years of the Staffing Allocation Model's use, TSA established several mechanisms to monitor the sufficiency of the model's outputs and make adjustments in key model assumptions that do not fully reflect operating conditions for some airports. For example, TSA established a process for FSDs to request revisions to the assumptions used for their individual airports. In fiscal year 2006, TSA granted some, but not all, requests. TSA headquarters also started an assessment to evaluate selected Staffing Allocation Model assumptions, an assessment it expects to perform annually, varying the assumptions it examines each year. However, TSA does not have a mechanism for selecting and prioritizing which assumptions to review each year and for assuring that all assumptions are periodically reviewed. Additionally, FSDs and our own analysis identified concerns with the appropriateness of some of the assumptions for the fiscal year 2006 model. For example, some FSDs stated that TSA's method of calculating screening demand (the 85th percentile day) to also account for TSO absences from screening did not provide them with sufficient surplus staffing. In addition, the model assumed a ratio of 20 percent part time to 80 percent full time (expressed in full-time equivalents), even in airports that have consistently been unable to achieve a 20 percent part-time TSO workforce; and the model had no mechanism to account for use of TSOs to perform operation support functions.

TSA's Staffing Allocation Model Seeks to Determine the Optimal TSO Staffing Levels for Each Airport, Relying on Assumptions that Are Designed to Help Ensure Necessary Levels of Security and to Minimize Passenger Wait Times

TSA's Staffing Allocation Model determined the fiscal years 2005 and 2006 TSO staffing level for each airport using several built-in assumptions regarding security and wait times, in addition to data that reflect each airports' baseline configuration—e.g., permanent infrastructure and type of screening equipment.

The key built-in assumptions are adjustable and designed to help ensure the necessary levels of security while minimizing wait times and include:

- The minimum number of TSOs needed to staff each passenger screening checkpoint or baggage screening area based on the standard operating procedures for screening passengers and checked baggage and throughput rates for passenger and checked baggage screening equipment (see app. II).
- A 10-minute maximum wait time for processing passengers and checked baggage.[29]
- Originating passenger and baggage load factors by airport based on a representative week during each airport's peak month (the 85th percentile assumption), which TSA expects will give FSDs some time during less busy periods to allow TSOs to obtain required training, perform operational support functions, and take annual or other forms of leave.[30]
- A desired ratio of 80 percent full-time to 20 percent part-time TSO staff, expressed as full time equivalents, at each category X, I, and II airport to allow for heavier staffing during busier periods (e.g., the hours when business travelers typically depart) and to minimize overstaffing during less busy periods, times during which part-time TSOs would not be scheduled to work.

[29] The wait time (e.g., 10, 20, or 30 minutes) set in the model will influence the number of lanes and baggage equipment required; and, therefore, the TSO staffing required to process 85 percent of the annual passengers in less than the wait time that is set.

[30] TSA determines this assumption by selecting the month with the highest average passenger demand day (calculated by dividing total monthly passenger loads, reported by airlines, by the number of days in the month) as the peak month. According to TSA, only about 7 percent of an airport's days during the year will have greater passenger demand than this average peak demand day. TSA's industrial engineers have determined that running the model with a level of demand based on a representative week during this peak month will provide enough TSA staff to process 85 percent of passengers through security checkpoints in 10 minutes or less annually.

- Nonpassenger throughput rate of 4 percent.[31]

- Rates at which screening equipment have historically signaled the possibility of a threat object and the consequent need for additional screening.

The Staffing Allocation Model used these assumptions, along with other inputs such as each airport's baseline configuration—e.g., the number and type of checkpoints, security lanes, baggage screening areas, and screening equipment at each airport—to determine TSO staffing allocations for the nation's commercial airports for fiscal years 2005 and 2006. TSA officials stated that the assumptions used in the staffing allocation model and the other inputs collectively determine the TSO full-time-equivalent allocation for each airport. For this reason, airports with similar screening demand but different checkpoint configurations and types of screening equipment may receive different allocations. For example, TSA officials identified two category I airports that have similar screening demand, yet one airport received almost 50 percent more full-time equivalent TSOs in fiscal year 2006 due to the physical infrastructure differences at these airports. Specifically, one airport has one terminal building, with three concourses, which generally enables passengers to be efficiently routed through one checkpoint in that one terminal. In contrast, the other airport has two separate terminals that prevent passengers from being routed through common checkpoints. This airport's separate terminals make sharing TSOs among the various checkpoints more challenging, creating a need for additional TSOs, thus the larger TSO allocation. Additionally, we visited category X and I airports with similar passenger volumes and differing TSO full-time-equivalent allocations for fiscal year 2006. According to TSA, in the case of the category X airports, while the passenger volumes for the two airports were similar—17.4 and 16.5 million, respectively—the difference in the type of passengers and the type of baggage screening equipment resulted in one of these airports receiving 26 percent more full-time-equivalent TSOs. Table 1 provides a summary of the various factors that influenced full-time-equivalent TSO allocations for fiscal year 2006 at some of the airports we visited.

[31]Examples of non-passengers going through security checkpoints include flight crews and other airline employees, vendors at the airport, and other airport personnel.

Table 1: Examples of Differences in Screening Operations, at Selected Airports We Visited, That Resulted in Differing TSO Allocations

Airport Category	Airports visited	FY 2006 model allocation	FY 2005 total enplanements	Differences in screening operations resulting in differing allocation
X	Detroit (DTW)	734	17,433,663	• Orlando has more originating passengers than Detroit, which results in more passengers to screen. Detroit has more connecting flights whose passengers have already been screened at their originating airport. • Detroit has a partial in-line baggage screening system, which requires fewer TSOs, and Orlando does not have an in-line system.[a]
	Orlando (MCO)	925	16,502,499	
I	Indianapolis (IND)	292	4,211,461	• Indianapolis has more originating passengers than Orange County. Indianapolis is a mid-west airport with more connecting passengers that do not need to be screened. • Orange County has a full in-line baggage system, and Indianapolis has a partial in-line system serving only 3 airlines. As a result, Orange County has a reduced need for baggage-screening TSOs.[a] • Orange County has 2 checkpoints in its terminal building that are close enough to one another to allow transferring of TSOs back and forth as screening demand dictates. This ease of sharing TSOs between the checkpoints results in a reduced number of TSOs than that called for by the model. In contrast, Indianapolis has 4 concourses with 3 checkpoints and less ease of movement among them, which the model recognizes, thus requiring more TSOs.
	Orange County (SNA)	217	4,791,100	

Source: TSA and GAO observations at airports.

Note: The fiscal year 2005 enplanements data are only a rough indicator of actual screening demand. However, at the time we selected the airports to visit, enplanements data were the best available data.

[a]An in-line baggage screening system integrates explosive detection systems with an airport's existing baggage handling system, requiring less human intervention (and, correspondingly, less TSO staff) than stand-alone systems that are not integrated into existing baggage systems. In a partial in-line system, the airport has some explosive detection systems integrated with the conveyor belts of the airport's existing baggage handling system while others are in a stand-alone setup. An airport with a full in-line system has all of its explosive detection systems integrated with the baggage handling system.

The Intelligence Reform and Terrorism Prevention Act of 2004 required TSA to develop staffing standards that provide for the necessary levels of security and minimize delays for passengers. According to TSA officials responsible for the Staffing Allocation Model, the model ensures that the staffing allocations provide for the necessary levels of security because the model is based on TSA's standard operating procedures for screening passengers and their carry-on items and checked baggage and on the technology available at the passenger checkpoints and baggage screening areas. For example, the passenger checkpoint standard operating

procedures require that a minimum of one TSO be staffed for each of the screening functions at a checkpoint. The staffing model includes an assumption (for larger airports) of at least 5.5 TSOs per screening lane—which responds to the need for one TSO per function at every checkpoint and includes a value for supervisors that typically oversee two lanes.[32] In addition, the staffing model provides an allocation for each airport based, in part, on the screening technology at the airport. In addition, the model includes assumptions on alarm rates for various types of passenger and baggage screening equipment and determines the sufficient number of TSOs needed to resolve the alarms at the projected rate to be able to achieve the model's wait time standard of 10 minutes for processing passengers and checked baggage.[33]

Regarding minimizing passenger delays, a key assumption in the staffing allocation model is that wait times for screening passengers and checked baggage will not exceed 10 minutes when the model is set at a level referred to as the airport's 85th percentile day, which TSA calculates by estimating screening demand at the level required for a representative week of each airport's busiest month. TSA officials stated this assumption is based on a goal that was established when TSA was first created within the Department of Transportation. Specifically, the Secretary of the Department of Transportation established a goal that passengers be processed through passenger screening checkpoints in 10 minutes or less—a standard considered appropriate to meet the dual needs of ensuring security while maintaining national mobility. TSA officials stated that they determined that basing the Staffing Allocation Model's demand level on the representative demand week of each airport's peak month, coincided with screening 85 percent of passengers within 10 minutes. TSA officials told us that some passengers will still have to wait longer than 10 minutes at certain airports at certain times due, at least in part, to the fact that about 7 percent of an airport's travel days (about 25-30 days) during the year are expected to exceed the 85 percentile demand day.

[32]Based on their review of selected model assumptions, TSA has changed the number of TSOs, per lane, for fiscal year 2007 from 5.5 to 4.25 (at category X, I, and II airports).

[33]We currently have an ongoing review of the Department of Homeland Security's and TSA's efforts to research, develop, and deploy airport screening operations. As part of this review, we are determining the extent to which DHS and TSA have deployed technologies to mitigate terrorist threats effectively at airport passenger checkpoints while ensuring the efficient movement of passengers. We expect to report our results in August 2007.

As shown in table 2, TSA data for fiscal years 2004 through 2006 show that the nation's smaller airports (categories II, III, and IV) had shorter average wait times than the standard, overall, with a wait time during peak periods averaging less than 10 minutes, although wait times exceeded this level at certain airports on certain days.[34] Average peak wait times at the nation's larger airports (category X and I) generally exceeded the wait time standard, overall, although wait times were less than 10 minutes at certain airports on certain days. According to TSA headquarters officials, if airports are consistently exceeding the 10 minute wait time goal, it is the responsibility of the Area Directors to reach out to the FSDs at those airports in an effort to determine whether the root cause relates to staffing, equipment, capacity, or some other issue and to take appropriate remedial action.[35]

Table 2: Average Peak Wait Times in Minutes, by Airport Category, Fiscal Years 2004-2006

Average peak wait times in minutes						
Fiscal year	**All categories**	**Category X**	**Category I**	**Category II**	**Category III**	**Category IV**
FY04	9.4	13.0	11.8	8.5	9.1	8.6
FY05	8.9	12.0	11.2	8.3	8.7	8.2
FY06	8.2	12.6	10.4	7.7	8.0	7.2

Source: TSA.

TSA officials cited capacity issues as a factor that contributed to category X airports generally exceeding the 10-minute wait time goal during peak periods, as shown in table 2. These airports have higher screening demand than smaller airports and sometimes lack the capacity, with regard to space available for additional passenger lanes and baggage

[34] TSA is to collect wait time data every 30 minutes during peak hours (e.g., weekdays between 5:00 am-8:00 am and 3:00 pm-7:00 pm and Sundays between 4:00-9:00 pm) and every hour during non-peak periods of time. During each data collection period, a TSO is to stamp wait time cards with the current time, provide the cards to the last three passengers in line during off-peak periods and the last four passengers during peak periods. The passengers are to give the cards to a TSO once they reach the front of the line and are directed to a lane for screening. The TSO is to record the time on the card. At the end of each day, a supervisory TSO is to collect the wait time cards from his or her checkpoint and enter the wait time data into the Performance Management Information System.

[35] FSDs report to one of three Area Directors, based on their geographic regions, on administrative matters. The Area Directors oversee transportation security at airports and in other modes of transportation for the East Coast, Central, and Western regions, respectively.

screening areas, to process passengers and baggage quickly enough to have lower wait times. Smaller airports are more likely to have a number of passenger lanes and baggage screening areas that are more commensurate with their screening demand than some larger airports that have higher screening demand.

TSA Has Four Mechanisms in Place to Monitor the Sufficiency of Its TSO Allocations and Is Formalizing Its Process for Revising the Model's Assumptions

TSA has four mechanisms in place to monitor the sufficiency of the TSO allocations. First, at individual airports, FSDs and the industrial engineers assigned to their airports are responsible for monitoring their passenger and checked baggage screening operations to ensure that the staffing allocation model's inputs are reliable.[36] A process currently exists to enable FSDs to request revisions to the assumptions used for their individual airports when they believe that a model assumption is unrealistic. As part of this process, FSDs are to submit empirical data to support requests to alter assumptions. Based on TSA's review of the data, TSA may send an "optimization team" to the airport in an effort to identify the cause of the staffing problem.[37] Optimization teams are composed of experts in passenger and baggage screening operations and procedures, the staffing allocation model, and TSO scheduling. These teams observe screening operations and seek to maximize efficiencies by applying practices learned at other airports. The reviews are used to help improve the design of passenger and baggage checkpoints, evaluate staffing and scheduling practices, determine compliance with the standard operating procedures, validate the TSO staffing model at the airport, and make adjustments to model assumptions, if necessary. TSA officials stated that they are formalizing a process for systematically collecting information on best practices identified by optimization teams so that this information can be disseminated across airports. TSA's solicitation of input from FSDs regarding changes that need to be made to the assumptions that guide their TSO allocations is consistent with our standards for internal control, which call for management to ensure effective internal communications,

[36] TSA employs industrial engineers and assigns them to airports throughout the country based on the geographic region. Each of the industrial engineers is assigned to TSA headquarters and reports to one of TSA's three Area Directors. These engineers are responsible for assisting and monitoring airports in their use of the Staffing Allocation Model.

[37] According to TSA officials, an optimization team is not sent to an airport in response to every FSD request for a revision to an assumption for their airport. For example, if TSA determines that it is readily apparent from the request that a change is not needed, TSA would not send an optimization team to visit the airport.

for example, by establishing mechanisms for employees to recommend improvements in operations.[38]

During the first 2 years of the implementation of the Staffing Allocation Model, TSA granted some, but not all, of FSDs' requests to modify the assumptions used for their individual airports. TSA provided several examples of these requests and the final outcome. For example, an FSD requested a change to passenger screening throughput rates at some of the passenger lanes in the international terminal due to the amount and type of carry-on items passengers tended to carry through this checkpoint. After reviewing the FSD's request and sending an optimization team to assess the validity of the request, TSA changed the model's assumption about the passenger throughput rate for this checkpoint from 200 to 165 passengers per hour at these lanes. TSA officials told us that, in situations like this, the model will recommend opening more lanes and adding TSOs, if deemed warranted, to offset a reduction in the number of passengers screened per hour. In another example, an FSD requested a change in its non-passenger—flight crew and airport employees—throughput rate based on data collected at the checkpoint that showed a higher percentage of nonpassenger throughput than the model assumes. TSA headquarters officials denied the request because the higher percentage of nonpassenger throughput was primarily occurring during off-peak periods and would not have changed the model's results for that airport.

TSA headquarters officials told us that they did not document all the previous requests that they received from FSDs, potentially limiting the agency's ability to learn from past circumstances. TSA officials acknowledged that it would be helpful to fully document the requests they receive from FSDs and the outcome of these requests to help ensure consistency in their decision making, to provide a basis for management and decision makers to review and evaluate the decision-making process for potential improvements, and to replicate successful practices when similar circumstances arise at other airports. Officials stated that TSA is formalizing its process for revising assumptions based on airport-specific circumstances. In August 2006, TSA developed and distributed to FSDs a draft standard form to use when requesting deviations from the Staffing Allocation Model's standard assumptions. The form, finalized as of

[38]GAO, *Internal Control: Standards for Internal Control in the Federal Government*, GAO/AIMD-00-21.3.1 (Washington, D.C.: November 1999); *Internal Control: Internal Control Management and Evaluation Tool*, GAO-01-1008G (Washington, D.C.: August 2001).

January 2007, captures information such as the date of the request; the airport for which the request is being made; the justification for the request; and approvals at various levels, such as the industrial engineer and TSA headquarters. TSA stated that FSDs were previously made aware of the draft form and provided instructions on using this form through various communication mechanisms, including written instructions provided to FSDs and FSD conferences held in September 2006. TSA is also developing a database to record and track the requests made by FSDs, decisions on whether to approve or deny requests, and the basis for the decisions. TSA officials stated that they expect the database to be completed by April 30, 2007.

Regarding the second mechanism to monitor the sufficiency of the model's outputs, TSA headquarters officials said it is the responsibility of individual FSDs and the industrial engineers assigned to their airports to ensure that the staffing allocation model reflects the configuration of and operating conditions at their airports. Therefore, TSA officials stated that, just prior to the model's annual allocation run for fiscal year 2006, they systematically solicited input from the industrial engineers assigned to the more than 400 commercial airports to determine whether the model contains correct information regarding the configuration of each airport.[39] TSA expects this process to occur annually in order to help ensure the reliability of the data inputs.

As a third mechanism to monitor the sufficiency of the model's outputs, TSA headquarters officials stated that they continually monitor performance data reported by individual airports to identify any anomalies that may require further investigation such as high wait times over an extended period of time, lower than expected throughput at passenger lanes, high overtime rates (in excess of 4 percent), and airports with onboard TSO staff consistently below their staffing allocation. In some cases, anomalies identified by TSA may result in an optimization team visit to an airport in an effort to determine their cause. For example, TSA headquarters officials stated that an airport with consistently high wait times (generally greater than 40 minutes during peak periods) may prompt such a visit. During the visits, the optimization teams perform analyses (with the assistance of the staffing allocation model) to determine the

[39] TSA assigns industrial engineers to assist these airports with their use of the staffing model based on the region of the country where they are located. However, TSA does not have sufficient levels of industrial engineers to locate one at each of these airports. As a result, a single industrial engineer may be responsible for assisting multiple airports.

causes of the problems the airport is having and suggest to the local FSD ways to increase efficiency in the passenger and baggage screening operations to overcome the problems. In some cases, the optimization team may conclude that a change to the Staffing Allocation Model's baseline assumptions for the airport is necessary. For example, the airport may have lower throughput rates at some of its passenger or baggage screening areas than the Staffing Allocation Model assumes, due to different types of screening equipment or the physical layout of the airport security checkpoints.

Finally, according to TSA officials, in September 2006, TSA completed its first annual review of certain assumptions in the Staffing Allocation Model. This review included an assessment of whether the assumptions under review are still realistic, including assumptions related to screening procedures, technology, screening throughput, and nonpassenger alarm rates; and whether adjustments to the model are needed to make the full-time-equivalent allocation reflect actual operating conditions at airports. As a result, as shown in table 3, TSA has changed some assumptions and added others to more realistically reflect actual operating conditions.[40] For example, TSA headquarters officials responsible for the model stated the fiscal year 2007 model will provide 4.25 TSOs per passenger checkpoint screening lane rather than the 5.5 TSOs per lane provided in the fiscal year 2006 model—a change TSA officials attributed to the model directly accounting for collateral duties performed by TSOs, TSO time paid but not worked,[41] and TSO training requirements.

[40]According to TSA, as part of the process of reviewing the staffing allocation model assumptions, TSA headquarters officials responsible for the model held conferences with FSD staff responsible for preparing TSO work schedules to help ensure that they understood the model and the changes implemented in fiscal year 2007.

[41] This time includes annual, sick, and military leave in addition to compensatory time and injury time off.

Table 3: Summary of Changes to the Staffing Allocation Model Implemented in Fiscal Year 2007

	Fiscal year 2006 staffing allocation model	Fiscal year 2007 staffing allocation model
Staffing constants	Security checkpoint staffing set at 5.5 for category X, I, and II airports.	Security checkpoint staffing set at 4.25 for category X, I, and II airports.
	EDS machine staffing set at 3.	EDS machine staffing set at 2.
TSO paid-not-worked hours (annual, sick, and military leave, comp time, and injury time off)	Not directly accounted for	Each airport has a 14.5 percent annual FTE allowance for time paid not worked.
Operational support functions	Not directly accounted for	Airports in categories X, I, and II have a 5 percent collateral duties FTE credit.
TSO training	Not directly accounted for	Each airport has a 2 percent annual FTE allowance for training that cannot be completed during operational down times.
Part-time TSOs	Set at 20 percent of total FTEs for all category X, I, and II airports.	TSA has implemented a variable part-time goal based on each airport's individual part-time to full-time ratio.
Baggage/passenger screening equipment processing rates	ETD machine baggage processing rates (depending on type of equipment and internal/external screening methodology) set at 60, 90, or 180 seconds).	ETD baggage processing rates set at 55, 98, or 238 seconds.
	CTX 2500 EDS machine screening rate set at 90 bags per hour.	CTX2500 set at 115 bags per hour.
	CTX5500 EDS screening rate set at 160 bags per hour.	CTX5500 EDS screening rate set at 200 bags per hour.
		CT80 machine added with processing rate of 80 bags per hour.
		Explosives Trace Portal (ETP) machine added with processing rate of 175 passengers per hour.
Baggage arrival distributions	Included 6 different baggage distributions.	Number of baggage distributions reduced to 2.
New security initiatives		Added line item allocation for SPOT,[a] BAO,[b] and ADASP[c] security initiatives.

Source: TSA.

[a]TSA's Screening Passengers by Observation Technique program is designed to detect individuals who exhibit behavior that indicates they may be a threat to aviation and/or transportation security.

[b]TSA's Bomb Appraisal Officer initiative designates TSOs to receive specialized training in the detection of improvised explosive devices and apply this knowledge at security checkpoints.

[c]TSA's Aviation Direct Access Screening Program involves TSOs performing security screening for explosives, incendiaries, weapons, and other prohibited items or improper airport identification media. This security screening will occur at direct access points to include secured areas, sterile areas, or aircraft operating areas outside of TSA's security screening checkpoints.

TSA officials responsible for the staffing allocation model stated that in deciding which assumptions to review for the fiscal year 2007 model, they considered input they received from FSDs regarding operational

conditions at their airports that may not be adequately reflected in the model, along with other data and events that may have a bearing on the validity of the assumptions. However, TSA does not have a mechanism, such as a documented plan, for selecting and prioritizing which assumptions to review each year and for assuring that all assumptions are periodically reviewed. Without a plan for periodically validating the assumptions, the agency is at risk of assumptions becoming outdated, which could result in TSO allocations that do not reflect actual operating conditions. Moreover, given the ongoing personnel changes in TSA, a documented plan would help provide future decision makers with information on which assumptions had historically been assessed and which ones TSA planned to assess in the future.[42] TSA officials responsible for the staffing model acknowledged that while they had a general idea of how they plan to approach future annual reviews of the model, a documented plan would help provide assurance that the assumptions are periodically reviewed and validated, and are current with actual operating conditions.

Some Key Assumptions Used in the Fiscal Year 2006 Staffing Allocation Model Did Not Reflect Operating Conditions at Individual Airports

FSDs we interviewed reported that the screening allocation model is a more accurate predictor of their overall staffing needs than previous models that took into account fewer factors affecting screening operations. However, these FSDs and our own analysis identified that some of the key assumptions used in the staffing allocation model, during the first 2 years of its implementation, did not reflect actual operating conditions. Specifically, the FSDs identified five weaknesses in the model for fiscal year 2006.

First, 11 of the 14 FSDs identified concerns related to TSA's basing its estimate of demand levels for the Staffing Allocation Model on a representative week of each airport's peak screening demand month to allow excess time for training, leave, and other factors not directly considered by the staffing allocation model. Regarding training, 9 of the 14 FSDs expressed concern that the model did not specifically account for the training requirement of 3 hours per week averaged over a fiscal year quarter. Three of these FSDs said they faced challenges in meeting the minimum training requirements. With respect to annual and sick leave, 5

[42]Since its inception in November 2001, TSA has had multiple Assistant Secretaries (originally titled Under Secretaries of Transportation for Security). In addition, between January 2005 and August 2006, TSA issued seven press releases regarding senior-level personnel changes within the agency.

of the 14 FSDs stated that in their view the model did not adequately account for this leave. Two FSDs stated that the use of the peak demand month to account for training and leave, though sound in principle, is particularly difficult for smaller airports because they do not have as much fluctuation between their peak period and their non-peak period, which leaves little cushion in the allocation to accommodate TSO absences from screening duties such as training and annual leave.

TSA headquarters officials stated that TSA determined that using the 85th percentile day concept would more than account for training, leave, and other factors related to TSOs not being available for work because, according to TSA, on only about 7 percent of days do passenger volumes exceed it. Thus, according to TSA officials, the Staffing Allocation Model is set at a high enough demand level to cover screening demand for most days during the year and allow for the extra time needed for necessary nonscreening time needed by TSOs such as training, leave, and other duties. TSA officials told us that they believe this method of calculating demand provides the necessary level of security and, secondarily, reflects their responsibility to be good financial stewards of taxpayer dollars, as using even higher volume days would result in higher costs and perhaps lower overall productivity. Regarding the need for an additional allowance for various forms of TSO leave needs, TSA had included an allowance, for fiscal year 2007, in the Staffing Allocation Model for additional full-time equivalents (14.5 percent full-time-equivalent allowance) to cover annual, sick, comp, injury, and military leave.

Additionally, TSA headquarters officials have included an allowance in the fiscal 2007 Staffing Allocation Model (an additional 2 percent full-time equivalent allowance) for training that cannot be completed during operational down times. TSA specifically intended this allowance to provide additional assurance that TSOs complete the required training each month on detecting improvised explosive devices—which TSA has identified as the highest threat to commercial aviation security.

TSA officials involved in developing the staffing model stated that they did not plan to assess the extent to which the representative week of screening demand during each airport's peak month does, in fact, represent actual screening demand for that week. However, officials acknowledged that such an assessment could help verify that, for purposes of the model's annual allocation run, the resulting allocation provides TSO staffing levels adequate to allow for 85 percent of airline passengers at the nation's commercial airports to wait 10 minutes or less at security checkpoints.

Second, 7 of the 14 FSDs we interviewed stated that the goal of a 20 percent part-time TSO workforce, as measured by full-time-equivalent TSOs, is not realistic. TSA data show that the part-time TSO full-time-equivalent level at 13 airports we visited,[43] as of July 2006, ranged from approximately 1 to 38 percent, with an average of 8 percent. FSDs stated that the 20 percent part-time goal for TSOs has been difficult to achieve for most airports because of, among other things, economic conditions leading to competition for part-time workers, remote airport locations coupled with a lack of mass transit in some locations, TSO base pay that has not changed since fiscal year 2002, the lack of benefits for part-time TSOs, and the large number of part-time TSOs who convert to full-time status when full-time positions become available. According to TSA, these factors have made the hiring and retention of part-time TSOs particularly difficult. As shown in figure 6, TSA data reflect that, nationwide, part-time levels of TSOs had not reached 20 percent in the first 2 years of implementation of the current staffing allocation model (fiscal years 2005 and 2006) with regard to the nation's larger (category X, I, and II) airports.[44] For example, figure 6 also shows that in fiscal years 2005 and 2006, the nation's 26 category X airports had a TSO workforce comprised of about 9 percent part-time equivalents. TSA officials stated that the number of part-time TSOs had increased in recent months.

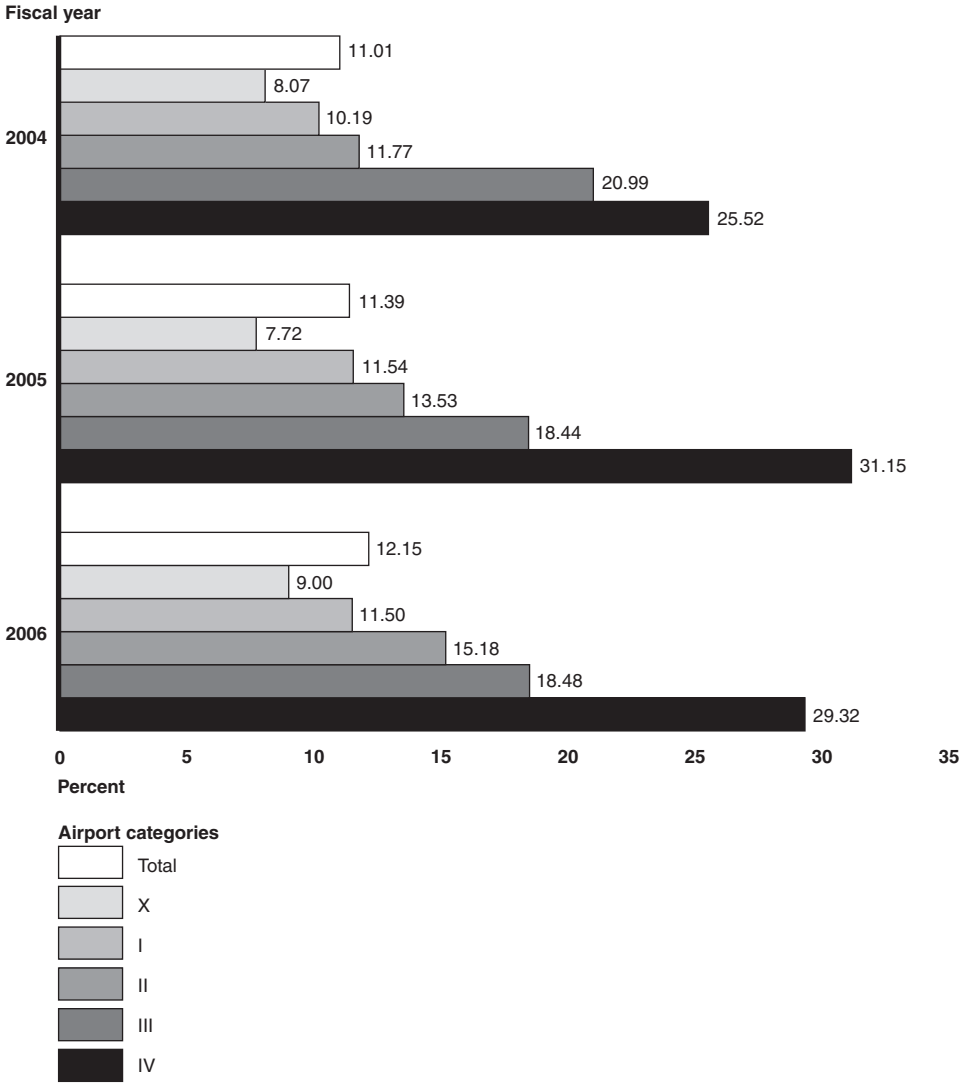
TSA officials originally assumed that the 20 percent TSO part-time assumption provides the most efficient coverage for airports (especially those in categories X, I, and II) by enabling FSDs to have more flexibility in matching the daily peak-load workflow at airports.[45] Nonetheless, figure 6 shows that, on average, only smaller airports (categories III and IV) came close to or exceeded the 20 percent part-time TSO workforce goal during fiscal years 2004 through 2006.

[43] The 14th airport we visited, San Francisco, had private screeners instead of TSOs.

[44] This ratio of part-time to full-time is based on annualized full-time-equivalent data. According to TSA, an annualized number represents an estimate of the usage of FTEs over the fiscal year assuming that the usage in a given pay period remains constant over all future pay periods.

[45] TSA officials stated that they conducted sensitivity analysis around various mixes of full-time to part-time TSOs at category X airports and identified that no additional efficiency was gained at these airports with a full-time-equivalent level of part-time TSOs greater than about 20 percent.

Figure 6: Percentage of Part-Time TSOs by Airport Category, Fiscal Years 2004 through 2006



Source: GAO analysis of TSA data.

Note: This figure includes data on federal TSOs only and not on private screeners employed at the 6 airports across the nation utilizing these personnel.

TSA has recognized that some airports cannot likely achieve a 20 percent part-time FTE level and others (most likely smaller airports) may operate more effectively with other levels of part-time TSO staff. As a result, for fiscal year 2007, TSA has modified this assumption to include a variable

part-time goal based on each airport's historic part-time to full-time TSO ratio.

Third, 5 of the 14 FSDs stated that the staffing model does not appear to consider new passenger screening procedures that may require additional TSOs at the checkpoint. For example, one FSD stated that the model has yet to incorporate the additional TSOs that will be required by TSA's new Screening Passengers by Observation Techniques program currently being implemented at the nation's airports.[46] TSA headquarters officials acknowledged that changes to screening procedures could increase the number of TSOs needed at a checkpoint or, conversely, increase wait times at the checkpoint. Therefore, TSA has made changes to the staffing allocation model for fiscal year 2007 to include line item allocations for the new Screening Passengers by Observation Techniques, Bomb Appraisal Officer, and Aviation Direct Access Screening Program security initiatives.

Fourth, two of the five FSDs with in-line checked baggage screening systems stated that in their view TSA overestimated the TSO labor savings that would be achieved as a result of deploying in-line baggage screening systems. TSA headquarters officials responsible for the staffing model stated that some adjustments had to be made to individual airports' TSO staffing levels to adequately reflect the configuration of the airports' in-line systems, which permit higher throughput rates. Specifically, some airports have full in-line systems, while others have partial in-line systems that are installed at a particular terminal or terminals. Additionally, TSA officials cited one example in which a category X airport received a reduction in TSOs in fiscal year 2005 to account for the in-line baggage screening system at the airport. However, TSA officials responsible for the staffing model later learned that the model had incorrectly assumed that the system was fully operational, when in fact it was still under construction. Officials stated that the FSD at this airport was consequently allocated additional TSO positions. TSA officials stated that the model validation process currently underway should help ensure that the model adequately reflects the actual operating conditions at the airport, which highlights the importance of a mechanism to provide assurance that all assumptions periodically undergo validation.

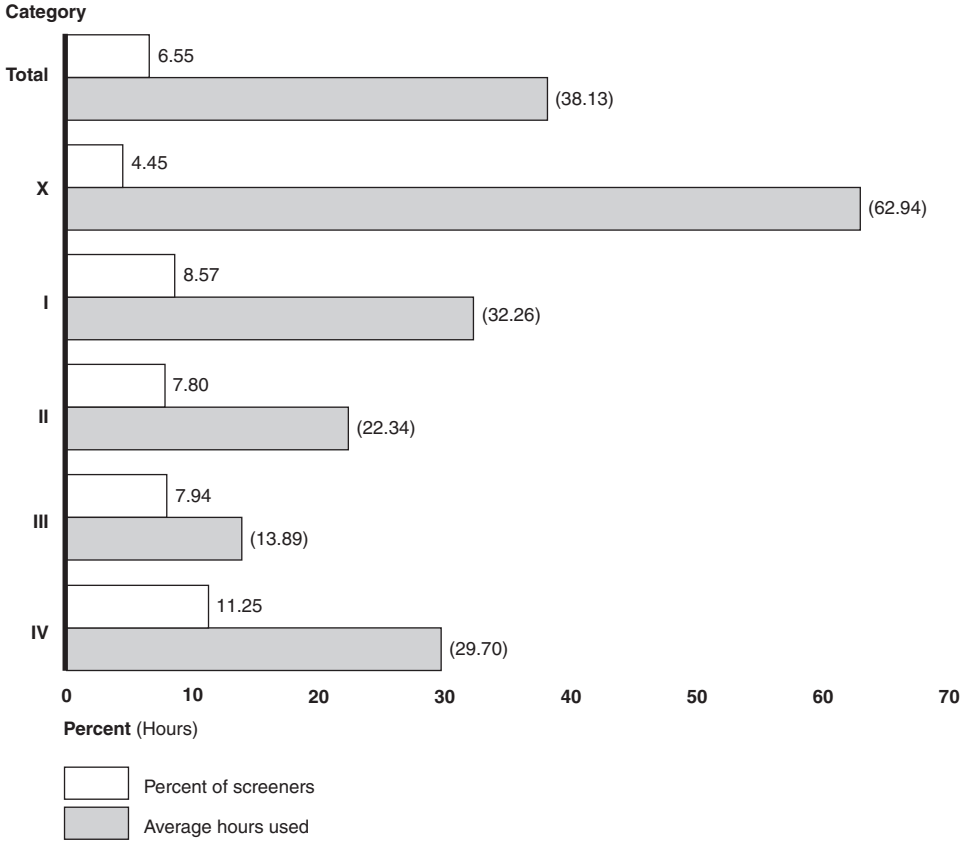
[46]The "Screening Passengers by Observation Technique" involves specially trained TSOs observing the behavior of passengers and resolving any suspicious behavior through casual conversation with passengers and referring suspicious passengers to selectee screening.

Finally, FSDs identified that the model does not account for TSOs being used in operational support functions. Eleven of the 14 FSDs we interviewed stated that because they are not authorized to hire a sufficient number of mission support staff, TSOs are being routinely used to perform certain operational support functions such as payroll processing, scheduling, distribution and maintenance of uniforms, data entry, and workman's compensation processing. At 13 airports[47] we visited between January and August 2006, out of a total of 4,710 TSOs on-board at those airports, TSA was using 242 TSOs (about 5 percent) for operational support functions. FSDs and their staffs stated that these TSOs were spending varying amounts of time on operational support duties, some on a nearly full-time basis.[48] As shown in figure 7, nearly 7 percent of TSOs nationwide performed operational support (on at least a part-time basis) during a specific 2-week pay period in fiscal 2006. This percentage was slightly higher for the smaller airport categories. Also, as shown in figure 7, the TSOs performing operational support functions at the nation's airports spent approximately half their time on these duties—38 out of 80 possible hours—during the 2-week period. In addition, TSOs performing operational support functions at Category X airports spent significantly more time on these duties (approximately 63 out of 80 hours) than TSOs in the other airport categories.

[47]We excluded one airport we visited, San Francisco, from this discussion since it employed private contractors as screeners. TSA data on use of TSOs in operational support functions do not include airports with private screeners.

[48]According to a TSA management directive dated December 4, 2006, TSOs must perform screening duties at least 8 hours per week.

Figure 7: Percent of TSOs Used for Operational Support Functions, along with Average Hours Spent by Them on These Functions, by Airport Category for a 2-Week Period—September 17, 2006, through September 30, 2006



Source: GAO analysis of TSA data.

Note: This figure includes data on federal TSOs only and not on private screeners employed at the 6 airports across the nation utilizing these personnel.

In September 2006, in reporting on its review of TSA administrative positions, the Department of Homeland Security's Office of Inspector General found that TSA had not determined the precise number of FSD administrative positions it needs and was using TSOs to perform administrative work due to a lack of other personnel to perform this work.[49] The Inspector General reported that during a 15-week period from

[49]Department of Homeland Security Office of Inspector General, Review of TSA Non-Screener Administrative Positions, OIG-06-65, September 2006.

October 2, 2005, through January 21, 2006, TSOs performed operational support work equivalent to 1,441 full-time-equivalent TSO positions, which is equivalent to about 78 percent of the 1,850 support staff formally assigned to do this work. Moreover, the Inspector General reported that TSOs were working overtime to perform these duties. The Inspector General recommended that, among other actions, TSA conduct a workforce analysis of FSD administrative staff and develop a staffing model to determine the number of administrative employees needed at airports, and take into consideration the time and nature of administrative work performed by TSOs when assessing its workforce requirements. In May 2006, TSA headquarters officials told us that they were conducting a survey of FSDs to identify the number of hours their staffs, including TSOs, spend each week on a variety of operational support functions. These officials stated that they will review the FSD responses to determine the time it takes to perform each function and the level of staffing needed. The number of operational support staff provided to each airport will be based on the types of administrative functions performed at the airport and the availability of funding. TSA headquarters officials stated that they have not made a decision on whether permanent operational support staff would be provided in the form of additional TSOs or full-time administrative staff. In the interim, TSA contracted with three private companies in September 2006 to provide temporary operational support services to FSDs that request this assistance from TSA headquarters. According to TSA, these contractors supplement FSD administrative staff so that TSOs performing operational support functions can return to their primary screening duties.

Additionally, in order to account for additional TSO time needed for operational support, TSA included a "collateral duties credit" in the Staffing Allocation Model for fiscal year 2007. This credit will increase each airport's fiscal year 2007 allocation identified by the staffing model by 5 percent at category X, I, and II airports. TSA officials stated that the agency is not providing this credit to category III and IV airports because the extended periods of low screening demand at these airports offsets the need for such an allowance.

TSA's use of TSOs to perform operational support functions may contribute to scheduling challenges because these TSOs are unavailable for their primary responsibilities to screen passengers and their checked baggage. For example, an FSD at a category X airport stated that he would have less of a problem scheduling checkpoints during peak passenger volume if he did not have to use TSOs to provide operational support. Additionally, the use of TSOs to perform operational support functions

may undermine TSA's investment in training them for screening functions since the TSO is not performing the job for which they were trained. Moreover, TSA has stated that TSO performance improves with experience. Consequently, TSOs who are not conducting passenger or checked baggage screening are not gaining the additional experience to help enhance their performance. An FSD we interviewed at a category X airport stated that having to use TSOs to perform operational support duties at his airport has created challenges in keeping these TSOs proficient in screening duties. However, TSA headquarters' officials stated that using TSOs to perform operational support functions does not adversely impact TSO performance because the agency has various methods in place to ensure that all TSOs, including those performing nonscreening duties, meet minimum security standards. For example, all TSOs have to meet the recurrent training requirement of 3 hours of training per week averaged over a calendar quarter to maintain proficiency and remain current on procedural changes and new threat items and all TSOs are subject to the various components of TSA's performance accountability and standards system.[50] Additionally, TSA officials stated that an April 2006 management directive requires TSOs who have not performed screening functions for 15 or more consecutive days to complete a return to duty training program. Nevertheless, TSA officials acknowledged that the agency has not examined the impact of using TSOs to perform operational support duties on cost, scheduling efficiency, and TSO performance. In addition, TSA has not determined under what circumstances it is appropriate to use TSOs to perform operational support functions or provided FSDs with guidance on when TSOs can be used this way. Without establishing such guidance, FSDs may over rely on TSOs to perform operational support functions.

[50] TSA's performance accountability and standards system, which was implemented in April 2006, will be used by TSA to assess agency personnel at all levels on various competencies, including training and development, readiness for duty, management skills, and technical proficiency. There are three elements of the TSO technical proficiency component of the performance and accountability standards system: (1) quarterly observations of TSOs' ability to perform particular screening functions in the operating environment to ensure they are complying with checkpoint screening standard operating procedures; (2) quarterly quizzes given to TSOs to assess their knowledge of the procedures; and (3) an annual, multi-part knowledge and skills assessment (known as recertification testing).

TSA's FSDs Are Responsible for Deploying TSO Allocations at their Airports, but Face Workforce and Other Challenges to Effective Deployment

TSA has vested its FSDs with responsibility for managing their TSO allocations while considering local circumstances that can affect the staffing allocation model's effectiveness in deploying the TSO workforce. After receiving the annual FTE allocation from TSA headquarters, the FSD and his or her staff must prepare TSO work schedules, by using the staffing model's optional scheduling tool or some other method, to ensure that adequate numbers of TSOs are conducting passenger and baggage screening operations, at all times, to ensure adequate security and attempt to meet the 10 minute wait time standard. However, factors outside the model's determination of overall staffing levels can affect FSDs' ability to effectively schedule TSOs at passenger lanes and baggage check areas. For example, as previously discussed, few airports have been able to achieve a 20 percent FTE level for part-time staff as assumed by the staffing allocation model in its first 2 years of implementation (fiscal years 2005 and 2006)—forcing FSDs to adjust the scheduling tool based on actual part-time TSOs on board. Also, as of September 30, 2006, approximately one-third of airports had less than 90 percent of their overall TSO positions filled, and nine of the 14 airports we visited were similarly below their staffing allocation. FSDs cited certain other challenges in scheduling TSO staff including injuries and absenteeism, in addition to time spent away from screening duties due to training requirements and operational support needs—factors that the scheduling tool did not directly consider in fiscal years 2005 and 2006. As previously discussed, to address some of these difficulties, TSA has revised some of the assumptions in the Staffing Allocation Model for fiscal year 2007. To address other difficulties, TSA has implemented several human capital initiatives to improve hiring and retention of TSO staff, lessen the impact of injuries and absenteeism, and study the impact of training and operational support demands on TSO time. TSA has not yet assessed the impact of these initiatives on hiring and retention, but plans to do so during fiscal year 2007.

FSDs Are Responsible for Managing to Their TSO Staffing Allocation in Light of Local Circumstances

FSDs are responsible for deploying and managing to their TSO allocation in light of local circumstances, including those that might affect scheduling and pose challenges to most efficiently deploying their resource allocations. At the beginning of each fiscal year, the staffing allocation model identifies the annual allocation of TSOs needed at each airport based on projected demand levels and other factors that make up the model. Nonetheless, this stated allocation is only a starting point. Throughout the fiscal year, FSDs are responsible for preparing TSO work schedules that adapt to changing circumstances at the local level. Specifically, FSDs are responsible for scheduling TSOs to ensure that a

sufficient number of TSOs are deployed, from available staff, to meet airport screening needs.

TSA has provided FSDs with an optional tool they can use to facilitate the management of their TSO allocation. Specifically, the Staffing Allocation Model includes a scheduling component that uses the various inputs to and assumptions of the model, including the number of checkpoints, lanes, and checked baggage screening machines needed to respond to the passenger and checked baggage load and the minimum TSO staffing levels identified in the standard operating procedures for passenger and checked baggage screening. This tool is then to produce daily workforce requirements and calculates a work schedule for each airport. The schedule identifies a recommended mix of full-time and part-time staff and a total number of TSO FTEs needed to staff the airport on a given day, consistent with a goal of 10 minutes maximum wait time for processing passengers and baggage. In addition, there are several areas where TSA adjusts the scheduling tool to most accurately reflect actual conditions and needs. These areas include:

- Flight schedule changes.
- TSO training requirements (based on available times identified by the scheduling tool).
- Number of TSOs needed for operational support associated with operating the checkpoint and baggage screening areas.
- New passenger and checked baggage screening procedures that affect TSO utilization.

FSDs stated that because the scheduling tool does not contain this information, they must modify the input to the tool, or use an alternative scheduling tool, to deploy their TSO workforce. For example, FSDs and their staffs stated that the scheduling tool does not contain the most current flight schedule data due to the reporting practices of various airlines. During our airport visits, TSA scheduling officers reported that the scheduling tool includes data from as much as 90 days in advance, but some airlines provide their final flight schedules and anticipated passenger volume as late as 1 week in advance—sometimes leaving FSDs little time to ensure adequate TSO availability. TSA officials said that in order to keep their flight offerings competitive, airlines seek to protect their flight data from public disclosure as long as possible. For this reason, TSA headquarters officials said they expect FSDs to work with airport operators and airline officials to obtain the most current data available on which to base their scheduling efforts and to make adjustments to the

scheduling tool to ensure that their deployment of TSOs most effectively meets the screening demand.

The nine FSDs we interviewed at category X and I airports reported that the scheduling tool was useful as a starting point for developing their schedules. However, all six FSDs who said they used the scheduling tool regularly reported making adjustments to the schedule output to more accurately reflect their local conditions primarily because, according to these FSDs, the scheduling tool does not automatically take into account the actual composition of the TSO workforce at each individual airport or, in some cases, unique work schedules that may be implemented at some airports (other than a standard 5-day work week). For example, the scheduling tool is based on the model's assumption of a 20 percent part-time force expresses as a full-time-equivalent level among available staff, although few of the larger airports have been able to achieve this level of part-time staff. Specifically, only 2 of the 26 category X airports had a workforce composed of at least 20 percent part-time staff in July 2006. Because the scheduling tool assumes a 20 percent part-time level for TSOs, FSDs at airports we visited with lower levels of part-time TSOs stated that they make adjustments to the scheduling tool's output to more accurately reflect the airport's actual mix of full-time and part-time TSOs and then develop a work schedule accordingly. In addition, as of September 30, 2006, TSA data showed that approximately one-third of the nation's airports had less than 90 percent of their annual TSO positions filled. According to FSDs we interviewed, however, the scheduling tool assumes that each airport has its full TSO allocation on board. Moreover, according to TSA, the scheduling tool assumes that TSOs across all airports have standard 5-day work weeks, although individual airports may require TSOs to work varying schedules. For example, an FSD for a category III airport told us that he requires TSOs to work a sixth day once every 4 weeks. However, the FSD at this airport stated that the scheduling tool cannot account for this schedule.

In response, TSA headquarters officials stated that the scheduling tool can indeed account for the actual number of onboard TSOs, the actual mix of full-time and part-time TSOs, and most scheduling anomalies FSDs encounter.[51] The TSA headquarters officials attributed the FSDs' comments to misunderstandings regarding the full capabilities of the

[51] TSA officials acknowledged that the scheduling tool cannot be adjusted to reflect more than a 5-day work week. However, other variations within the 5 days are possible.

scheduling tool. The officials further explained that the agency has done a better job recently in training field staff in the use of the scheduling tool than was done earlier in the Staffing Allocation Model's implementation.[52]

FSDs at the four smaller (category II and III) airports we visited stated that the scheduling tool was more useful for larger airports with more complex scheduling challenges given the size of the workforce, the higher passenger volumes, and the larger number of checkpoints and terminals. These FSDs stated that smaller airports can more easily predict their screening demand and generally said they did not believe that the staffing model's scheduling tool added value to their scheduling process—especially since they are dealing with small numbers of TSO staff and limited passenger and baggage check facilities, for example, having only one checkpoint with few lanes. Therefore, they have chosen to continue to use such locally developed tools, such as spreadsheets. However, TSA headquarters officials stated that use of the scheduling tool by all airports will eliminate applications, such as these spreadsheets, that are inconsistent with the Staffing Allocation Model and TSA's time and attendance reporting system, thereby enhancing efficiency in scheduling TSOs.

While TSA headquarters officials stated that the scheduling tool is capable of preparing schedules for any size airport and accounting for all the issues noted as problems by the FSDs we visited, officials are currently permitting each FSD to determine whether to use the scheduling tool. TSA officials stated that technical improvements planned for the scheduling tool will improve its usefulness in preparing TSO schedules. For example, installation of high-speed internet connectivity and implementation of electronic time and attendance reporting will allow the scheduling tool to efficiently maintain up-to-date rosters of available TSO staff to schedule, according to TSA officials. After these technical improvements are made, which TSA expects to be completed in fiscal year 2007, TSA officials told us they may consider making the tool mandatory.

According to TSA, electronic time and attendance will improve scheduling by providing connectivity between the scheduling tool and TSA's timekeeping system. This automation is to enable the automatic linking of

[52] We did not assess the adequacy of training of FSDs because it was outside the scope of our work.

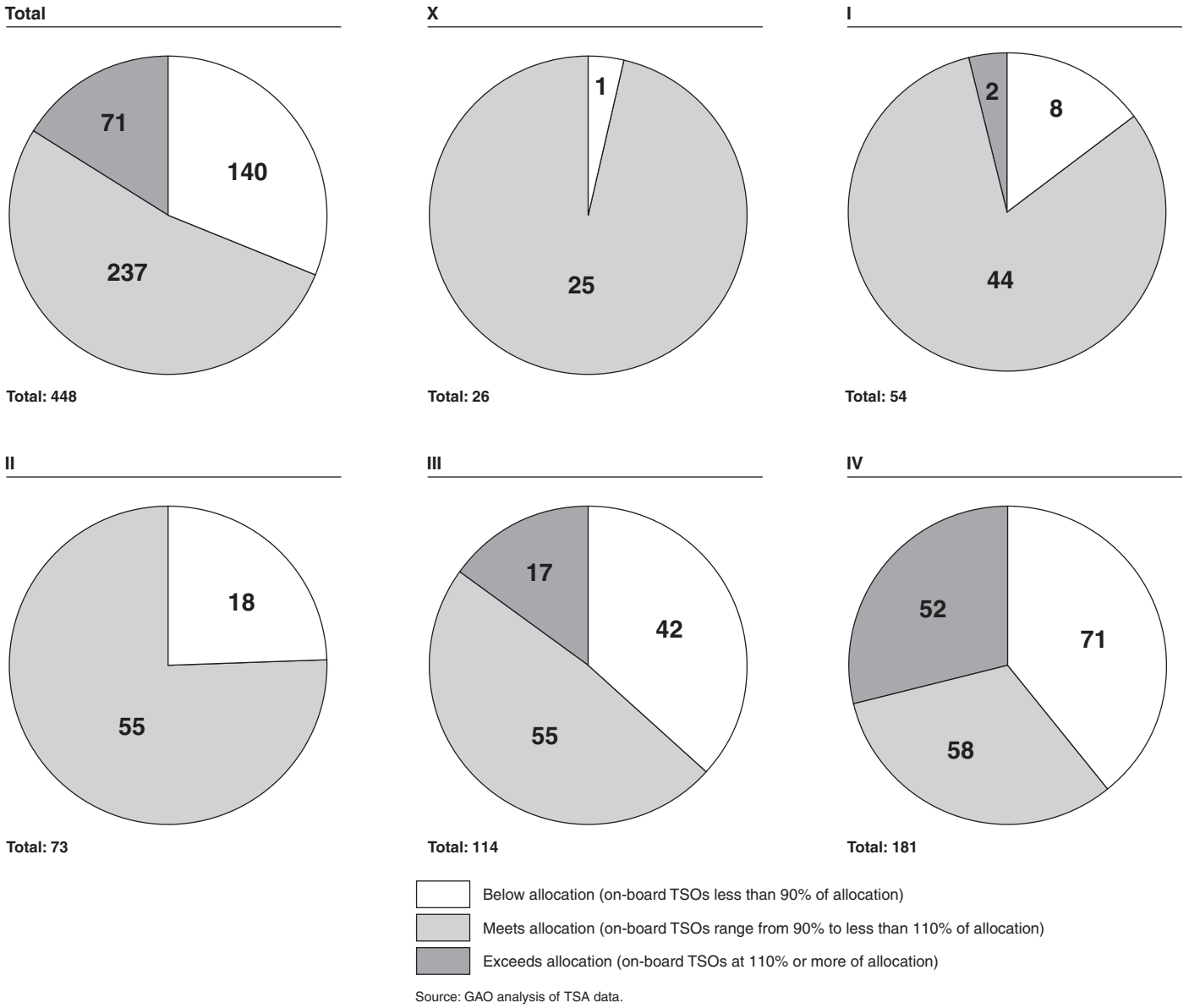
scheduling and timekeeping information and provide planned schedules and actual time worked.

FSDs Cited Challenges in Deploying Their TSO Workforce to Perform Screening, and Several Efforts Are Underway to Address These Challenges

All 14 FSDs we interviewed identified challenges they faced in deploying their TSO workforce. Nine of the 14 airports we visited were below their allocation for TSOs as determined by the staffing model. FSDs at these airports cited the inability of TSA's centralized hiring process to replace TSOs quickly. However, attrition, particularly by part-time TSOs, was also cited as a barrier to achieving and maintaining their TSO staffing levels. TSA has stated a goal of each FSD maintaining a TSO staffing level of not less than 90 percent of each individual airport's TSO allocation. Based on TSA data, approximately 53 percent (237) of commercial airports were either at, or no less than 10 percent below, their respective TSO allocations at the end of fiscal year 2006. Approximately 31 percent of airports (140) were below 90 percent of their allocation, and 16 percent (71) of airports were 110 percent or more above their allocation.[53] Sixty-nine of the 71 airports above their allocation were among the small category III and IV airports. Conversely, as also shown in figure 8, 131 of the 140 airports below 90 percent of their TSO allocations are airports in categories II, III, and IV. These smaller airports have correspondingly smaller numbers of TSOs; therefore, even small staff fluctuations have a greater impact on being above or below their TSO allocations. Overall, more large airports (categories X and I) have succeeded in meeting their TSO allocations determined by the Staffing Allocation Model.

[53] Due to TSA's expectation that FSDs maintain on-board TSO staffing of at least 90 percent of their TSO allocation, in addition to significant numbers of airports falling marginally above and below 100 percent, we used a 20 percent range (90 to less than 110 percent) to determine how many airports were above and below their allocation in terms of on-board TSOs. That is, airports with less than 90 percent of their allocation were "below" their allocation and airports with 110 percent or more of their allocation were "above" their allocation.

Figure 8: Airports' On-Board Status, by Airport Category, Compared to TSO Staffing Allocation, in Full-Time-Equivalent TSOs, as of September 30, 2006



Source: GAO analysis of TSA data.

Note: This figure includes data on federal TSOs only and not on private screeners employed at the 6 airports across the nation utilizing these personnel.

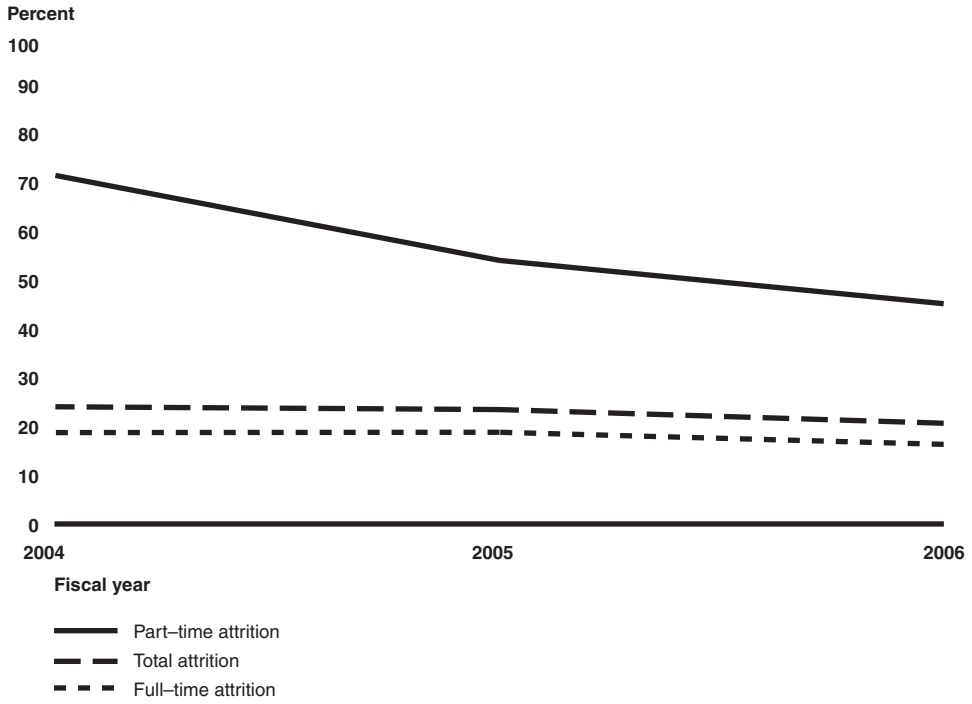
According to TSA officials, airports that are above their allocation must reduce their TSO staffing levels by either (1) attrition or (2) transferring their excess TSOs to airports that are below their allocation. TSA officials

also stated that airports grouped together under TSA's "hub and spoke" organizational structure often share TSO resources as needs dictate.[54]

FSDs we interviewed cited various reasons for attrition, including limited advancement opportunities, need for higher paying job, work hours, difficulty of work, and job dissatisfaction. At the same time, as shown in figure 9, TSO attrition rates, for both full-time and part-time staff, decreased from approximately 24 percent to 21 percent from fiscal year 2004 to fiscal year 2006. However, as previously discussed, the part-time TSO attrition rate remains considerably higher than the rate for full-time personnel (approximately 46 percent versus 16 percent for fiscal year 2006).

[54]TSA implemented its "hub and spoke" organizational structure in fiscal year 2006 to allow for sharing of management, TSO and operational support staff, and other resources among individual category X and I airports and other smaller airports in their geographic vicinity.

Figure 9: Attrition Rates for Full-Time and Part-Time TSOs, Fiscal years 2004 to 2006



Source: GAO analysis of TSA data.

Note: This figure includes data on federal TSOs only and not on private screeners employed at the 6 airports across the nation utilizing these personnel.

According to the Office of Personnel Management, an important principle behind maintaining a quality workforce is employee retention, and an analysis of workforce trends is essential to determine what factors most affect retention. To this end, in August 2005, TSA hired a contractor to administer exit surveys during fiscal year 2006 to employees who voluntarily separated from TSA. While the response rate, as of July 2006, was too low (15 percent) to draw overall conclusions about the results, TSA stated that the most common reasons cited by TSOs for separating from TSA include better job opportunities, dissatisfaction with TSA leadership, and personal reasons. For part-time TSOs, the most common reasons were better job opportunity, personal reasons, dissatisfaction with their supervisor and undesirable work schedule. TSA plans to conduct further analysis of the responses based on whether the TSO was a full-time

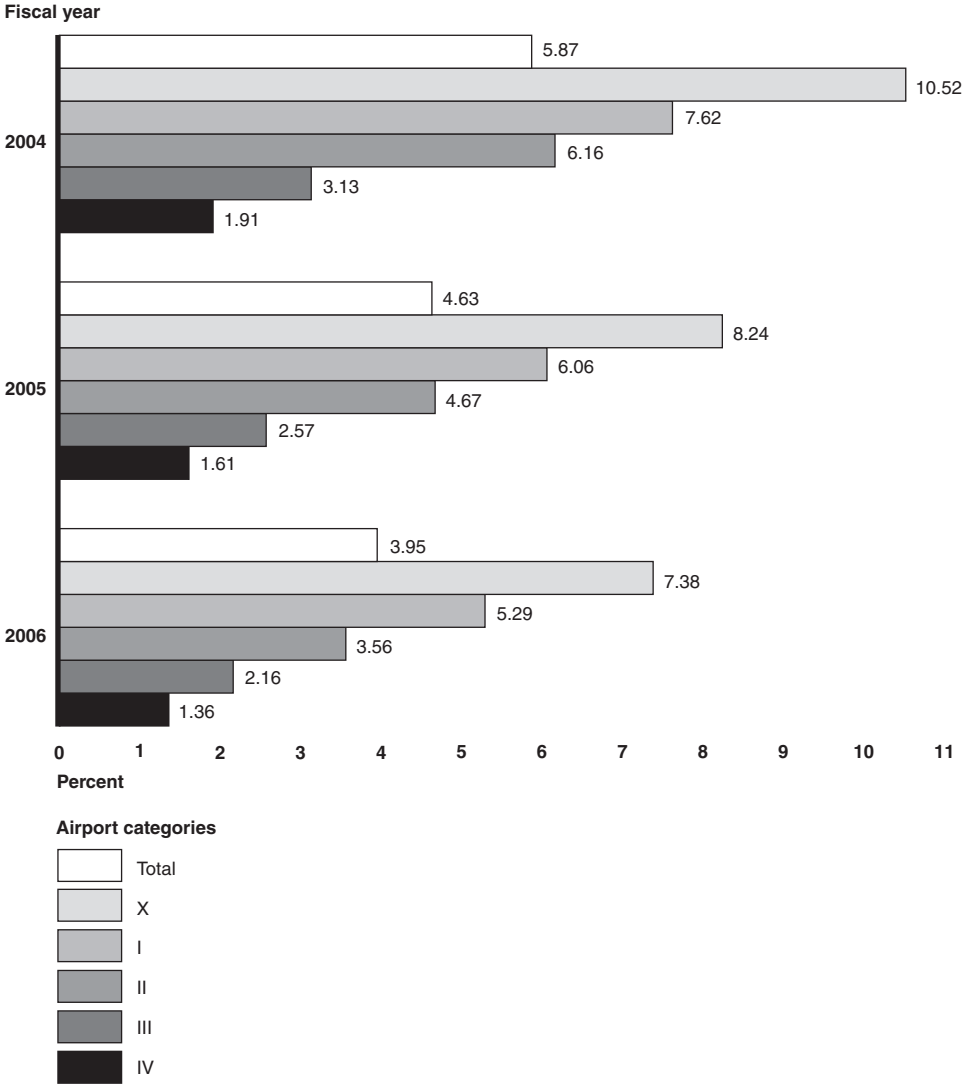
or part-time employee in an effort to determine the unique issues facing each group. TSA officials stated that nearly half (47%) of the survey respondents said that they would consider returning to TSA.[55] TSA has acknowledged that the high attrition rates drive up hiring and training costs. TSA officials stated that it costs about $10,000 to assess, hire, and train a TSO. Officials estimated that for every 2,500 TSOs that TSA retains, including part-time TSOs, TSA could save about $25 million.

Five of the 14 the FSDs we interviewed cited either generally high levels of absenteeism[56] or injuries as factors that affect their ability to schedule TSOs to passenger lanes and baggage screening areas. The Assistant Secretary of Homeland Security for TSA has also identified high absenteeism and injury rates as major causes of staffing shortages. While absenteeism and injuries remain prevalent among the TSO workforce, TSA data indicate overall improvement in these problem areas. As shown in figure 10, TSO absenteeism rates, across all airport categories, have improved from fiscal year 2004 to fiscal year 2006.

[55] According to TSA, the survey respondents were from all of TSA's employees, not just TSOs. However, TSA did isolate certain responses by TSOs.

[56] TSA defines absenteeism in terms of unscheduled absences and tardiness among the TSO workforce. Unscheduled absences include calling in sick the day of work, arriving two or more hours late, being AWOL, or otherwise failing to show. Absenteeism does not include those TSOs previously approved to be on any kind of leave or TDY such as, annual leave, pre-arranged sick leave, military leave, jury duty, training, etc. TSOs are "tardy" when they are 1 or more minutes late for their designated shift. TSOs who are more than 2 hours late are counted as unscheduled absences.

Figure 10: Average Rate of TSO Absenteeism per 100 TSOs, by Airport Category, for Fiscal Years 2004 - 2006

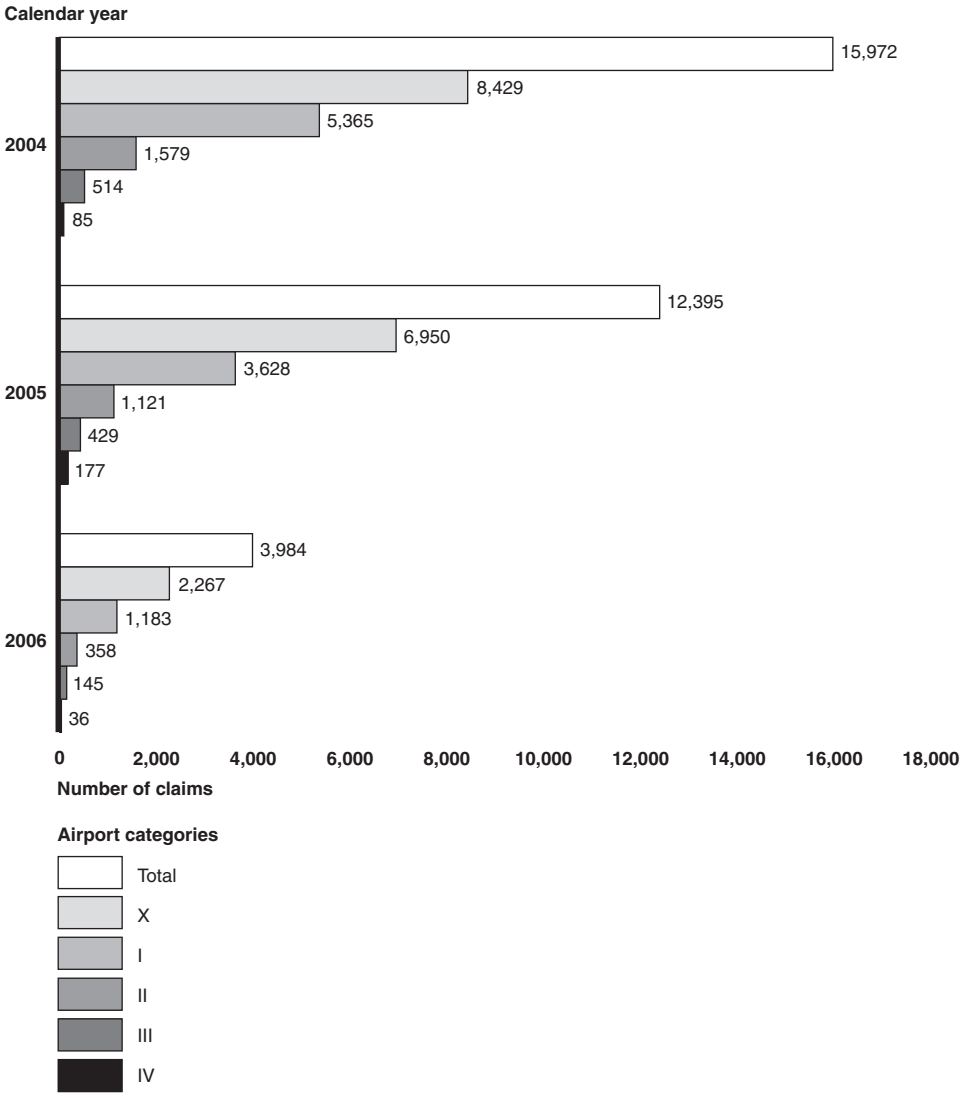


Source: GAO analysis of TSA data.

Note: This figure includes data on federal TSOs only and not on private screeners employed at the 6 airports across the nation utilizing these personnel.

In addition, as shown in figure 11, TSO injuries (as represented by workman's compensation claims) have improved over the same period (fiscal year 2004 to 2006). TSA headquarters officials attributed this improvement to the agency's initiatives to reduce injuries among the TSO workforce.

Figure 11: TSA Workman's Compensation Claims for Calendar Years 2004 - 2006, through June 2006



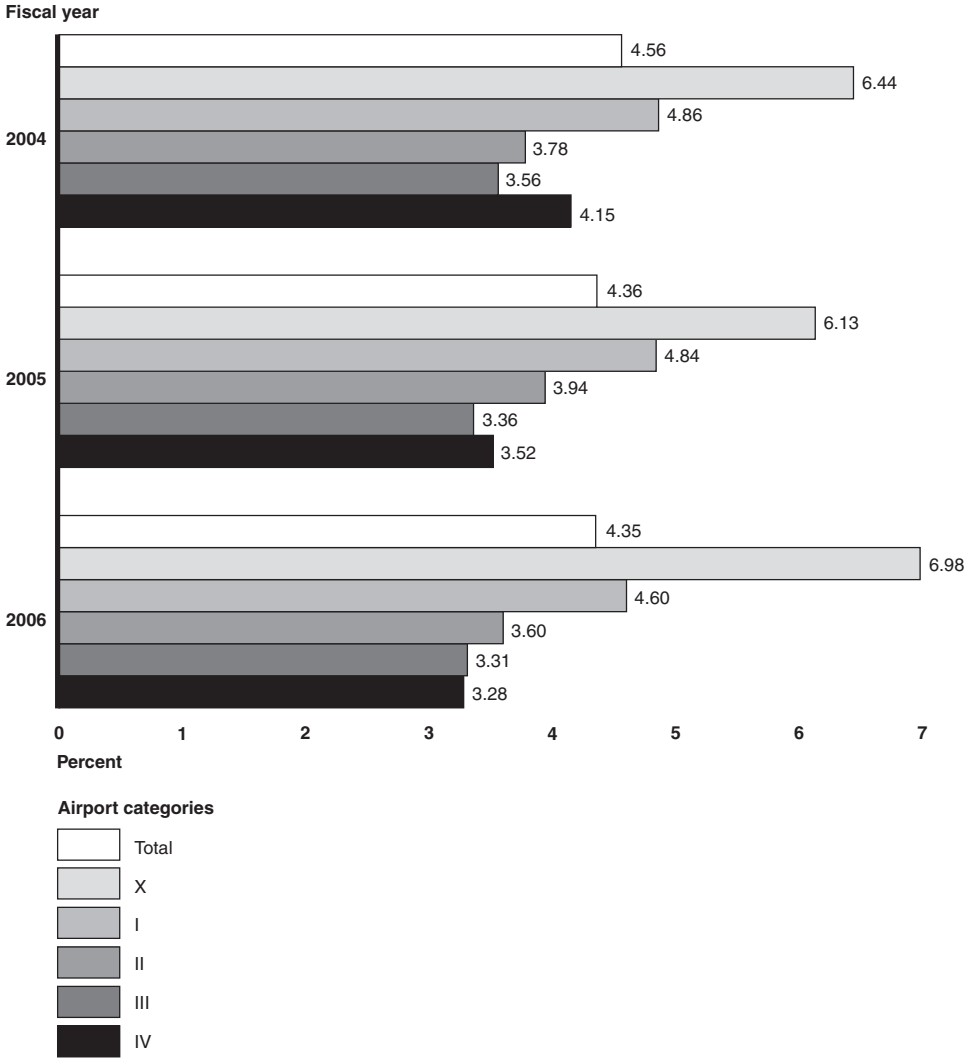
Source: GAO analysis of U.S. Department of Labor data.

Note: The data in this figure include all workman's compensation claims received by the Department of Labor from TSA and are not limited exclusively to TSOs. However, TSA officials stated that the vast majority of these claims are from their TSO workforce.

Despite the acknowledgement of problems with attrition and absenteeism, TSA headquarters officials stated that, nationwide, excessive use of overtime has not been a problem and is mostly used to address attrition, one-time events, unexpected delays, and holidays. Figure 12 shows that

TSA's use of overtime, which does not count against the full-time-equivalent rate at airports, has remained relatively stable—4 to 5 percent—during fiscal years 2004 through 2006 with larger airports generally having higher overtime rates each year.

Figure 12: TSO Overtime Hours as a Percentage of Total Hours Worked, by Airport Category, during Fiscal Years 2004 - 2006



Source: GAO analysis of TSA data.

Note: This figure includes data on federal TSOs only and not on private screeners employed at the 6 airports across the nation utilizing these personnel.

FSDs we spoke to cited a need to use TSOs for various operational support functions on either a full-time or part-time basis due to a lack of sufficient administrative staff to perform these functions. As previously noted, these functions included such activities as payroll and workman's compensation processing, various data input related to screening operations, uniform management and control, and managing and distributing supplies for the checkpoints. As a result of devoting at least a portion of their time to these activities, FSDs could not rely on these TSOs to perform all of their other passenger and baggage screening activities during these periods.

Another challenge to using the model to deploy TSOs, according to TSA headquarters officials and FSDs, is that some airports have physical infrastructure configurations that limit their capacity for processing passengers and checked baggage that cannot necessarily be accounted for in the Staffing Allocation Model. At these airports, longer wait times are due, at least in part, to limitations on the number of screening lanes available, a limitation imposed by the layout of the checkpoint. TSA officials stated that in some of these instances, airports have made capital improvements to increase capacity and help minimize wait time. Of the 14 airports we visited, 7 had made, or were in the process of making, capital improvements to expand the passenger processing capacity of their security screening checkpoints. For example, during the period of October 2004 to June 2005, a category I airport experienced wait times exceeding 40 minutes on 40 separate occasions. TSA determined that wait times could not be reduced at the airport, even if it deployed more TSOs, due to the physical construction of the checkpoint, which only allowed for four screening lanes. In June 2005, the airport removed a wall to enable the installation of additional screening lanes. As a result of the additional lanes staffed with TSOs during peak periods, the airport only experienced one instance of a reported wait time exceeding 40 minutes as of October 2006.

In addition to airports making capital improvements to help address capacity issues, airports and air carriers have also taken action to assist with increasing the efficiency of the screening process. For example, an air carrier at a category X airport was concerned about wait times at the airport. The air carrier established a security process improvement team consisting of representatives of TSA, air carriers, and the airport authority to examine checkpoints and suggest ways to make the screening process more efficient. One initiative that resulted from this effort is that the air carrier provided staff at passenger screening checkpoints to assist passengers in removing cell phone, keys, change, and other metal objects

from their person before going through the walk through metal detector. According to the air carrier, it spent about $15,000 to $18,000 of its own money each month in personnel costs to staff the checkpoints over a 12-hour period most days. In another case, a representative of an airport board for a category X airport told us that in response to concerns about high wait times—wait times exceeding 30 minutes—the airport board spent $1 million to hire a consultant to simulate existing checkpoint configurations and conditions to determine where and how improvements could be made to increase passenger throughput, thereby reducing wait times. As a result of this effort, several improvements were made, including posting a TSO at the front of each checkpoint to facilitate the screening process, posting signage at checkpoints to explain the items that passengers should remove from their person; adding space at end of the x-ray screening belt so that passengers can easily pick up their items without holding up the line; and providing more room for passengers to remove items from their person before they get to the x-ray machines. According to this airport official, these improvements collectively resulted in an increase in passenger throughput from 175 to 200 passengers per hour at relatively low cost. However, the official expressed concern that most airports are not in a position to fund similar projects because they do not have the resources.

TSA Reported Several Efforts Underway to Help Address Challenges in Deploying the TSO Workforce

TSA headquarters officials and FSDs we interviewed reported having several efforts underway to help address some of the challenges they face in deploying the TSO workforce. For example, to allow FSDs to more efficiently address staffing needs, TSA has shifted responsibility for hiring TSOs from TSA headquarters to FSDs at individual airports and, according to TSA officials, provided contractor support to assist in this effort. TSA data show that since local hiring began in March 2006, TSA has increased the number of new hire TSOs from approximately 180 per pay period in February 2006 to nearly 450 each pay period under the local hiring initiative. Additionally, TSA officials stated that prior to the implementation of the local hiring initiative, TSA was able to support hiring at only about 30 airports during any given period compared to more than 100 airports each pay period since the local hiring initiative was implemented. Table 4 provides a summary of the national human resource-related initiatives intended to help increase TSO retention, utilization, and effectiveness.

Table 4: National Human Resource Initiatives by TSA for Its TSO Workforce

Human resource challenge	TSA initiative	Description
Hiring and retention of adequate numbers of TSO staff (including part-time)	Local hiring	In March 2006, TSA shifted responsibility for hiring TSOs from TSA Headquarters to the FSDs at individual airports. TSA headquarters has provided contract personnel to assist airports in all aspects of the hiring process.
	TSO Career Progression Program	Recognizing that the screener workforce had few upward mobility opportunities within their profession, TSA reclassified the agency's 43,000 screeners as TSOs. This new classification gives TSOs an opportunity for career progression and to apply for DHS law enforcement positions. Through this program, TSA has implemented new pay bands that broaden TSO career opportunities and include "technical" and "leadership" career track options for the TSOs.
	Performance-based pay	In April 2006, TSA deployed a pay-for-performance system.
	Retention incentive payments	During fiscal year 2006, TSA offered bonus payments in installments to TSOs who stay with the agency for a certain period of time. TSA is also providing a $500 separate retention incentive for full-time TSOs at 22 hard-to-hire airports. TSA made the first of these payments in May 2006.
	Full-time to part-time conversion bonus	In fiscal year 2006, TSA provided bonus payments in May and September to full-time TSOs who decided to convert to part-time status by May 1, 2006.
	TSO Incentive Awards	In fiscal year 2006, TSA provided monetary support to FSDs to assist them in retaining TSOs with good performance records. During the year, FSDs received $20 million to be paid to TSOs' to reward superior performance.
	Part-time health benefits pilot	TSA has implemented a pilot program at 6 airports providing part-time TSOs with the same benefits as full-time TSOs .
	Career coaching/skills inventory	TSOs can speak one-on-one with a career counselor and complete a self-assessment to determine their needs for advancement.
	Lifecare	TSA offers this service, free-of-charge, to TSOs to assist them with eldercare, daycare, or other issues that can affect their work life and keep them from performing effectively.
Absenteeism	Performance-based pay	TSO pay based, in part, on attendance.
	TSO Career Progression Program	By enhancing the motivation of TSOs, TSA believes this program will help improve attendance.
Injuries	Nurse case management program	TSA acknowledged that TSO injuries were a significant drain in its workforce and responded by creating an agencywide nurse case management program based on the recommendations of the TSO Injury Task Force. This program assists TSOs in getting the medical attention they need to return to work as soon as possible.
	Industrial engineer visits to problem airports	TSA Headquarters is in the process of sending teams of industrial engineers to evaluate the 25 airports with the worst injury rates and make recommendations for improvements, including simple configuration changes and small equipment purchases (like roller tables and floor mats) that could significantly reduce injury rates.

Source: TSA.

In addition to these workforce initiatives, TSA also continues to use TSOs from the national screening force to address short-term needs at individual airports nationwide. According to TSA, the national screening force is generally deployed only to those airports experiencing significant staffing shortfalls associated with increased seasonal traffic or when a special event—such as a Super Bowl or a large national conference—occurs requiring an immediate influx of additional, though temporary, TSO support. Of the 14 FSDs we interviewed, 6 stated that they had used the national screening force at least once. All but one of these FSDs told us that the national screening force was used to meet short-term screening demand associated with special events and unexpected circumstances, such as heavy passenger loads stemming from hurricanes Katrina and Rita. In the other instance, at a category X airport, the FSD stated that, because of challenges in hiring and retaining TSOs for this airport, he has had to rely on about 60 members of the National Screening Force deployed to his airport since 2004. However, in November 2006, TSA officials stated that as of November 1, 2006, there were no National Screening Force TSOs assigned to this airport, which they attributed to TSA's local hiring initiative.

TSA officials stated that they are examining methods for addressing hiring and retention challenges at specific airports where these problems are particularly acute. For example, as shown in table 4 above, TSA has implemented a $500 retention incentive for TSOs at 22 "hard-to-hire" airports who were on-board as of April 15, 2006. As also shown in the table, to help with hiring and retention of part-time TSOs, TSA is piloting a program that offers full health benefits to part-time TSOs at six airports. At these airports, part-time TSOs receive the same health benefits as full-time TSOs. At all other airports, part-time TSOs do not receive health benefits. In addition to incentives and expanding health benefits, TSA is considering other options for attracting and retaining TSOs. For example, these options include (1) parking allowances, (2) child care, (3) elder care, and (4) tuition assistance.

In addition to the national initiatives underway, several FSDs at the 14 airports we visited were implementing their own local initiatives to address some of the staffing challenges they faced at their airports. For example, after receiving local hiring authority under the nationwide local hiring initiative, one FSD we spoke to stated that he puts brand-new TSO hires out on the passenger lanes as "helpers" so that they may better understand what the job entails. He expects that this will cut down on attrition at his airport and help reduce wasted training resources for TSOs who leave within short periods of being hired. Regarding absenteeism, all

the FSDs we spoke to stated that they monitored unscheduled absences and counseled TSOs as needed. To help reduce the number of on the job injuries, 6 of the 14 FSDs we interviewed said they had local initiatives, such as injury prevention committees and detailed instruction on safe lifting techniques. To help mitigate inadequate numbers of part-time TSOs, two TSA managers we interviewed said that they asked some of their full-time TSOs to work "split" shifts to cover demands in peak periods that would normally go to part-time TSOs, one of whom might work the first peak period shift and another who might work the second peak period shift. The result was that it eliminated the staffing of full-time TSOs during non-peak periods when they were most likely to be idle. The experience of these managers illustrates an attempt at an efficient use of TSOs and also the primary reason that TSA has tried to achieve a mix of 20 percent part-time to 80 percent full-time TSOs. Specifically, using part-time TSOs can help to permit adequate staffing during peak periods while avoiding the consequent overstaffing stemming from having the same number of TSOs on duty during non-peak periods. Additionally, to maximize the flexibility in staffing passenger and checked baggage screening checkpoints, 3 of the 10 FSDs whose TSOs were not all dual-trained stated that they were working to increase the number of dual-trained TSOs—TSOs trained and certified in both passenger and checked baggage screening. Four of the 14 airports we visited already had dual-trained TSOs at the time of our visits.

Given that many of TSA's workforce initiatives were only recently implemented or are in the planning stages, we could not assess the extent to which these initiatives achieved the intended results. TSA human capital officials told us that they plan to establish performance metrics to use in evaluating their workforce initiatives and use the results of the evaluations to make any needed changes to their approach.

Conclusions

TSA's use of a staffing allocation model to help allocate its finite TSO resources in a manner that ensures security and minimizes wait times has helped guide its allocation of resources. While we recognize the difficulty in developing precise assumptions given the dynamic nature of the aviation industry, the assumptions used in the staffing allocation model should reasonably reflect actual operating conditions. We are encouraged that TSA has established several mechanisms to monitor the sufficiency of the model's outputs and make adjustments in key model assumptions, for specific airports, that are not accurate for those airports. We also recognize that TSA has reviewed and changed several key assumptions for fiscal year 2007 that affect all the nation's airports. While TSA has taken

steps in the right direction, without a management control for selecting and prioritizing which assumptions to systematically review each year and for assuring that all assumptions are periodically reviewed—a particular concern considering the dynamic nature of the aviation industry and the ongoing personnel changes experienced by the agency—TSA is missing an opportunity to increase its assurance that the model reflects actual operating conditions over time.

Given the extent to which TSOs have been used to perform operational support functions at airports, TSA has directly accounted for this for the first time in the staffing allocation model for fiscal year 2007. We recognize that FSDs may have to rely on TSOs to perform operational support duties at some times. However, overreliance on TSOs for operational support limits the availability of TSOs to perform the functions they were hired to perform, contributes to challenges in scheduling TSOs so that the right number of TSOs are at the right checkpoints at the right times, undermines the investment TSA has made in training them in screening functions, and could over time limit on-the-job training opportunities. Therefore, it is important for TSA to determine under what circumstances it is appropriate to use TSOs to perform operational support functions and to provide FSDs with guidance on when TSOs can be used this way.

Recommendations for Executive Action

To assist TSA in its efforts to identify TSO staffing levels that reasonably reflect the operating conditions at individual airports and to help ensure that TSOs are effectively utilized, we recommend that the Secretary of Homeland Security direct the Assistant Secretary for Transportation Security to take the following two actions:

- Establish a formal, documented plan for reviewing all of the assumptions in the Staffing Allocation Model on a periodic basis to ensure that the assumptions result in TSO staffing allocations that accurately reflect operating conditions that may change over time.
- Establish a policy for when TSOs can be used to provide operational support.

Agency Comments and Our Evaluation

We provided a draft of this report to DHS for review and comment. On February 26, 2007, we received written comments on the draft report, which are reproduced in full in appendix III. DHS concurred with our findings and recommendations and stated that the findings and recommendations are constructive and useful.

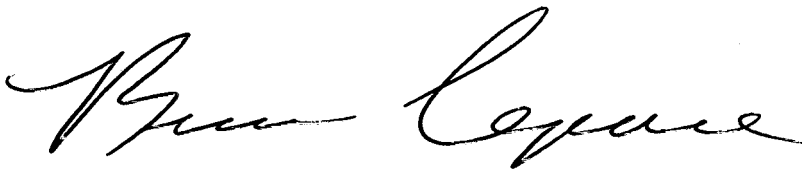
TSA also provided comments on our draft report, which are also reproduced in full in appendix III. In its comments, TSA stated that the conclusions of our study are valuable, but TSA wants to ensure that a full and current picture of the state of its workforce management is portrayed. TSA highlighted several of the workforce management initiatives it has implemented. These initiatives were already discussed in the draft report provided to DHS and TSA for comment.

Regarding our recommendation that TSA establish a formal, documented plan for reviewing all of the assumptions in the Staffing Allocation Model on a periodic basis, DHS concurred and stated that TSA has already begun implementing this recommendation as part of its review of the Staffing Allocation Model assumptions for fiscal year 2007. DHS also stated that TSA has begun developing a formal and systematic process that would identify and prioritize the staffing model assumptions for periodic review. We are encouraged that, as part of this process, TSA plans to use formal studies and empirical data to validate the staffing model's assumptions—methods that should enhance the validity of TSA's efforts. TSA also plans to document this new assumption validation process and have it approved by senior leadership.

DHS also concurred with our recommendation to establish a policy for when TSOs can be used to provide operational support. DHS stated that TSA's Offices of Security Operations and Human Capital are working together to develop a policy that would define when TSOs might be used to provide operational support. DHS also stated that TSA expects that the final policy will provide a greater degree of structure and guidance to FSDs concerning the use of TSOs in operational support positions.

We will send copies of this report to the Secretary of Homeland Security; the Assistant Secretary of Homeland Security for Transportation; and interested congressional committees as appropriate.

If you or your staff have any questions about this report, please contact me at (202) 512-4523 or leporeb@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff that made major contributions to this report are listed in appendix IV.



Brian J. Lepore
Acting Director
Homeland Security and Justice

Appendix I: Objectives, Scope, and Methodology

Objectives

The Intelligence Reform and Terrorism Prevention Act of 2004, enacted in December 2004, required the Transportation Security Administration (TSA) to develop and submit to the Senate Committee on Commerce, Science, and Transportation, and the House of Representatives Committee on Transportation and Infrastructure, standards for determining the aviation security staffing for all airports at which TSA provides or oversees screening services by March 2005.[1] These standards are to provide the necessary levels of aviation security and ensure that the average aviation security-related delay experienced by passengers is minimized. This provision of the act also mandated that we conduct an analysis of TSA's staffing standards. To assess TSA's efforts in developing a staffing allocation model that ensures that it provides the necessary levels of aviation security and that the average aviation security-related delay experienced by passengers is minimized, we addressed the following questions:

- How does TSA ensure its Staffing Allocation Model provides a sufficient number of Transportation Security Officers (TSO) to perform passenger and checked baggage screening at each airport and what challenges has it faced while implementing the model?

- How does TSA deploy its TSO allocation and what factors affect the model's effectiveness in helping TSA accomplish this deployment?

Scope and Methodology

Our work generally focused on the two major components of TSA's determination of TSO staffing at the nation's airports. First, at the TSA headquarters level, we interviewed (and reviewed documentation provided by) officials responsible for the development, implementation, and ongoing monitoring of the Staffing Allocation Model and its determination of the annual allocation of TSOs to each of the nation's commercial airports. Second, at the field level, we interviewed TSA staff at selected airports who were responsible for working within their allocation to deploy sufficient TSO staff to their airports' passenger and checked baggage screening operations.

[1] Pub. L. No. 108-458, § 4023, 118 Stat. 3638, 3723-24 (2004).

During our design phase, we visited six airports selected based on location, airport category,[2] and participation in TSA's Screening Partnership Program.[3] Table 5 provides information on the airports we visited during the design phase.

Table 5: Airports Visited during Design Phase

Geographic location	Airport category	Screening Partnership Program participation
Texas:		
• Dallas/Ft. Worth International Airport	X	No
• William P. Hobby Airport	I	No
• Waco Regional Airport	III	No
Washington, D.C. (Metro):		
• Washington-Dulles International Airport	X	No
• Washington-Regan National Airport	X	No
California:		
• San Francisco International Airport	Yes	Yes

Source: GAO review of TSA data.

After completing the design phase of our study, we visited eight additional airports, shown in table 6, representing a geographic mix of large and small airports. We selected these airports by choosing two airports in each of categories X, I, and II with a similar number of annual passenger enplanements,[4] but which have significantly different passenger wait times

[2] TSA classifies the commercial airports in the United States into one of five security risk categories (X, I, II, III, and IV). In general, category X airports have the largest number of passenger boardings, and category IV airports have the smallest.

[3] The Aviation and Transportation Security Act, Pub. L. No. 107-71, 115 Stat. 597 (2001), established TSA and assigned TSA with the responsibility of building a federal workforce to conduct screening of airline passengers and their checked baggage. See 49 U.S.C. §§ 114(a), 44901(a). The act also required that TSA allow commercial airports to apply to TSA to transition from a federal to a private screener workforce. See § 44920. To support this effort, TSA created the Screening Partnership Program to allow all commercial airports an opportunity to apply to TSA for permission to use qualified private screening contractors and private screeners. There are currently six airports participating in the Screening Partnership Program, including Jackson Hole, Kansas City International, Greater Rochester International, San Francisco International, Sioux Falls Regional, and Tupelo Regional.

[4] Enplanements are the number of airplane passengers boarding planes.

and full time equivalent allocations under the Screening Allocation Model. We also selected two additional airports in category III based solely on their geographic proximity to two of the airports we visited in the larger airport categories. All of the nation's airports in the categories we selected (categories X, I, II, and III) to visit collectively comprise more than 90 percent of TSA's total TSO allocation nationwide.

Table 6: Airports Visited after the Design Phase

Geographic location	Airport category	2005 total enplanements	2006 SAM allocation	2006 average peak wait time
Florida:				
Orlando International	X	16,502,499	925.1	16.98
Michigan:				
Detroit Metro Wayne County	X	17,433,663	733.9	7.85
Indiana:				
Indianapolis International	I	4,211,461	292.1	8.27
California:				
John Wayne	I	4,791,100	217.4	17.99
South Carolina:				
Columbia Metropolitan	II	725,267	58.9	16.18
Maine:				
Portland International	II	734,084	101.4	7.49
Georgia:				
Augusta Bush Field MBS	III	155,146	24.9	7.22
Michigan:				
Saginaw International	III	213,595	21.0	3.08

Source: GAO based on review of TSA data.

In total, since we selected a limited nonprobability sample of 14 airports, the information and results obtained cannot be generalized to all airports nationwide. Rather, the results from our airport visits were designed to help identify aspects of the Screening Allocation Model that may not be adequately addressing unique airport characteristics. Also, on a year-to-year basis, TSA may change the data inputs and assumptions used to calculate TSO allocations nationwide and at individual airports.

In reviewing TSA's Staffing Allocation Model, we did not (1) review the statistical algorithm used in the model, (2) verify the model's computer programming, or (3) run test data through the model.

More details about the scope and methodology of our work regarding each of the objectives are presented in the following sections, respectively.

Objective One: Use of the Staffing Allocation Model to Provide a Sufficient Number of TSOs to Perform Passenger and Checked Baggage Screening at Each Airport and Challenges Faced While Implementing the Model

To determine how TSA ensures its Staffing Allocation Model provides a sufficient number of Transportation Security Officers (TSO) to perform passenger and checked baggage screening at each airport and what challenges it has faced while implementing the model, we first sought to obtain an understanding of how the Staffing Allocation Model works to provide the appropriate number of TSO staff at the nation's airports. We interviewed key officials in TSA headquarters responsible for the development and implementation of the model about the inputs and assumptions to the model and how these elements are used to determine appropriate TSO staffing levels. We also reviewed documentation, provided by these officials, on the design and operation of the model. Additionally, we interviewed Federal Security Directors (FSD) and their staff at the 14 airports about how the Staffing Allocation Model considers factors unique to their airports in determining the allocation of TSOs to perform passenger and baggage screening functions. In addition, we asked FSDs and staff about the adequacy of their allocation and their ability to make changes to the model input, for their airport, if necessary. During the visits to category X, I, and II airports, we also interviewed representatives of each airport's governing authority and one or more of each airport's significant airline operators, to obtain their perspectives on the adequacy of TSA's staffing allocations and TSO scheduling practices at the respective airports. In addition, we interviewed representatives of two airline industry associations—the Air Transport Association and the Regional Airline Association—about their perspectives on TSO staffing levels at the nation's commercial airports.

We also met with TSA headquarters officials to ascertain the methodology used in developing the Screening Allocation Model—including the extent of input from FSDs and other airport stakeholders—and compared/contrasted the model to previous staffing models and methods used by TSA for allocating TSOs to the nation's airports. We interviewed these same officials to determine details on the functioning of the Screening Allocation Model, the various data inputs and assumptions built into the model, how the model uses these factors to determine specific TSO staffing at individual airports, and what feedback, if any, is obtained from FSDs regarding their allocations. In addition, we reviewed relevant documentation from TSA regarding the Screening Allocation Model's assumptions, requirements, and components, along with TSA's policies and procedures guiding the allocation of TSO staff at airport passenger

checkpoints and checked baggage screening areas. We also obtained data on the changes in nationwide TSO allocations since 2004 and examined how TSA, using the model, ensures that it has a sufficient number of TSOs to perform passenger and checked baggage screening.

We also examined how TSA ensures the model complies with statutory requirements—specifically, whether the model (1) provides the necessary levels of passenger and baggage security, (2) minimizes average passenger wait times, and (3) ensures that TSA remains in compliance with the congressionally mandated full-time-equivalent TSO cap. To that end, we interviewed TSA headquarters officials and reviewed Screening Allocation Model-related documentation to ascertain TSA's approach to monitoring performance of the model. We also analyzed TSA's airport-specific performance data to determine how, if at all, various workforce indicators have changed since the model was implemented. These indicators include passenger wait times, TSO absenteeism rates, TSO attrition rates, TSO overtime usage, TSO injury rates, number of TSOs devoted to administrative duties, level of usage of part-time TSOs, and use of the National TSO force.

At the 14 airports, we met with FSDs and other TSA officials to determine details on the extent to which they participated in the development of the Staffing Allocation Model and their level of input into the model's annual TSO allocation process. During our discussions with the FSDs, we discussed how well the airport's allocation, as determined by the model, takes into account the unique characteristics of the airport and the TSO workforce. These characteristics include airport layout, passenger checkpoint configuration, and passenger and baggage screening procedures and equipment. We also examined how the Staffing Allocation Model addresses changes in air traffic and airport layout, changes in security screening procedures, and changes in screening equipment.

In addition to the discussions with FSDs and other TSA officials, during our airport visits we also physically observed the airport's passenger checkpoints and baggage screening areas in order to better understand any unique situations or airport characteristics that affect screening operations and assessed the impact of these situations on the model's allocation of TSOs to the airport.

During the visits to the two similar airports in each of categories X, I, and II, we attempted to determine (1) why one airport received a larger TSO allocation under the Screening Allocation Model, (2) reasons for differences in passenger wait times, and (3) how the SAM allocations at

these two airports affected the FSD's ability to schedule TSOs to perform required security screening activities.[5]

Objective Two: TSA's Deployment of Its TSO Allocation at Individual Airports and Factors That Impact the Allocation Model's Effectiveness in Helping TSA Accomplish This Deployment

To determine how TSA deploys its allocation of TSOs at individual airports and addresses other factors affecting the deployment, we interviewed TSA staff at headquarters and at the airports we visited, regarding TSO scheduling and workforce-related factors that can affect these efforts. We also obtained and reviewed various TSO workforce-related data from TSA headquarters pertaining to these factors than can affect TSA's scheduling efforts at individual airports. These data include airport-specific information on the number of part-time TSOs, absenteeism rates, attrition, overtime, workman's compensation injury claims, and number of TSOs being used for operational support. In addition, we interviewed TSA headquarters officials, and FSDs at individual airports, about various human capital initiatives TSA is implementing to address TSO workforce issues (e.g., TSO attrition, lack of sufficient part-time staff, TSO absenteeism, injuries, etc.) that affect the deployment of TSOs allocated to individual airports.

At the 14 airports we visited, we met with FSDs and other TSA officials to determine details on their methods for scheduling TSOs allocated to them by the model and their use of the model for this purpose. During our discussions with the FSDs, we discussed challenges they face in scheduling the required number of TSOs to perform screening functions. These challenges include airport layout and associated physical infrastructure limitations, type of passenger and baggage screening procedures employed and type of equipment available, number and mix of available full-time/part-time TSOs, number of TSOs unavailable for work (including those on leave, absent, injured, in training, or performing administrative duties), and experience level of TSOs. We also examined how each airport's scheduling operation addresses changes in air traffic and airport layout, changes in security screening procedures, and changes in screening equipment.

We also analyzed certain TSA airport-specific performance data to determine how these factors impact FSDs' ability to effectively schedule

[5] We excluded category IV airports from our study because they make up less than 3 percent of TSOs allocated nationwide under the SAM and passenger boardings at these airports are much more limited and sporadic.

their TSO allocation. Finally, we interviewed TSA airport and human capital officials to determine workforce actions TSA has taken to improve or enhance the Screening Allocation Model's ability to effectively allocate TSOs to the nation's airports and what other efforts, if any, TSA has underway to enhance its ability to deploy TSOs—specifically with respect to the indicators noted above.

Data Reliability

In addressing our objectives, we obtained the following data from TSA:

- Staffing by airport, in full-time equivalents, as of September 30, 2006.
- TSO staffing allocation, by airport, for fiscal years 2004, 2005, and 2006.
- TSO full-time and part-time full-time equivalents levels for fiscal years 2004, 2005, and 2006.
- TSO absenteeism for fiscal years 2004, 2005, and 2006.
- Workman's compensation historical claims activity for calendar years 2004, 2005, and first half of 2006.
- TSO attrition data for fiscal years 2004, 2005, and 2006.
- TSO overtime rates for fiscal years 2004, 2005, and 2006.
- Number and percentage of TSOs used for operational support for 2-week period ending September 30, 2006.
- Deployment of the National Screening Force TSOs as of October 10, 2006.
- Airport passenger wait times for fiscal years 2004, 2005, and 2006.

We discussed the sources of the data with the appropriate TSA officials and obtained written responses to questions about TSA data quality control efforts for several of these data sets. We determined that the data for all were sufficiently reliable for the purposes of this report.

We conducted our work from January 2006 through January 2007 in accordance with generally accepted government auditing standards.

Appendix II: Development and Description of TSA's Staffing Allocation Model

TSA's Development of Its Staffing Allocation Model

The Aviation and Transportation Security Act, enacted in November 2001, significantly changed how passenger and checked baggage screening is conducted in the United States.[1] ATSA removed screening responsibility from air carriers and the contractors who conducted screening for them, and placed this responsibility with TSA. As a result, TSA hired and deployed approximately 55,000 federal passenger and baggage Transportation Security Officers (TSO) (formerly known as screeners) to more than 400 airports nationwide. This initial deployment was based on input from a contract consultant and the number of private sector screeners that had been in place prior to TSA. After this initial roll-out of TSOs, TSA developed a demand-driven staffing model called the "GRA" model in order to improve screening operations and make them more efficient. To derive a TSO staffing allocation for each airport, the GRA model used flight schedules, load factors[2] and connecting flight data, passenger arrival distribution curves, and the number of passenger baggage. However, according to TSA, the GRA model did not provide flexibility to react to dynamic changes in the transportation industry. An initial run of the GRA model in 2003 called for an overall staffing level of 49,600 despite a congressionally imposed 45,000 full-time-equivalent cap on the number of TSOs TSA could hire. As a result, TSA had to impose a 7 percent TSO reduction across the board to comply with the congressional cap by the end of the year. TSA decided it needed to improve its existing demand-driven staffing model—the GRA model—to create a more dynamic model that takes into account information about each airport's configuration,[3] as well as assumptions about passenger and baggage processing.

TSA developed its new model, the Staffing Allocation Model (SAM), with the assistance of a contractor, Regal Decisions (the model was originally called the "Regal" model). As part of the contract requirements, Regal staff and TSA industrial engineers visited airports and met with their Federal Security Directors (FSD) to collect baseline information such as number of lanes, and number of checked baggage processing nodes, along with unique characteristics (physical configuration) of the airports. FSDs had some input (mostly verification of the model input data specific to their

[1] Pub. L. No. 107-71, 115 Stat. 597 (2001).

[2] The percentage of seats filled on a plane. For example, a plane with a load factor of 0.831 has 83.1 percent of its seats filled.

[3] An airport's configuration entails the layout, design, and number of its checked baggage screening areas and passenger screening checkpoints and lanes.

airports) into the process, but were not directly involved in creating the model.[4] Overall, it took Regal and TSA almost a year to get the new Staffing Allocation Model stabilized and ready for initial roll-out. TSA obtained data for,[5] developed, and began deploying the model for testing in the summer of 2004 and first used it for the fiscal year 2005 TSO staffing allocation for the nation's airports. The latest TSO staffing numbers based on the model (for fiscal year 2006) were sent out to the field in October 2005. TSA was in the process of developing allocations for fiscal year 2007 at the time of our report.

Staffing Allocation Model Components

The Staffing Allocation Model consists of three different components. The first is the "GRA" flight data, which provides information to the model on flight schedules and passenger and baggage volume. These data are fed into the "Regal" software (from Regal Decision Systems), which is a simulation model that replicates each airport's configuration and screening process. Finally, the "Sabre" software is a scheduling tool that takes the Regal output, expressed in numbers of TSOs needed to staff security checkpoints in 5-minute increments during the day, and produces an FTE requirement and corresponding TSO work schedules for each airport. Below is a detailed description of the three components that combine to make up TSA's Staffing Allocation Model.

[4]FSDs we interviewed had mixed views on the extent to which they were provided an opportunity to provide input to the initial development of the staffing allocation model. Nine of the 14 FSDs we interviewed stated that they provided little, if any, input to the Staffing Allocation Model's fundamental assumptions and did not know how their allocations were derived. However, 10 FSDs said TSA headquarters did give them an opportunity to provide input specifically on their airports' configuration. TSA officials responsible for the Staffing Allocation Model acknowledged that all FSDs were not directly involved in creating the model. Officials stated that industrial engineers were responsible for visiting the airports to which they are assigned and meeting with FSDs, or their designated staff member, to obtain basic information about screening operations and any unique aspects of their airports.

[5] During this period, TSA officials at individual airports provided data input to the model regarding their airports' profiles—including number of checkpoints, number of lanes, and number of checked baggage processing nodes.

GRA Flight Data

The GRA flight data uses historical data[6] to determine screening demand at each airport. These historical data include baggage volume, flight and passenger distribution curves, size/type of aircraft, and load factors. The GRA firm obtains these data mainly from the various airport authorities and from published sources such as the Official Airlines Guide. The guide's flight schedules are provided to the airports 60-90 days in advance. This allows airports enough time to react to potential changes in their passenger flow, and for the FSDs to make any needed changes to the flight schedules listed in the model, so as to account for last minute scheduling changes or added flights that were not originally published in the guide. The updated flight schedules and passenger loads (which represent the screening demand) from the GRA model serve as the input for the Regal software, which determines the number of open lanes and the amount of baggage equipment needed.

Regal Software

The annual staffing allocation for each airport is based on the peak month demand level (derived by reviewing historical flight and passenger/baggage load data available from the GRA software) input into the Regal software, together with data on airport configurations and assumptions about passenger and baggage processing (that were not a part of the old GRA demand-driven model). The Regal software uses these input data to simulate the actual flow of passengers and baggage through the airport. The final output—each airport's requirements (in number of TSO staff for all passenger lanes and baggage pods, expressed in 5 minute increments throughout the day)—is determined based on the various assumptions outlined in table 7 and discussed as follows:

- Nonpassenger screening demand—This is the additional demand for personnel screening checkpoints created by nonpassengers (e.g., airline crews, concession staff, and airport vendors). Based on discussions with TSA leadership and estimates by industrial engineers, the model constant for nonpassenger screening demand was set at 4 percent of passenger lane volume.

- Passenger processing wait time—This is the amount of time passengers have to wait to undergo screening at the security checkpoint. The

[6] The GRA consulting firm engages in an ongoing data collection effort. It gathers future flight schedules, historical passenger loads, and connecting percentages—all of which can be adjusted with appropriate approval. Passenger loads and baggage counts are purely historical data that can't be routinely adjusted.

model sets a threshold of a 10-minute wait before opening additional lanes, if available, based on passenger volumes.

- Peak month screening demand—TSA derives the Staffing Allocation Model's allocations based on originating passenger load factors for the 85th percentile day of each airport's peak month. In determining the 85th percentile day, TSA must first determine each airport's peak month by reviewing historical monthly passenger load data for each month in the airport's year. According to TSA industrial engineers, selection of the peak month is based on the average demand day (based on passenger load) for each month with the peak month being the month with the highest average demand day. Since daily screening demand data are not reported by the airlines (and, is therefore, not available) TSA must approximate each month's average demand day by dividing the monthly passenger load data by the number of days in the month. This assumption is linked to TSA's 10-minute wait time goal for processing passengers and baggage through security. That is, according to TSA industrial engineers, basing the Staffing Allocation Model on the average peak demand day is intended to ensure that, on an annual basis, 85 percent or more of the total passengers screened in U.S. airports will not have to wait more than 10 minutes to be screened. Further, based on TSA's analysis, basing the model on this level of demand may result in TSA taking longer than 10 minutes to screen passengers during 7 percent of an airport's days during the year. According to TSA, these 25 to 30 days are typically the exceptionally high travel days such as the days before the Thanksgiving and Christmas holidays. Conversely, for purposes of the annual allocation, TSA industrial engineers added that basing the model's demand level on the average peak demand day may result in TSA screening passengers in 10 minutes or less during 93 percent of the airport's days during the year (approximately 335 to 340 travel days over the airport's year). Lastly, when determining the annual allocation, TSA officials run the model on a representative week during the peak month.[7]

  By basing airports' staffing allocations on their peak month passenger volume, TSA intends to ensure that airports will have some staff to accommodate nonscreening activities such as training and annual leave during off-peak periods. In addition, the peak month-based allocation is intended to provide airports with excess staffing capacity to respond to

[7] TSA officials stated that, for the annual allocation run, they must run the model based on a full week (as if trying to schedule for that week) since it is not practical to run the model based on only 1 day.

unforeseen events such as changes in flight schedules, injuries, and sick leave. In addition to nonpassenger screening demand, passenger processing wait time, and the calculation of demand, the following assumptions were included in the fiscal year 2007 model:

- Line item full-time-equivalent allocation for TSO time paid but not worked—In fiscal year 2007, TSA, for the first time, provided a separate line item allocation for the various categories of TSO time paid not worked. These categories include vacation, sick, comp, injury, and military leave. Prior to fiscal year 2007, TSO time paid not worked was indirectly accounted for within the peak month screening demand/85th percentile day assumption.

- Part-time staff—TSA sets the SAM to run at a staffing mix of full-time and part-time TSO full-time equivalents based on each airport's individual part-time to full-time TSO ratio. Prior to fiscal year 2007, TSA assumed the same part-time goal for all category X, I, and II airports—regardless of their actual ratios.

- Passenger checkpoint throughput—The passenger checkpoint throughput is the number of passengers that are processed per security checkpoint lane, per hour. The model assumes this to be 200.

- Checked baggage processing rates—The checked baggage processing rate is the number of bags that various types of screening equipment will process per hour. Table 7 shows baggage processing rates based on type of screening equipment and whether the baggage screening system is in-line[8] or stand-alone.[9]

- Baggage staffing requirements—This is the number of TSO FTEs required to adequately staff screening equipment. As with checked baggage processing rates, baggage staffing requirements vary by screening equipment, whether the equipment is stand-alone or inline, and by airport category.

- Staffing per lane by airport category—The model allocates staffing by airport category and by lane type. A standard checkpoint lane is a lane

[8] A bag screening methodology that employs the automated movement of a bag in and out of an explosive detection system machine.

[9] A bag screening methodology that employs a manual (as opposed to an automated) movement of bag in and out of an explosive detection system machine.

that processes only passengers who are not selectees (i.e., those passengers selected for more intense screening). An integrated checkpoint lane is a lane that processes both standard passengers and selectees. A dedicated checkpoint lane is a lane that processes only passengers who are selectees.

- Standard alarm rates—The model assumes specific rates for alarms on screening equipment used at both passenger checkpoints and baggage check areas. The model also assumes a selectee rate for passenger checkpoints.

Table 7: Staffing Allocation Model Assumptions for Fiscal Year 2007

Assumption		Value or description	
Nonpassenger demand (percent)			4
Passenger processing time (in minutes)			10
Peak month demand		Based on 95th percentile day	
Full-time-equivalent credits for time paid not worked (in percent)	Annual leave allocation		14.5
	Sick leave		3.7
	Comp time		0.4
	Injury time off		0.2
	Military leave		0.1
Full-time-equivalent credit for training (percent)			2.0
Full-time-equivalent credit for collateral duties (percent)			5.0
Part-time staff full time-equivalent level (percent)			Variable by airport
Passenger checkpoint throughput (passengers per lane, per hour)			200
Passenger checkpoint throughput for ETP machine			175
Checked baggage processing rates (bags per machine, per hour)	**EDS Equipment Type**	**Stand-Alone**	**In-Line**
	Invision CTX 9000	160	350
	Invision CTX 5500	200	210
	Invision CTX 2500	115	N/A
	Examiner 6000 L3	160	350
	CT80	80	N/A

	Assumption		Value or description		
Baggage staffing requirements[a]	**Airport category**	**Equipment type**	**Stand-alone**	**In-line**	**In-line (with OSR)**
	X, I, II, & III (ETD only)	EDS	2	0.625	0.625
		ETD	1.25	1.25	1.25
	IV				
Staffing per lane by airport category[a]	Airport category	**Land type**	**Staff per lane**		**Per lane selectee[b] credit**
	X, I, & II	Standard	4.25		0.9
		Integrated	4.25		0.9
		Dedicated	2.5		0.9
	III	All lanes	3.5		0
	IV	All lanes	2.0		0
Standard alarm rates	Checkpoint	Standard passenger	Staffing sufficient up to 6 percent selectee alarm		
		Selectee passenger	Staffing sufficient up to 6 percent selectee alarm		
	Baggage	EDS	Staffing sufficient up to 15 percent alarm		

Source: TSA.

Legend: EDS = explosive detection system; ETD = explosive trace detection; ETP = explosive trace portal; OSR = on-screen resolution; N/A = not available.

[a]Staffing is number of TSO staff per piece of equipment or passenger checkpoint lane.

[b]A selectee is a passenger who meets certain criteria based on the Computer Assisted Passenger Pre-Screening System or some other TSA-approved process and is, therefore, subject to more intense screening such as wanding and bag checks.

In addition to the model assumptions shown in table 7, the Regal software also incorporates adjustments to flight schedules (increases or decreases), variable arrival patterns, and each airport's configuration including making any allowances for projected expansions to the airport's configuration. Regal also determines, based on input from the GRA software, when TSA airport officials need to open more passenger processing lanes in response to increased passenger flow (not to exceed the total number of TSOs available). An individual airport FSD cannot change either the model assumptions or the baseline configuration for their assigned airport without TSA headquarters approval, but can petition TSA headquarters to change assumptions and baseline configuration data if it is believed they are not reflective of his/her airport.

Sabre Software

Sabre Airline Solutions, Inc., provides the commercial, off-the-shelf software for the staffing allocation model's scheduling tool. The Sabre scheduling tool has three features—Staff Admin, Staff Manager, and Staff Plan. (TSA did not purchase the Staff Manager component.) Staff Admin

rosters an airport's employee group in a database (shifts, schedules, personal information, training, etc.) while Staff Plan recommends a mix of full-time and part-time TSOs and generates a daily work schedule based on the Regal software's staffing requirement output. Sabre takes the Regal output and converts it into an full-time-equivalent figure and it determines scheduling plans based on that figure (if the airport uses Sabre for scheduling) using the 80/20 full-time/part-time TSO mix for category X, I, and II airports.

TSA's Use of the Staffing Allocation Model

TSA uses the Staffing Allocation Model in three different ways—first, it is run once a year to determine the staffing allocation for all airports (annual allocation run). Second, it is run at other times to perform capacity analysis for both lanes required and number and types of baggage equipment required. Third, it is run at other times of the year where airports can tweak certain aspects of the model for scheduling runs without approval from TSA headquarters—for example, to conduct "what-if" scheduling scenarios by changing different inputs, such as passenger flow, or flight schedules. However, they cannot do so for an annual allocation run unless TSA headquarters grants approval to change an assumption for a specific airport. The baseline for an annual allocation run always stays the same and cannot be changed by an airport without TSA headquarters approval. TSA models each airport according to its unique configuration—that is, no two airports are modeled the same because no two airports look the same (nor do they have the same airline traffic profile). FSDs and their staffs typically meet with airline carriers on a continuing basis to obtain updated flight schedules. The scheduling runs to determine TSO schedules incorporate these updated flight schedules whereas, the fiscal runs to determine overall full-time-equivalent allocation, using peak month passenger volumes from historical flight data. If the historical flight schedule used for an annual allocation run is significantly different from current flight schedules at an airport (e.g., a new airline carrier joins the airport), the FSD can submit an appeal to TSA headquarters to re-run the model using the current flight schedule in order to obtain a more accurate staffing allocation for his or her airport. (This has been done on an annual basis or when a significant change in the airport's flight schedule occurs.) Unlike for annual allocation runs, updated flight schedules are used more frequently for scheduling runs at the local airports without headquarters intervention.

The Staffing Allocation Model can be adjusted to account for the uniqueness of a particular airport's security checkpoints and airline traffic patterns. However, FSDs are responsible for ensuring that all data

elements and assumptions are accurate for their airports and bringing to headquarters' attention any factors that should be reviewed to determine if changes to the model for their airports may be appropriate.

Appendix III: Comments from the Department of Homeland Security

U.S. Department of Homeland Security
Washington, DC 20528

Homeland Security

February 26, 2007

Mr. Brian J. Lepore
Acting Director
Homeland Security and Justice
U.S. Government Accountability Office
441 G. Street, NW
Washington, DC 20548

Dear Mr. Lepore:

Thank you for the opportunity to comment on the draft report GAO-07-299, *AVIATION SECURITY: TSA's Staffing Allocation Model Is Useful for Allocating Staff Among Airports, but Its Assumptions Should Be Systematically Reassessed*. The Department's Transportation Security Administration (TSA) values GAO's work in planning, conducting and issuing this report.

TSA appreciates GAO's conclusion that the Staffing Allocation Model (SAM), which allocates Transportation Security Officers (TSOs) in a manner that ensures security and minimizes wait times, is a useful tool for allocating TSO resources. TSA understands the importance of using a robust staffing model that effectively and efficiently manages the large number of TSOs at more than 400 airports. We also understand that any model, over time, must be continuously improved and enhanced. In 2004, after experimenting with other systems, TSA management officials, industrial engineers, information management specialists, and industry stakeholders collaborated to develop a new SAM. This new system has served as the primary staffing allocation and scheduling tool and has been the focus of continued refinement and increasing levels of staffing precision. The GAO report validates these efforts by noting that Federal Security Directors (FSDs) believe SAM has become a more accurate predictor of staffing needs compared to previous models. The continuing challenge, for any modeling involving the dynamic aviation industry, will be refining model assumptions.

TSA has a number of initiatives under way which are intended to address workforce staffing challenges. It is essential that TSA recruit, retain, and maintain a steady workforce that is highly trained, motivated, smart, and flexible. In 2006, TSA deployed a pay-for-performance system for TSOs, Lead and Supervisory TSOs, and Screening Managers called the Performance Accountability and Standards System (PASS). PASS facilitates clear expectations and understanding of performance standards for Security Officers and Managers. This system ensures that the staff knows how performance will be evaluated, and what rewards are associated with achieving the standards of performance. PASS informs staff that outstanding performance is required, recognized, and rewarded. It reinforces the challenge and seriousness of the jobs

www.dhs.gov

performed by TSA's frontline employees. TSA is fully committed to PASS and believes it will be a major factor in attracting and retaining a professional, high performing workforce.

TSA is also implementing a number of other programs to help improve recruitment and retention. For example, TSA has developed a local, decentralized hiring process to give FSDs control over key aspects of hiring. Local hiring empowers FSDs to find the best-qualified candidates. FSDs and staff receive the training and tools needed to direct recruitment activities, serve as the primary points-of-contact for TSO applicants, and shepherd applicants throughout the application, testing, and assessment cycles. Local hiring also provides applicants with more site-specific information relevant to their decision to apply for a position. As a result, the percentage of new full-time TSOs leaving TSA employment voluntarily in the first 3 months after hire declined from 26.7 percent in the fourth quarter of FY 2005 to 11 percent in the fourth quarter of FY 2006, a reduction of 58.8 percent. Also, the percentage of new part-time TSOs leaving TSA employment voluntarily in the first 3 months after hire declined from 27 percent in the fourth quarter of FY 2005 to 12.6 percent in fourth quarter of FY 2006, a reduction of 53.3 percent. Before implementing the local hiring initiative, the agency average hiring rate for new TSOs was about 180 each pay period. The local hiring initiative has demonstrated the capability to on-board 800 or more new TSOs in a single pay period, with an average of 350 TSOs being hired every pay period.

These new staffing programs are also contributing to an increase in the number of part-time TSOs which make up the workforce. In recent months the average number of part-time TSOs has continued to increase and is now closer to TSA's operational goal of a full-time equivalent (FTE) workforce that is 20 percent part-time. At the 14 airports mentioned in the report, the average number of part-time TSO FTEs has increased from 7 percent to 14 percent subsequent to GAO's visits. Nationally, this number has also increased from 15.6 percent at the beginning of FY 2007 to 16.9 percent. While GAO reports that a 20 percent part-time mix of TSOs may be difficult to achieve at some airports, TSA continues to look at how best to utilize its personnel based upon operational demands. The utilization of part-time and full-time shift workers is critical as we move forward and refine our recruitment, retention, and management efforts to optimize our workforce. TSA has recognized that each airport may face different workforce challenges and no longer uses a standard 20 percent part-time SAM assumption for all airports. TSA now customizes SAM part-time staffing assumptions to the unique needs and circumstances at individual airports. Moreover, TSA is initiating an Optimization Program which will help FSDs identify the right mix of part-time and full-time TSOs needed to meet their airports' specific needs. The program will teach FSDs and staff the techniques and best practices that will maximize their efforts. For example, the Optimization Program will help some FSDs evaluate the utility and flexibility of split shifts.

The GAO report indicates that using TSOs in operational support positions may undermine TSA's investment in training. TSA is vigorously working to reduce the number of TSOs performing operational support functions and has contracted with three private companies to provide operational support when requested by the FSD. These contractors supplement FSD administrative staff so that those TSOs assigned to these functions may return to their primary screening duties. Further, TSA has implemented several solutions to ensure that TSOs performing operational support functions maintain sharp security screening skills. PASS and recurrent training requirements set a very clear standard for acceptable TSO screening skills.

TSA has implemented several training and certification requirements which require TSOs periodically to perform screening duties and demonstrate that their ability to detect prohibited items on passengers and in baggage remains at acceptable levels. As part of PASS, TSA has implemented a policy requiring all TSOs to perform screening functions every week and requires TSOs to receive at least three hours of screener training per week, with an additional 4 hours per month designated exclusively for the detection of improvised explosive devices.

TSA appreciates GAO's recommendation that we should systematically and periodically ensure SAM assumptions continue to reflect actual operating conditions that may change over time. TSA considers this recommendation to be a validation of the direction in which we are already headed. As noted in the GAO report, TSA has already performed its first annual reassessment of select assumptions as part of SAM refinements for 2007. As a result of this reassessment, TSA has made several enhancements to the staffing model. For example, the modeling now provides additional TSO resources for leave (annual, sick and military), training, operational support, and new screening procedures. Also, as noted earlier, TSA now customizes SAM to match the unique part-time/full-time TSO mix at individual airports. The next step in TSA's refinement of SAM is to develop and formalize a plan and prioritization scheme which ensures all assumptions are systematically validated on a periodic basis. TSA has already begun work in this area.

The following represents our responses to the recommendations.

Recommendation 1: Establish a formal, documented plan for reviewing all of the assumptions in the Staffing Allocation Model on a periodic basis to ensure that the assumptions result in TSO staffing allocations that accurately reflect operating conditions that may change over time.

TSA Concurs. TSA has already begun implementing this recommendation. As part of the SAM '07 process, the Office of Security Operations (OSO) worked in conjunction with the Chief Technology Office (CTO) to review baseline Explosives Trace Detection (ETD) and Explosives Detection System (EDS) processing rates. TSA also conducted a detailed review of baggage distribution patterns. Both reviews resulted in enhancements to our staffing model.

Moving forward, OSO, CTO, and other stakeholders have begun collaborating to develop a formal and systematic process which will identify and prioritize SAM assumptions for periodic review. A joint action team, composed of a diverse group of subject matter experts from different disciplines, will develop a process that includes the use of formalized studies and empirical data to validate model assumptions. It is important to note that any modeling assumption and validation process must include flexibilities to allow for unexpected and immediate changes in the security operational environment. As TSA develops this new process, we plan to make full use of lessons learned during prior year model-runs and seek and receive input from both field and headquarters personnel. TSA is committed to developing a final process that is dynamic, comprehensive, well-documented, and approved by OSO senior leadership. Further, TSA recognizes the importance of the continued use of performance metrics to determine trends across our network. When we identify concerns at airports, we will be able to determine quickly if the problem is staffing or operational and continue to modify the Staffing Allocation Model.

Recommendation 2: Establish a policy for when TSOs can be used to provide operational support.

TSA Concurs. OSO and the Office of Human Capital (OHC) are working together to develop a policy which would define when TSOs might be used to provide operational support. While this effort is currently in its beginning stages, the final policy will provide a greater degree of structure and guidance to FSDs concerning the use of TSOs in operational support positions. The policy will help the FSD decide how best to meet their security and operational staffing needs. Development of the policy will evaluate key roles and responsibilities and analyze appropriate situations for the use of TSOs as operational support.

TSA is committed to implementing the report's recommendations. The findings and recommendations resulting from this audit are constructive and useful. Thank you again for the opportunity to comment on this draft report and we look forward to working with you on future homeland security issues.

Sincerely,

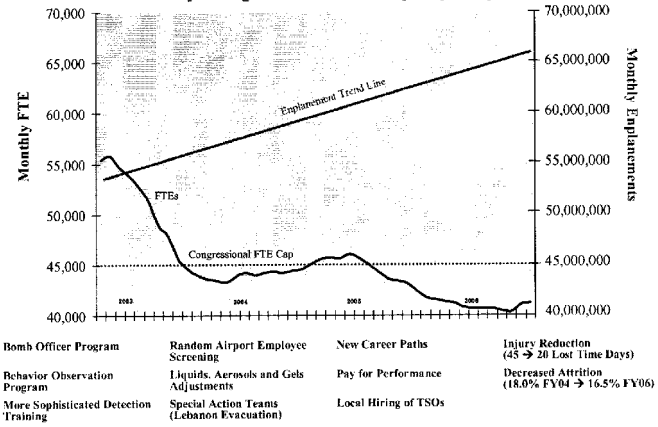
Steven J. Pecinovsky
Director
Departmental GAO/OIG Liaison Office

Draft Report GAO-07-299 "TSA's Staffing Allocation Model (SAM) is Useful for Allocating Staff among Airports, But Its Assumptions Should be Systematically Reassessed."

Executive Summary

The Transportation Security Administration (TSA) has screened more people with a flat headcount the past 3 years and has done so with active workforce management.

2006-2007
With increased enplanements and flat staffing,
TSA has implemented and self-funded major initiatives to
increase security through better workforce quality and performance



Toward that end, TSA changed the entire staffing management system that GAO originally was asked to study and implemented a wide array of significant changes in its workforce management during the time that this GAO study was underway. This highlights the challenge for GAO which had to study a topic that is in the midst of major process change. The conclusions of the study are valuable, but TSA wants to ensure that a full and current picture of the state of TSA's workforce management is portrayed. Some of the major aspects are highlighted below:

- Federal Security Directors (FSDs) now have local hiring authority and the tools to tailor their headcount to meet their dynamic operating needs – including getting the right part-time mix of Transportation Security Officers (TSOs). This is completely new since the study was commissioned.

- FSDs now have numerous additional tools to drive better retention, fewer injuries, higher attendance, and better performance. Those are new since the study was commissioned.

2

- TSA has taken the position – and provided the tools – to move TSOs from administrative functions where possible and deploy them to front-line security duties. This is new since the study was commissioned.

- The staffing methodolgy has been changed from a top-down Headquarters (HQ) driven model that worked from the TSO full-time equivalent (FTE) cap downwards to a bottoms-up approach based on airport input which includes actual airline operations and checkpoint and baggage information. That change alone eliminates many of the issues with the old model.

- There were many other significant changes in the SAM including: building in specific time into the model for training, operational support, collateral duties, and leave (i.e. sick, military leave, annual leave); an addition of a variable part-time component; as well as recognizing other security initiatives, such as Bomb Appraisal Officers, and Screening Passengers by Observation Technique, etc.

- TSA actively evaluates the work that is done by TSOs and the way is the work is done with an eye toward focusing TSA resources to the changing security environment. Not only is the model constantly updated, but the underlying business processes that drive the model are constantly reviewed for improvement.

Appendix IV: GAO Contact and Staff Acknowledgments

GAO Contact

Brian J. Lepore (202) 512-4523 or leporeb@gao.gov.

Acknowledgments

In addition to those named above, Maria Strudwick; Assistant Director; David Alexander; Richard Ascarate; Philip Caramia; Kathryn Godfrey; Michael Harmond; Thomas Lombardi; Enemencio Sanchez; Edith Sohna; Pamela Valentine; Vaughn Williams; and Greg Wilmoth made key contributions to this report.

Related GAO Products

Aviation Security: Progress Made in Systematic Planning to Guide Key Investment Decisions, but More Work Remains. GAO-07-448T. Washington, D.C.: February 13, 2007.

Homeland Security: Progress Has Been Made to Address the Vulnerabilities Exposed by 9/11, but Continued Federal Action Is Needed to Further Mitigate Security Risks. GAO-07-375. Washington, D.C.: January 24, 2007.

Aviation Security: TSA Oversight of Checked Baggage Screening Procedures Could Be Strengthened. GAO-06-869. Washington, D.C.: July 28, 2006.

Aviation Security: TSA Has Strengthened Efforts to Plan for the Optimal Deployment of Checked Baggage Screening Systems but Funding Uncertainties Remain. GAO-06-875T. Washington, D.C.: June 29, 2006.

Aviation Security: Management Challenges Remain for the Transportation Security Administration's Secure Flight Program. GAO-06-864T. Washington, D.C.: June 14, 2006.

Aviation Security: Further Study of Safety and Effectiveness and Better Management Controls Needed If Air Carriers Resume Interest in Deploying Less-than-Lethal Weapons. GAO-06-475. Washington, D.C.: May 26, 2006.

Aviation Security: Enhancements Made in Passenger and Checked Baggage Screening, but Challenges Remain. GAO-06-371T. Washington, D.C.: April 4, 2006.

Aviation Security: Transportation Security Administration Has Made Progress in Managing a Federal Security Workforce and Ensuring Security at U.S. Airports, but Challenges Remain. GAO-06-597T. Washington, D.C.: April 4, 2006.

Aviation Security: Progress Made to Set Up Program Using Private-Sector Airport Screeners, but More Work Remains. GAO-06-166. Washington, D.C.: March 31, 2006.

Aviation Security: Significant Management Challenges May Adversely Affect Implementation of the Transportation Security Administration's Secure Flight Program. GAO-06-374T. Washington, D.C.: February 9, 2006.

Aviation Security: Federal Air Marshal Service Could Benefit from Improved Planning and Controls. GAO-06-203. Washington, D.C.: November 28, 2005.

Aviation Security: Federal Action Needed to Strengthen Domestic Air Cargo Security. GAO-06-76. Washington, D.C.: October 17, 2005.

Transportation Security Administration: More Clarity on the Authority of Federal Security Directors Is Needed. GAO-05-935. Washington, D.C.: September 23, 2005.

Aviation Security: Flight and Cabin Crew Member Security Training Strengthened, but Better Planning and Internal Controls Needed. GAO-05-781. Washington, D.C.: September 6, 2005.

Aviation Security: Transportation Security Administration Did Not Fully Disclose Uses of Personal Information during Secure Flight Program Testing in Initial Privacy Notes, but Has Recently Taken Steps to More Fully Inform the Public. GAO-05-864R. Washington, D.C.: July 22, 2005.

Aviation Security: Better Planning Needed to Optimize Deployment of Checked Baggage Screening Systems. GAO-05-896T. Washington, D.C.: July 13, 2005.

Aviation Security: Screener Training and Performance Measurement Strengthened, but More Work Remains. GAO-05-457. Washington, D.C.: May 2, 2005.

Aviation Security: Secure Flight Development and Testing Under Way, but Risks Should Be Managed as System Is Further Developed. GAO-05-356. Washington, D.C.: March 28, 2005.

Aviation Security: Systematic Planning Needed to Optimize the Deployment of Checked Baggage Screening Systems. GAO-05-365. Washington, D.C.: March 15, 2005.

Aviation Security: Measures for Testing the Effect of Using Commercial Data for the Secure Flight Program. GAO-05-324. Washington, D.C.: February 23, 2005.

Transportation Security: Systematic Planning Needed to Optimize Resources. GAO-05-357T. Washington, D.C.: February 15, 2005.

Aviation Security: Preliminary Observations on TSA's Progress to Allow Airports to Use Private Passenger and Baggage Screening Services. GAO-05-126. Washington, D.C.: November 19, 2004.

General Aviation Security: Increased Federal Oversight Is Needed, but Continued Partnership with the Private Sector Is Critical to Long-Term Success. GAO-05-144. Washington, D.C.: November 10, 2004.

Aviation Security: Further Steps Needed to Strengthen the Security of Commercial Airport Perimeters and Access Controls. GAO-04-728. Washington, D.C.: June 4, 2004.

Transportation Security Administration: High-Level Attention Needed to Strengthen Acquisition Function. GAO-04-544. Washington, D.C.: May 28, 2004.

Aviation Security: Challenges in Using Biometric Technologies. GAO-04-785T. Washington, D.C.: May 19, 2004.

Nonproliferation: Further Improvements Needed in U.S. Efforts to Counter Threats from Man-Portable Air Defense Systems. GAO-04-519. Washington, D.C.: May 13, 2004.

Aviation Security: Private Screening Contractors Have Little Flexibility to Implement Innovative Approaches. GAO-04-505T. Washington, D.C.: April 22, 2004.

Aviation Security: Improvement Still Needed in Federal Aviation Security Efforts. GAO-04-592T. Washington, D.C.: March 30, 2004.

Aviation Security: Challenges Delay Implementation of Computer-Assisted Passenger Prescreening System. GAO-04-504T. Washington, D.C.: March 17, 2004.

Aviation Security: Factors Could Limit the Effectiveness of the Transportation Security Administration's Efforts to Secure Aerial Advertising Operations. GAO-04-499R. Washington, D.C.: March 5, 2004.

Aviation Security: Computer-Assisted Passenger Prescreening System Faces Significant Implementation Challenges. GAO-04-385. Washington, D.C.: February 13, 2004.

Aviation Security: Challenges Exist in Stabilizing and Enhancing Passenger and Baggage Screening Operations. GAO-04-440T. Washington, D.C.: February 12, 2004.

The Department of Homeland Security Needs to Fully Adopt a Knowledge-based Approach to Its Counter-MANPADS Development Program. GAO-04-341R. Washington, D.C.: January 30, 2004.

Aviation Security: Efforts to Measure Effectiveness and Strengthen Security Programs. GAO-04-285T. Washington, D.C.: November 20, 2003.

Aviation Security: Federal Air Marshal Service Is Addressing Challenges of Its Expanded Mission and Workforce, but Additional Actions Needed. GAO-04-242. Washington, D.C.: November 19, 2003.

Aviation Security: Efforts to Measure Effectiveness and Address Challenges. GAO-04-232T. Washington, D.C.: November 5, 2003.

Airport Passenger Screening: Preliminary Observations on Progress Made and Challenges Remaining. GAO-03-1173. Washington, D.C.: September 24, 2003.

Aviation Security: Progress Since September 11, 2001, and the Challenges Ahead. GAO-03-1150T. Washington, D.C.: September 9, 2003.

Transportation Security: Federal Action Needed to Enhance Security Efforts. GAO-03-1154T. Washington, D.C.: September 9, 2003.

Transportation Security: Federal Action Needed to Help Address Security Challenges. GAO-03-843. Washington, D.C.: June 30, 2003.

Federal Aviation Administration: Reauthorization Provides Opportunities to Address Key Agency Challenges. GAO-03-653T. Washington, D.C.: April 10, 2003.

Transportation Security: Post-September 11th Initiatives and Long-Term Challenges. GAO-03-616T. Washington, D.C.: April 1, 2003.

Airport Finance: Past Funding Levels May Not Be Sufficient to Cover Airports' Planned Capital Development. GAO-03-497T. Washington, D.C.: February 25, 2003.

Transportation Security Administration: Actions and Plans to Build a Results-Oriented Culture. GAO-03-190. Washington, D.C.: January 17, 2003.

Aviation Safety: Undeclared Air Shipments of Dangerous Goods and DOT's Enforcement Approach. GAO-03-22. Washington, D.C.: January 10, 2003.

Aviation Security: Vulnerabilities and Potential Improvements for the Air Cargo System. GAO-03-344. Washington, D.C.: December 20, 2002.

Aviation Security: Registered Traveler Program Policy and Implementation Issues. GAO-03-253. Washington, D.C.: November 22, 2002.

Airport Finance: Using Airport Grant Funds for Security Projects Has Affected Some Development Projects. GAO-03-27. Washington, D.C.: October 15, 2002.

Commercial Aviation: Financial Condition and Industry Responses Affect Competition. GAO-03-171T. Washington, D.C.: October 2, 2002.

Aviation Security: Transportation Security Administration Faces Immediate and Long-Term Challenges. GAO-02-971T. Washington, D.C.: July 25, 2002.

Aviation Security: Information Concerning the Arming of Commercial Pilots. GAO-02-822R. Washington, D.C.: June 28, 2002.

Aviation Security: Vulnerabilities in, and Alternatives for, Preboard Screening Security Operations. GAO-01-1171T. Washington, D.C.: September 25, 2001.

Aviation Security: Weaknesses in Airport Security and Options for Assigning Screening Responsibilities. GAO-01-1165T. Washington, D.C.: September 21, 2001.

Homeland Security: A Framework for Addressing the Nation's Efforts. GAO-01-1158T. Washington, D.C.: September 21, 2001.

Aviation Security: Terrorist Acts Demonstrate Urgent Need to Improve Security at the Nation's Airports. GAO-01-1162T. Washington, D.C.: September 20, 2001.

Aviation Security: Terrorist Acts Illustrate Severe Weaknesses in Aviation Security. GAO-01-1166T. Washington, D.C.: September 20, 2001.

GAO's Mission

The Government Accountability Office, the audit, evaluation and investigative arm of Congress, exists to support Congress in meeting its constitutional responsibilities and to help improve the performance and accountability of the federal government for the American people. GAO examines the use of public funds; evaluates federal programs and policies; and provides analyses, recommendations, and other assistance to help Congress make informed oversight, policy, and funding decisions. GAO's commitment to good government is reflected in its core values of accountability, integrity, and reliability.

Obtaining Copies of GAO Reports and Testimony

The fastest and easiest way to obtain copies of GAO documents at no cost is through GAO's Web site (www.gao.gov). Each weekday, GAO posts newly released reports, testimony, and correspondence on its Web site. To have GAO e-mail you a list of newly posted products every afternoon, go to www.gao.gov and select "Subscribe to Updates."

Order by Mail or Phone

The first copy of each printed report is free. Additional copies are $2 each. A check or money order should be made out to the Superintendent of Documents. GAO also accepts VISA and Mastercard. Orders for 100 or more copies mailed to a single address are discounted 25 percent. Orders should be sent to:

U.S. Government Accountability Office
441 G Street NW, Room LM
Washington, D.C. 20548

To order by Phone: Voice: (202) 512-6000
TDD: (202) 512-2537
Fax: (202) 512-6061

To Report Fraud, Waste, and Abuse in Federal Programs

Contact:

Web site: www.gao.gov/fraudnet/fraudnet.htm
E-mail: fraudnet@gao.gov
Automated answering system: (800) 424-5454 or (202) 512-7470

Congressional Relations

Gloria Jarmon, Managing Director, JarmonG@gao.gov (202) 512-4400
U.S. Government Accountability Office, 441 G Street NW, Room 7125
Washington, D.C. 20548

Public Affairs

Paul Anderson, Managing Director, AndersonP1@gao.gov (202) 512-4800
U.S. Government Accountability Office, 441 G Street NW, Room 7149
Washington, D.C. 20548

PRINTED ON RECYCLED PAPER