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February 2018

AVIATION SECURITY

TSA Uses Current Assumptions and Airport-Specific Data for Its Staffing Process and Monitors Passenger Wait Times Using Daily Operations Data

Accessible Version

GAO-18-236

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GAO Highlights

Highlights of GAO-18-236, a report to congressional committees

Why GAO Did This Study

TSA employs about 43,000 TSOs who screen over 2 million passengers and their baggage each day at airports in the United States. TSA allocates TSOs to airports using both a computer-based staffing model and information from airports that are intended to provide each airport with the optimum number of TSOs. In the spring of 2016, long screening checkpoint lines at certain U.S. airports raised questions about TSA's process for allocating TSOs to airports.

The Aviation Security Act of 2016 includes a provision for GAO to review TSA's process for allocating TSOs. This report examines how (1) TSA modifies staffing assumptions and tailors staffing levels to airports' needs, (2) TSA monitors wait times and throughput and adjusts resources accordingly, and (3) TSA shares information with stakeholders about staffing and related screening procedures at airports. GAO reviewed TSA documentation describing how the agency modifies staffing assumptions and manages stakeholder coordination. GAO also analyzed passenger wait time and throughput data from January 2015 through May 2017 for the 28 airports monitored by headquarters. GAO visited eight airports selected on the basis of passenger volume and other factors and interviewed TSA officials and stakeholders at those locations.

GAO is not making any recommendations.

View GAO-18-236. For more information, contact Jennifer A. Grover at (202) 512-7141 or groverj@gao.gov.

What GAO Found

The Transportation Security Administration (TSA) modifies staffing assumptions used in its computer-based staffing model (model) and tailors staffing levels to individual airport needs. Specifically, TSA works with a contractor annually to evaluate the assumptions used in the model and modifies the model's assumptions as needed. For example, TSA adjusted its model after contractor evaluations conducted in fiscal years 2016 and 2017 found that transportation security officers (TSO) needed more time to screen passengers and their baggage when using one type of screening equipment. Moreover, in 2016, TSA began using forecasts on the number of passengers screened at each airport's checkpoints (throughput) to better allocate staff commensurate with the expected rate of increase in passenger throughput at each airport. Furthermore, prompted by the long wait times at some airports in 2016, for the 2017 model TSA officials used actual expedited screening data, specific to each individual airport, rather than relying on the system-wide estimate used in 2016. TSA officials also use other information specific to each airport—such as staff training needs—to further tailor the TSO allocation because the initial allocation resulting from the model does not reflect the full range of operating conditions at individual airports.

TSA uses data to monitor passenger wait times and throughput on a daily basis and responds to increases. For example, TSA's Airport Operations Center (AOC) monitors daily wait times and passenger throughput from 28 airports that TSA officials say represent the majority of passenger throughput nationwide or are operationally significant. Furthermore, TSA officials at airports are required to report to the AOC when an event occurs—such as equipment malfunctions—that affects airport screening operations and results in wait times that are greater than 30 minutes in standard screening lanes. GAO analyzed wait time data for the AOC-monitored airports for the period of January 2015 through May 2017 and found that TSA's reported wait times met its standard of less than 30 minutes in standard screening 99 percent of the time. Within that time frame, two airports accounted for the longest wait times in the spring of 2016. TSA officials identified several tools, such as passenger screening canines, that they use to respond to increases in passenger wait times at these airports.

TSA has taken steps to improve information sharing with airline and airport officials (stakeholders) about staffing and related airport screening operations, and most stakeholders GAO interviewed reported improved satisfaction with information sharing. However, some stakeholders noted differences in the type and extent of information shared. According to TSA officials, stakeholders can elevate any problems they experience with information sharing within TSA to ensure information is shared regularly with stakeholders.

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Abbreviations

AAAE	American Association of Airport Executives
ACI-NA	Airports Council International-North America
AIT	advanced imaging technology
AOC	Airport Operations Center
FSD	Federal Security Director
NDF	National Deployment Force
OSO	Office of Security Operations
OSPIE	Office of Security Policy and Industry Engagement
PMIS	Performance Measurement Information System
RAP	Resource Allocation Plan
TSA	Transportation Security Administration
TSO	transportation security officer
WTMD	walk through metal detectors

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February 1, 2018

The Honorable John Thune
Chairman
The Honorable Bill Nelson
Ranking Member
Committee on Commerce, Science, and Transportation
United States Senate

The Honorable Michael McCaul
Chairman
The Honorable Bennie Thompson
Ranking Member
Committee on Homeland Security
House of Representatives

The Department of Homeland Security's Transportation Security Administration (TSA) employs about 43,000 transportation security officers (TSOs) who screen over 2 million passengers and their accessible and checked baggage each day at airports in the United States.[1] TSA allocates TSOs to airports using its Resource Allocation Plan (RAP), which is intended to provide each airport with the optimum number of TSOs needed to screen passengers for threats to aviation security, such as prohibited and other potentially dangerous items.[2] In the spring of 2016, unusually long screening checkpoint lines at certain major U.S. airports raised questions about TSA's process for allocating TSOs to airports. Identifying and deploying the right number of TSOs to meet individual airport needs throughout the United States is a critical TSA responsibility for carrying out the agency's mission to protect the nation's

[1]TSOs are screening personnel employed by TSA. In this report, references to TSOs do not include screening personnel employed by qualified private-sector companies under contract with TSA to perform screening operations at the 21 airports participating in TSA's Screening Partnership Program (SPP). See 49 U.S.C. § 44920.TSA oversees the performance of screening operations at SPP airports, and the screening personnel at SPP airports must adhere to the same screening requirements applicable to TSOs.

[2]According to TSA headquarters officials, TSA identifies the number of TSOs for the RAP based on the number of positions authorized by the agency's budget, which serves as a constraint on the number of TSOs that can be staffed to airports.

transportation systems, while also ensuring the free movement of people and commerce.

To implement passenger screening and pursue efficient operations, in addition to relying on TSOs, TSA works with officials from airlines and airports, as well as officials from associations that represent airlines and airports. In this report, we refer to all of these officials as 'stakeholders.' At airports, Federal Security Directors (FSDs) and their designees work with individual airport operators and airlines to, among other things, adjust TSA resources (i.e., TSOs and screening assets such as metal detectors) in response to increases in the number of passengers that are screened at each checkpoint (throughput) and monitor passenger wait times at checkpoints.[3]

In 2007, we reviewed the RAP (referred to as the Staffing Allocation Model at that time) and recommended, among other things, that TSA establish a mechanism to ensure periodic assessment of the assumptions, such as passenger and checked baggage screening rates, underlying the RAP.[4] TSA agreed with the recommendation and in December 2007 developed a plan to periodically assess the RAP's assumptions.[5]

[3]FSDs are TSA officials responsible for overseeing TSA security activities, including passenger and checked baggage screening, at one or more commercial airports. See 49 U.S.C. § 44933. Some FSDs oversee more than one airport within a geographic area; thus, not all FSDs are located at the airports they oversee. Airport operators have direct responsibility for implementing security requirements in accordance with their TSA-approved airport security programs. Airport security programs generally cover the day-to-day aviation operations and implement security requirements for which airports are responsible. See generally 49 C.F.R. pt. 1542.

[4]For the purposes of this report, the RAP refers to both the computer-based staffing allocation model utilized by TSA to develop a base allocation of staff for each airport as well as modifications made to that base allocation by TSA officials. We will use the term "model" when we refer specifically to the computer-based staffing allocation model.

[5]GAO, *Aviation Security, TSA's Staffing Allocation Model Is Useful for Allocating Staff among Airports, but Its Assumptions Should Be Systematically Reassessed,* GAO-07-299 (Washington, DC: Feb. 2007).

The Aviation Security Act of 2016 includes a provision for GAO to conduct a review of TSA's RAP.[6] This report addresses (1) how TSA modifies staffing assumptions and has mechanisms in place to tailor TSO staffing levels to individual airports' needs, (2) how TSA monitors wait times and throughput and adjusts resources accordingly, and (3) how TSA has shared information with stakeholders about staffing and related screening procedures at airports, and what are the views of selected stakeholders on these information sharing efforts.

To gather information for each of our objectives, we visited eight airports – Chicago O'Hare International, Chicago Midway International, Dallas/Fort Worth International, Dallas Love Field, Los Angeles International, Hollywood Burbank International, Ronald Reagan Washington National, and Richmond International. We selected these airports based on a variety of factors, including the number of TSOs, passenger volume, differences in geography, and longer-than-usual wait times in fiscal year 2016, when passengers experienced long screening wait times at a number of airports. At each airport, we interviewed airport-level TSA officials, TSOs, airport operators, and airline officials. The results from our site visits cannot be generalized to all airports at which TSA has screeners. However, they provided important context about, and insights into, TSA's operations and coordination with stakeholders at airports.

To determine how TSA modifies its staffing assumptions, we reviewed TSA guidance and policies, including the agency's plan for assessing the assumptions used in the RAP, such as the frequency and methods for reviewing passenger and baggage screening processes.[7] In addition, to

[6]Pub. L. No. 114-190, tit. III, subtit. C, § 3302(f), 130 Stat. 615, 654 (2016) (enacted on July 15, 2016, as part of Title III of the FAA Extension, Safety, and Security Act of 2016). Section 3302(f) provides that GAO is to, not later than 180 days after the date of enactment, review TSA's staffing allocation model and report to the Committee on Homeland Security of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate. GAO provided a briefing with our preliminary findings to the committees on January 10, 2017, and as agreed with your staff, are presenting our final findings in this report.

[7]TSA's plan for assessing the assumptions used in the RAP is referred to by TSA as the "Sustainment Plan," and was developed in response to our recommendations in fiscal year 2007. The Sustainment Plan is intended to ensure a regular assessment of the factors that affect passenger and baggage screening rates, such as screening equipment processing rates and staffing needs for each type of equipment, among other things. For the purposes of this report, we will use the term "evaluation plan" when we refer to the Sustainment Plan.

determine whether TSA modified assumptions used in the RAP, we reviewed TSA internal reports regarding the assumptions used in the RAP in 2016 and 2017 as well as a 2016 assessment of TSA's approach to staffing at airports overall.[8] To evaluate the extent to which TSA has mechanisms in place to tailor staffing allocations to individual airports' needs, we analyzed TSA procedures, such as annual reviews of individual airports' configurations conducted by airport-level officials that govern staffing allocation, including procedures for modifying the RAP and tailoring staffing allocations to individual airports' needs. We reviewed data on TSA staffing allocations and interviewed TSA headquarters officials responsible for modifying the RAP to confirm our understanding of the processes used and TSA officials at the airport-level regarding any modifications to airport staffing levels resulting from this process.

To determine how TSA monitors wait times and throughput[9] and adjusts resources accordingly, we reviewed TSA documentation on wait times and throughput, such as TSA's Operations Directive, *Reporting Customer Throughput and Wait Times,* as well as TSA reports on wait times and throughput. To better understand trends in passenger wait times, we analyzed wait time and throughput data for the period of January 2015 through May 2017 for 28 airports that, according to TSA headquarters officials, represent the majority of passenger throughput nationwide or are operationally significant.[10] According to TSA directives and TSA headquarters officials, TSA began requiring that FSDs and their designees collect actual instead of estimated wait times for all airports in July 2014, so we began our analysis in 2015, the first full calendar year after this requirement was in place.[11] We assessed the reliability of the

[8]TSA hired a third-party contractor to, among other things, identify and propose modeling and simulation tools to optimize staffing allocations. The contractor provided a final briefing to TSA leadership in the fall of 2016.

[9]Wait times are the amount of time passengers spend from the end of the queue until they pass through a screening device, either the walk through metal detector (WTMD) or the advanced imaging technology (AIT) units, often referred to as body scanners. Throughput is the number of passengers that are screened at each checkpoint.

[10]There are about 440 TSA-regulated airports in the United States. Starting in May 2016, TSA headquarters began conducting near real time monitoring of operations at 28 airports through the establishment of the Airport Operations Center (AOC).

[11] TSA required FSDs and their designees to collect actual wait times from 2002 through 2007 and beginning again in July 2014. From 2008 through June 2014, TSA required that FSDs collect data on wait time ranges, such as between 20 to 29 minutes or greater than 30 minutes.

data used in our analyses by checking the data for any discrepancies, reviewing TSA reports on the quality of the data, as well as related database documentation, and working with agency officials responsible for compiling the data to understand the data collection and reporting methodologies. We determined that passenger wait time data and throughput data for the 28 airports monitored by TSA headquarters were sufficiently reliable for the purposes of our reporting objectives. Additionally, using the same data, we analyzed the extent to which TSA met its wait time standards for the period of January 2015 through May 2017 at the 28 airports. We also interviewed headquarters officials responsible for overseeing TSA's collection and use of wait time and throughput data. To obtain the perspective of TSA officials at airports, we interviewed FSDs and their designees at the eight airports we visited to determine the tools they use to respond to increases in passenger wait times and throughput.

To determine how TSA shares information with stakeholders about airport staffing and related screening procedures, we reviewed TSA guidance that directs FSDs to share information with stakeholders and directs headquarters officials to facilitate daily conference calls with stakeholders.[12] We also reviewed TSA documentation, such as agendas and attendance sheets, for meetings between FSDs and airport stakeholders held from October 2016 through March 2017 for the eight airports we visited to verify that the meetings took place. We selected this time period because the TSA guidance directing FSDs to meet with stakeholders became effective in October 2016. Additionally, we interviewed TSA headquarters officials and TSA airport-level officials such as FSDs and their designees at the eight airports we visited to determine how TSA shares information about staffing and related screening procedures at airports with stakeholders. The results from the airport-level interviews with TSA officials at these eight airports we visited cannot be generalized to all airports at which TSA has screeners, but provided insights on how FSDs and their designees share information with stakeholders at their respective airports during the time of our review.

To determine the views of selected stakeholders on TSA's information sharing efforts, we interviewed airline and airport officials at the eight

[12]TSA, *Internal Controls—Protocol for Facilitating Stakeholder Collaboration Meetings* (October 2016).TSA's Office of Security Operations issued guidance in October 2016 intended to ensure that FSDs share information with stakeholders. Among other things, the guidance requires FSDs to facilitate quarterly stakeholder meetings at airports.

airports we visited, as well as TSOs at those locations, to obtain their perspectives on TSA efforts to share information consistent with the Aviation Security Act and TSA guidance.[13] For each of the eight airports we visited, we interviewed airport officials representing the airport authority that oversees airport operations and airline officials from the airline with the greatest number of passengers at the respective airport.[14] The FSD or FSD designee selected the TSOs we interviewed during our site visits based on TSO schedule availability. Furthermore, we interviewed industry association officials from the American Association of Airport Executives (AAAE), Airports Council International-North America (ACI-NA), and Airlines for America to obtain their insights on both TSA's headquarters and airport-level information sharing. We chose these industry associations because they work directly with TSA headquarters-level officials and the associations' members work directly with TSA airport-level officials such as FSDs and their designees.[15] The results from the interviews with airline and airport officials at the eight airports we visited and the three industry associations cannot be generalized to all stakeholders, but provided insights on how these select stakeholders viewed TSA's information sharing efforts.

We conducted this performance audit from August 2016 to January 2018 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that

[13]See Pub. L. No. 114-190, §§ 3302, 3305, 130 Stat. at 654-56; TSA, *Internal Controls—Protocol for Facilitating Stakeholder Collaboration Meetings* (October 2016). The Aviation Security Act contains several information-sharing requirements for TSA. For example, section 3302(d) requires that the TSA Administrator share the staffing allocation model (currently known as the RAP) with aviation security stakeholders, such as air carriers, airport operators, and labor organizations representing TSOs. Furthermore, section 3302(e) states that the TSA Administrator shall require each FSD to engage on a regular basis with the appropriate aviation security stakeholders to exchange information regarding airport operations, including security operations. As previously noted, the TSA guidance requires FSDs to facilitate quarterly stakeholder meetings at airports.

[14]At two of the eight airports, due to scheduling conflicts, we interviewed officials from the airline with the second and third greatest number of passengers at those airports.

[15]AAAE represents airport executives from over 850 commercial and general aviation airports. ACI-NA represents 236 airport owners and operators that enplane more than 95 percent of the domestic and nearly all the international airline passenger and cargo traffic in North America. Airlines for America represents nine U.S airlines and one Canadian airline that transport passenger and cargo traffic.

the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

TSA Processes for Allocating TSOs across Airports

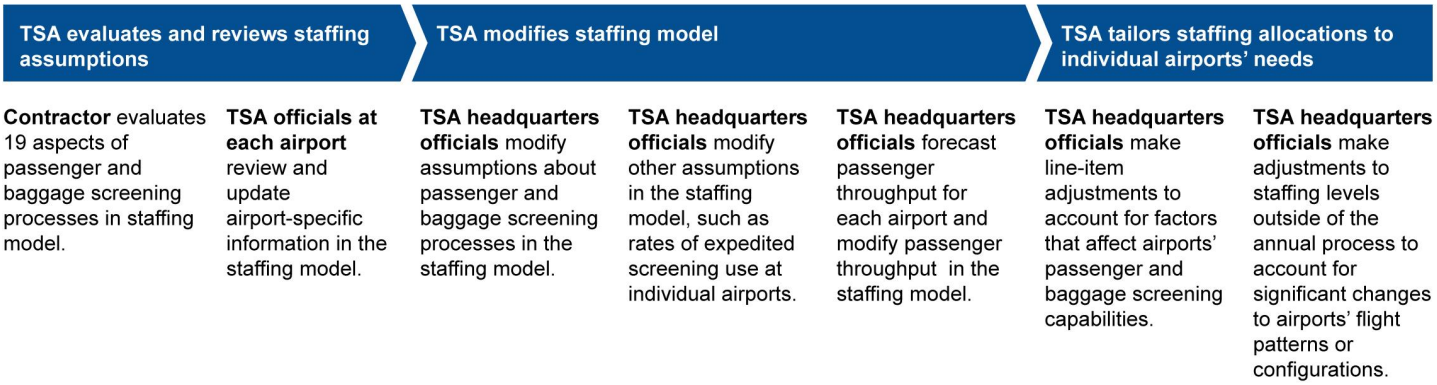
At TSA headquarters, the Office of Security Operations (OSO) has primary responsibility for operation of the RAP and allocation of TSOs across airports. Within OSO, the Staffing and Scheduling Division oversees the RAP. To allocate staff to the nearly 440 TSA-regulated airports in the United States, OSO is to use a combination of computer-based modeling and line-item adjustments based on airport-specific information.[16] First, the agency is to work with a contractor to evaluate the assumptions—such as rates of expedited screening[17]—used by the computer-based staffing allocation model (model) to determine the optimal number of TSOs at each airport based on airport size and configuration, flight schedules, and the time it takes to perform checkpoint and baggage screening tasks.[18] Second, after the model has determined how many TSOs are required for each airport, headquarters-level staff are to make line item adjustments to account for factors such as differences in staff availability and training needs that affect each airport. Figure 1 below provides additional details regarding TSA's process to determine the number of TSOs at airports.

[16]According to TSA headquarters officials, the agency uses the RAP to determine how many staff hours are required to adequately staff baggage and passenger screening operations at the 21 SPP airports in the United States operated by private sector companies. TSA allocates staff hours to SPP airports based on what TSA anticipates the cost would be to maintain a staff of TSOs at those airports. The private companies that operate the SPP airports control the hiring, scheduling and allocation of staff at these airports, although they are required to follow the same TSA standard operating procedures applicable to TSOs and other TSA employees.

[17]Expedited screening is a process that TSA uses to assess a passenger's risk to aviation security prior to the passenger arriving at an airport checkpoint.

[18]TSA's computer-based staffing model is a proprietary software application that uses simulations to determine each airport's workrequirement based on the airport's unique operating characteristics, such as layout, equipment, and flight data. The software simulates passenger and baggage screening operations to produce required staffing levels.

Figure 1: Transportation Security Administration's Process for Determining Transportation Security Officers Allocations at Airports



Source: GAO analysis of TSA documents and interviews. | GAO-18-236

TSA's Process for Evaluating Information Used in the RAP

As previously discussed, in 2007, we recommended that TSA establish a mechanism to periodically assess the assumptions in the RAP (prior to fiscal year 2017, known as the Staffing Allocation Model) to ensure that staffing allocations accurately reflect operating conditions that may change over time. TSA implemented this recommendation by developing an evaluation plan for regularly assessing the assumptions used in the staffing model. Assumptions include the number of passengers or bags that can be screened each hour by TSA equipment and the time TSOs require to operate discrete sections of the screening process, such as conducting pat-downs or searches of passengers' carry-on baggage. The evaluation plan states that TSA is to assess (1) the time it takes to screen passengers using TSA equipment and (2) the number of staff needed to operate the equipment. Results from these assessments are to inform the assumptions used in the model to determine the base allocation of TSOs to U.S. airports.

TSA uses the evaluation plan as well as airport-level characteristics to systematically evaluate the assumptions used in the model on a regular basis:

- **Evaluation plan:** TSA's evaluation plan recommends evaluating the time it takes to perform 19 aspects of passenger and checked baggage screening processes at least every two years[19] and includes detailed procedures for doing so. For instance, the evaluation of passenger screening processes involves observing operations at selected airports to determine the average time it takes for one passenger to remove items of clothing and prepare his or her belongings for screening.[20] Similarly, the evaluation determines how many passengers can be processed each hour during selected aspects of screening, such as by travel document checkers or via advanced imaging technology (AIT), often referred to as body scanners.
- **Individual airport characteristics:** Each year, TSA airport-level staff, such as FSDs or their designees, are to review the information in the model to ensure that information on the number of checkpoints and each checkpoint configuration and the number of flights departing the airport each day is accurate.

[19]The evaluation plan specifies that elements of the passenger and baggage screening processes are to be evaluated at least every other year. For example, checked baggage and passenger screening processes are to be evaluated quarterly. The timeframes during which passengers usually arrive at the checkpoint and the work required to screen individuals not included in flight data, such as airline and airport employees who pass through checkpoints, are to be evaluated at least every other year.

[20]According to the evaluation plan, TSA and the contractor conduct the evaluation at selected airports with a mix of standard and expedited passenger screening lanes and equipment types. TSA officials told us they also select some airports that have had previous evaluations, for comparison purposes; some airports that have not undergone evaluations in the past; and at least one airport that has had a change in airline operations, such as a new airline in operation.

TSA Processes for Conducting Passenger and Checked Baggage Screening, and Collecting Wait Time Data at Airports

At the airport level, FSDs and their designees are responsible for overseeing TSA security activities, including passenger and checked baggage screening.[21] TSOs at airports follow standard operating procedures that guide screening processes and utilize technology such as AITs or walk through metal detectors (WTMD) to screen passengers and their accessible property.[22] TSOs also inspect checked baggage to deter, detect, and prevent the carriage of any unauthorized explosive, incendiary, or weapon onboard an aircraft.[23] Checked baggage screening is conducted in accordance with standard operating procedures and generally is accomplished through the use of explosives detection systems or explosives trace detection systems.[24] TSA employs an expedited screening program, known as TSA Pre✓® that assesses passenger risk to aviation security prior to their arrival at an airport checkpoint. According to TSA, expedited screening involves a relatively more efficient and convenient screening process for individuals from whom TSA has obtained sufficient information to determine them to be of lower risk and thus undergo an expedited screening process, compared to the standard screening process a traveler may undergo, for whom TSA does not have such information in advance.

[21]TSA airports are divided into seven geographic regions, with a regional director overseeing FSDs within each region. Each region has airports that TSA classifies into one of five security risk categories (X, I, II, III, IV) based on various factors, such as the total number of takeoffs and landings annually, and other special security considerations. In general, category X airports have the largest number of passenger boardings and category IV airports have the smallest.

[22]At select airports, TSA uses passenger screening canines—trained to detect explosives on passengers—to expedite the screening process during periods of increased passenger volume. At 21 of the nation's nearly 440 TSA-regulated airports, screening personnel employed by qualified private screening companies under contract with TSA as part of TSA's SPP, and not TSOs, carry out passenger and checked baggage screening operations. See 49 U.S.C § 44920. TSA oversees screening operations at SPP airports and requires that such operations at SPP airports adhere to the same standard operating procedures and other requirements that apply to screening operations at airports for which TSOs perform the screening functions.

[23]See generally 49 U.S.C § 44901; see also 49 C.F.R. § 1544.203.

[24]See 49 U.S.C § 44901(d)-(e).

Finally, at each airport, TSA is to collect throughput data on the number of passengers screened under both expedited and standard screening and monitor passenger wait times at screening checkpoints. TSA airport officials are to submit passenger throughput and wait time data on a daily basis to OSO's Performance Management Division at TSA headquarters, which compiles the data through the Performance Measurement Information System (PMIS), TSA's web-based data collection system.

TSA Offices Responsible for Sharing Information with Stakeholders about Airport Operations

TSA's OSO and the Office of Security Policy and Industry Engagement (OSPIE) are both responsible for sharing information with stakeholders about airport operations. In response to the Aviation Security Act, OSO issued guidance in October 2016 intended to ensure that FSDs share information with stakeholders.[25] OSPIE communicates TSA information about airport operations, such as how TSOs are allocated across airports, to stakeholders.

[25]TSA, *Internal Controls—Protocol for Facilitating Stakeholder Collaboration Meetings* (October 2016). Among other things, the guidance requires FSDs to facilitate quarterly stakeholder meetings at airports to discuss TSA's RAP methodology, the number of TSA staff allocated to the airports, FSD's plans to address airport security operation issues and best practices related to stakeholders, checkpoint, and checked baggage with stakeholders. The guidance also pointed FSDs to online resources developed by TSA headquarters intended to assist FSDs with sharing information about the RAP and airport security operations with the stakeholders.

TSA Modifies Its Staffing Assumptions and Relies on Airport Information to Tailor TSO Staffing Levels to Individual Airports

TSA Modifies Its Staffing Assumptions as Needed Based on Contractor and TSA Officials' Evaluations and Passenger Throughput Forecasts

In fiscal years 2016 and 2017, TSA modified the assumptions used in its model, as needed, to reflect changes identified through annual evaluations performed by a contractor.[26] The contractor is specifically tasked with evaluating the assumptions related to the time needed to screen passengers and their baggage. For example, TSA officials stated that they increased the expected time needed to screen passengers for one type of passenger screening equipment in fiscal year 2017 because the contractor found that the actual time needed was more than the assumption TSA used in fiscal year 2016.[27] Similarly, in fiscal year 2016, TSA allocated fewer staff to review images of checked baggage, compared to previous years, because the contractor's evaluation determined it took TSOs less time to review the images than the time observed in previous years.

In addition to modifying its model based on evaluations performed by contractors, TSA officials at the headquarters level review and modify other assumptions in the model to ensure they are accurate. For example, prompted by the long waits in the spring of 2016, officials stated that they modified the model for the 2017 fiscal year based on their evaluation of the 2016 assumptions. Specifically, TSA assumed that 50 percent of airline passengers would use expedited screening in 2016, but only an average of 27 percent of passengers used expedited screening that year. According to the officials, TSA modified this assumption in fiscal

[26]In addition to annual reviews of assumptions, in fiscal year 2016, TSA hired an additional contractor to identify ways to improve airline passenger experiences while addressing security threats. The assessment noted that TSA was following industry best practices by using the same process used by the airline industry to create annual staffing allocation plans. The contractor provided briefing slides in October 2016.

[27]The average observed number of passengers that could be processed in an hour decreased in 2016 for one type of X-ray equipment compared to the average observed number in 2015.

year 2017 and now uses TSA Pre✓® Program data specific to each individual airport in the model. Similarly, officials told us that, since TSA was established in November 2001, many employees will reach 15 years of service with the federal government in fiscal years 2016 and 2017, resulting in increased annual leave allowances. In response, officials have increased the amount of annual leave they expect employees to use and rely on airport-specific data regarding employee tenure to estimate annual leave for the coming year.

TSA has also modified the way it develops assumptions regarding passenger throughput at each airport. For example, beginning in fiscal year 2016, TSA used passenger throughput forecasts to allocate staff commensurate with the expected rate of increase in passenger throughput at each airport. The estimated increase in passenger throughput for each fiscal year is based primarily on national and airport-level data from the previous 3 months from PMIS, TSA's web-based data collection system, and flight forecast data from the airline industry, as well as additional input from other sources.[28] Prior to fiscal year 2016, TSA planned for passenger throughput during the busiest 28 days from the previous fiscal year and did not adjust the assumption for the annual increase in passenger throughput, which increased two percent in 2014 and four percent in 2015. A TSA headquarters official responsible for overseeing the RAP stated that the agency compared projected passenger throughput to actual passenger throughput for fiscal year 2017 to determine the accuracy of the projections and concluded that no significant changes to the method of forecasting were necessary for fiscal year 2018.

[28]To develop a forecast for each fiscal year, TSA headquarters officials stated that they assign a weight to five sources of information based on their relevance to TSA operations. The forecast relies most heavily on airport-level PMIS data and flight forecast data from OAG (not an acronym), a company that analyzes and provides flight information and forecasts to the airline industry, among others. The forecast also includes data from the Bureau of Transportation Statistics (BTS) and the Federal Aviation Administration (FAA). For instance, the forecast uses data from BTS, but TSA officials stated that the BTS data is given less weight in the forecast because it is less current than the other sources of data available. Similarly, the FAA publishes a forecast of national-level passenger airline boardings (referred to as enplanements), which is included in the forecast but not weighted heavily because it is not airport-specific.

TSA Uses Airport-Level Information to Tailor Staffing Levels to Individual Airport Needs Using Line Item Adjustments

According to TSA officials, each airport in the United States has unique characteristics that make it difficult to apply a one-size-fits-all solution to staffing security operations. For instance, officials told us that some airports are allocated additional staff to account for the time needed to transport TSOs to off-site training facilities.[29] Because the staffing allocation resulting from TSA's model does not reflect the full range of operating conditions at individual airports, TSA headquarters officials use airport-specific information to further adjust allocations by changing individual line items within the allocation after running the model on both an annual and an ad hoc basis. TSA headquarters officials stated that they have developed methodologies for making standard line item adjustments such as training requirements, overtime, and annual and sick leave.[30] Officials told us they review the methodologies each year and use their professional judgement to modify the methodologies to account for changes in airport needs as well as budget constraints. We found that through its process of tailoring staffing allocations to individual airports' needs, TSA is able to respond to the circumstances at each individual airport.

TSA headquarters officials also use airport-specific data on staff availability, training needs, supervisory needs, and additional security layers to manually adjust the model's staffing allocation output at a line item level. For instance, headquarters officials use the previous years' data on staff sick leave for each airport to evaluate whether they are allocating the appropriate amount of sick leave to their staff allocations on an individual airport basis. According to TSA headquarters officials, sick leave use can vary by airport and region of the country. Similarly, officials stated that they adjust the model's output to account for individual airport

[29]TSA officials told us that although many airports have training space available on-site, at some airports, TSOs have to travel to an off-site location to access training facilities.

[30]TSA officials use a different methodology for each line item adjustment. For instance, officials allocate supervisory TSOs to large airports based on the number of checkpoints and checked baggage rooms in that airport, and the number of shifts worked each day. Smaller airports are allocated supervisory TSOs based on the number of staff or the number of operating hours.

staff's training needs so that each airport's staff can meet TSA's annual training requirements.

In addition, according to TSA officials at both the headquarters and airport levels, airport-level officials can request exceptions—modifications to their staffing allocation—based on unusual airport conditions that are difficult to address, such as problematic checkpoint configurations or lack of space for security operations. For instance, officials at one airport said that they had been granted exceptions for one checkpoint because pillars and curves within the checkpoint prevented the lanes in the checkpoint from screening passengers at the rate assumed by the model. TSA officials at the headquarters level review requests for exceptions and use their professional judgement to determine whether the exception will be granted.

Finally, in some cases, TSA may adjust an airport's staffing allocation outside of the annual staffing allocation process and may do so as the result of significant and unforeseen changes in airport operations. For instance, TSA officials stated that one airport was allocated additional staff for the remainder of the fiscal year when the airport opened a new terminal mid-year so that the additional checkpoints could be properly staffed. Officials at another airport we visited said that they had been allocated additional staff when an airline extended its operational hours to ensure appropriate staffing for the additional hours of operation.

TSA Uses Data to Monitor Airport Operations and Respond to Increases in Passenger Wait Times and Throughput

TSA Uses Passenger Wait Time and Throughput Data to Monitor Airport Operations on a Daily Basis

TSA collects passenger wait time and throughput data and uses those data to monitor daily operations at airports. TSA's Operations Directive (directive), *Reporting Customer Throughput and Wait Times,* provides instructions for collecting and reporting wait time and passenger throughput data for TSA screening lanes.[31] Regarding wait time data, according to the directive, FSDs or their designees at all Category X, I, and II airports[32] must measure wait times every operational hour in all TSA expedited and standard screening lanes. The directive requires wait times to be measured in actual time, using a verifiable system such as wait time cards, closed circuit television monitoring, or another confirmable method.[33] The directive indicates that wait times should be measured from the end of the line in which passengers are waiting to the WTMD or AIT units.[34] FSDs or their designees at Category III and IV

[31]TSA, Operations Directive, OD-400-50-1-5F: *Reporting Customer Throughput and Wait Times* (December 1, 2016). The wait time and throughput reporting requirements also apply to the 21 airports participating in TSA's SPP.

[32]TSA classifies airports into one of five security risk categories (X, I, II, III, IV) based on various factors, such as the total number of takeoffs and landings annually, and other special security considerations. In general, category X airports have the largest number of passenger boardings and category IV airports have the smallest.

[33]According to TSA officials, at the beginning of each hour, wait time cards are handed to passengers at the end of the checkpoint line and are collected when a passenger reaches the WTMD or AIT unit. Closed circuit television is monitored from a location other than the checkpoint, such as at the airport's coordination center.

[34]According to TSA headquarters officials, TSA does not require FSDs or their designees to collect a statistical sample of wait times throughout the hour, but rather requires that one wait time is collected for every operational hour in all screening lanes. If more than one wait time is collected during the hour, the directive indicates that the maximum wait time should be reported. TSA officials at airports we visited stated that TSOs return completed wait time cards to supervisors, who then enter the information into a shared spreadsheet and eventually into PMIS. Each hour's reported wait time is then applied to all of a lane's throughput for that given hour.

airports[35] may estimate wait times initially, but the directive requires them to measure actual wait times when wait times are estimated at 10 minutes or greater. The directive also requires FSDs or their designees to collect passenger throughput data directly from the WTMD and AIT units. According to TSA headquarters officials, the machines have sensors that collect the number of passengers that pass through each hour, and TSOs retrieve the data directly from the units. All airports regardless of category are required to enter their wait time and throughput data daily into PMIS, TSA's web-based data entry program, no later than 3:30 AM Eastern Time of the next calendar day so that the data can be included in the morning's Daily Leadership Report (discussed in more detail below).

To monitor operations for all airports, TSA compiles a daily report utilizing a variety of PMIS data points, including wait time and throughput data.[36] The Office of Security Operations' Performance Management Division disseminates the Daily Leadership Report to TSA officials, including regional directors and FSDs and their designees every morning detailing the previous day's wait times and throughput figures, among other data points. The Performance Management Division includes a quality assurance addendum with each Daily Leadership Report, indicating missing or incorrect data, to include wait time and throughput data, and TSA has procedures in place intended to ensure officials at the airports correct the data in PMIS within 2 weeks.

In addition to the Daily Leadership Report, TSA utilizes wait time and throughput data to monitor airport operations at 28 airports in near real time. In May 2016, TSA established the Airport Operations Center (AOC) that conducts near real time monitoring of the operations of 28 airports that, according to TSA headquarters officials, represent the majority of passenger throughput nationwide or are operationally significant.[37] TSA requires the 28 airports monitored by the AOC to enter passenger wait

[35]As previously stated, TSA classifies airports into one of five security risk categories (X, I, II, III, IV) and, in general, category X airports have the largest number of passenger boardings and category IV airports have the smallest.

[36]As mentioned above, Category III and IV airports only collect wait time data when they estimate the wait times to be longer than 10 minutes, so although the Daily Leadership Report will list Category III and IV airports, there may be days when no wait time data are reported for these airports.

[37]When TSA established this center in May 2016, they referred to it as the Incident Command Center. TSA changed the name to the Airport Operations Center in October 2016.

time data and throughput data into PMIS hourly (whereas the remaining airports are only required to submit data once daily, by 3:30 AM Eastern Time, as described above) so that AOC officials can monitor the operations in near real time. In addition, TSA officials at airports are required to report to the AOC when an event occurs—such as equipment malfunctions, weather-related events, or unusually high passenger throughput—that affects airport screening operations and results in wait times that are greater than TSA's standards of 30 minutes in standard screening lanes or greater than 15 minutes in expedited screening lanes.[38]

If an airport is undergoing a period of prolonged wait times, the AOC coordinates with the Regional Director and the FSD to assist in deploying resources. For example, over the course of the summer of 2016, after certain airports experienced long wait times in the spring of 2016 as confirmed by our analysis, the AOC assisted in deploying additional passenger screening canines and TSOs to those airports that experienced longer wait times.[39] The AOC disseminates a morning and evening situational report to TSA airport-level officials and airport stakeholders summarizing nationwide wait times, highlighting wait times at the top airports and any hot spots (unexpected passenger volume or other operational challenges) that may have occurred since the most recent report was issued. In addition to the near real time monitoring of the 28 airports, the AOC also monitors operations at all other airports and disseminates information to airports and stakeholders as needed.

[38] In 2007, we reviewed TSA's Staffing Allocation Model and reported that TSA had a 10 minute wait time goal for passenger screening (GAO, *Aviation Security: TSA's Staffing Allocation Model Is Useful for Allocating Staff among Airports, but Its Assumptions Should Be Systematically Reassessed,* GAO-07-299 (Washington, D.C.: February 28, 2007)). According to TSA headquarters officials we interviewed during the course of this review and the TSA Administrator's October 2015 testimony before the House Committee on Homeland Security, Subcommittee on Transportation Security, TSA began prioritizing security effectiveness rather than speed in 2015, in response to concerns regarding security effectiveness following the completion of the September 2015 DHS Office of Inspector General Report on covert testing, which used undercover methods to test TSA operations.

[39] Our analysis confirmed that reported wait times increased in the spring of 2016 at selected airports, as mentioned by the media. For example, in May 2016, approximately 22 percent of passengers at Chicago O'Hare International airport and 26 percent of passengers at Chicago Midway International airport waited over 30 minutes in standard screening as opposed to zero percent for both airports in May 2015, which accounted for the longest wait times in the spring of 2016. These two airports were part of the 28 airports for which we analyzed wait time data for the period of January 2015 through May 2017.

To determine the extent to which TSA exceeded its wait time standards, we analyzed wait time data for the 28 airports monitored by the AOC for the period of January 2015 through May 2017 for both standard and expedited screening. Our analysis shows that TSA met its wait time standard of less than 30 minutes in standard screening at the 28 AOC airports 99.3 percent of the time for the period of January 2015 through May 2017. For expedited screening for the same time period at the same airports, we found that 100 percent of the time passengers were reported to have waited 19 minutes or less.[40] Additionally, our analysis confirmed that the percentage of passengers in standard screening waiting over 30 minutes increased in 2016 during the months of March, April, and May as compared to 2015 at all 28 airports monitored by the AOC.

TSA Airport Officials Use a Variety of Tools to Respond to Increases in Passenger Wait Times and Throughput

FSDs and their staff at the airports we visited identified a variety of tools that they utilize to respond to increases in passenger wait times and/or throughput.

- TSOs from the National Deployment Force (NDF)—teams of additional TSOs—are available for deployment to airports to support screening operations during major events and seasonal increases in passengers.[41] For example, TSA officials at one airport we visited received NDF officers during busy holiday seasons and officials at another airport received officers during the increase in wait times in the spring and summer of 2016.
- TSA officials at select airports use passenger screening canines to expedite the screening process and support screening operations

[40]Although the TSA standard for expedited screening is 15 minutes, TSA does not routinely report the data this way. For expedited screening, TSA provided wait time data in increments of 0-4 minutes; 5-9 minutes; 10-19 minutes; and 20 minutes or more and we analyzed the data in these same increments. These are the similar increments that TSA uses to prepare its Daily Leadership Report.

[41]TSA's NDF officers support airport screening operations during emergencies, seasonal demands, severe weather conditions, or increased passenger activity requiring additional screening personnel above those normally available.

during increased passenger throughput and wait time periods.[42] For example, TSA officials at one airport we visited emphasized the importance of passenger screening canines as a useful tool to minimize wait times and meet passenger screening demands at times when throughput is high. Officials at another airport we visited rely on these canines in busy terminals during peak periods. According to officials at two of the airports we visited, the use of passenger screening canines helped them to reduce wait times due to increased passenger volumes in the spring and summer of 2016.

- TSA officials at airports also utilize part-time TSOs and overtime hours to accommodate increases in passenger throughput and wait times. For example, according to officials at all eight of the airports we visited, they use overtime during peak travel times, such as during holiday travel seasons, and officials usually plan the use of overtime in advance. Additionally, TSA officials at four of the airports we visited told us they use part-time TSOs to help manage peak throughput times throughout the day.
- According to TSA officials at two of the airports we visited, they move TSOs between checkpoints to accommodate increases in passenger throughput at certain checkpoints and to expedite screening operations. For example, TSA officials at one airport we visited have a team of TSOs that terminal managers can request on short notice. Officials at the other airport estimated that they move TSOs between terminals about 40 times per day.

[42]Passenger screening canine teams consist of a canine trained to detect explosives on passengers and a handler. Airports at which passenger screening canines are used can achieve a reduction in passenger wait times through broader use of expedited screening. Passenger screening canines are allocated to airports through a risk-based model, with airports with higher passenger throughput rates, among other factors, receiving more canines.

TSA Has Taken Steps to Improve Information Sharing with Stakeholders and Most Stakeholders We Interviewed Reported Improved Satisfaction

TSA Improved Information Sharing with Stakeholders through Daily Conference Calls, Presentations, and Meetings

TSA headquarters has taken steps intended to improve information sharing with stakeholders about staffing and related screening procedures at airports. For example, TSA officials hold daily conference calls with industry association, airline, and airport officials at the 28 airports monitored by the AOC.[43] According to TSA headquarters officials, TSA established the daily conference call as a mechanism intended to ensure timely communication with stakeholders and to help identify and address challenges in airport operations such as increases in passenger wait times. Also, TSA headquarters officials stated that they conducted a series of presentations and meetings with industry, airline, and airport officials to discuss TSA's RAP, security enhancements at airports, and airport screening processes, among other things. For example, TSA's headquarters officials shared information about the fiscal year 2017 RAP in October 2016 during a briefing at an industry conference and a meeting with airline representatives, airline engineers, and Federal Aviation Administration officials. Additionally, TSA headquarters officials facilitated a stakeholder meeting in May 2017 to discuss planned improvements for the TSA Pre✓® Program and met with stakeholders in June 2017 to discuss security enhancements and changes to screening procedures for carry-on baggage.

In addition to headquarters-level initiatives, at the eight airports we visited, we found that FSDs shared information with airport and airline officials by meeting on an ongoing basis to discuss TSA staffing and related screening procedures. For example, according to the FSDs and

[43]In addition to TSA's Airport Operations Center officials, TSA's Office of Security Policy and Industry Engagement (OSPIE) officials participate in the daily conference calls. OSPIE is responsible for developing security policies and plans that reduce the risk of terrorist attacks.

airline and airport officials at all eight airports we visited, FSDs met with stakeholders on a daily, weekly, monthly, or quarterly basis. During these meetings, FSDs and airline and airport officials told us that FSDs discussed TSO staffing levels at the airports, instances when passenger screening wait times were long at security checkpoints, and TSA screening equipment performance, among other things.

Stakeholders Reported Improved Satisfaction with TSA Headquarters Information Sharing Efforts and with Most FSDs

Stakeholders told us that TSA headquarters officials and most FSDs improved information sharing since fiscal year 2016. With regard to TSA headquarters officials' information sharing efforts, officials from all three industry associations we interviewed stated that, since fiscal year 2016, TSA headquarters improved information sharing with their association member companies and attributed that improvement, in part, to the daily conference call between TSA and stakeholders.[44] For example, officials from one industry association stated that the calls benefited members by facilitating collaboration with TSA to more quickly identify and address problems, such as malfunctioning screening equipment, before the problems negatively affected passengers. An official from another industry association told us that the daily conference call improved communication substantially between TSA and the organization by providing a regular opportunity to discuss airport security issues and TSA's plans to resolve those issues.

Additionally, stakeholders we interviewed generally reported positive relationships or improved information sharing with FSDs, but also noted differences in the type and extent of information that FSDs shared. For example, officials at seven of eight airlines and all eight airports we visited stated that they have positive relationships with their FSDs and that their FSDs were accessible and available when needed, while the remaining airline official noted improving access to information. Furthermore, officials from all three industry associations cited improved information sharing between their members at airports and FSDs since fiscal year

[44]We interviewed industry association officials to provide insight on both TSA's headquarters and airport level information sharing because industry association officials typically work directly with TSA headquarters-level officials while their members work directly with TSA airport-level officials, such as FSDs and their designees.

2016, but officials from two association noted that some FSDs still do not regularly share information, such as changes in the number of TSOs staffed at individual airports. According to TSA headquarters officials, stakeholders can elevate any problems they experience with FSDs sharing information to regional directors who are responsible for ensuring that FSDs engage regularly with stakeholders.

Agency Comments and Our Evaluation

We provided a draft of this product to DHS for comment. We received technical comments which we incorporated as appropriate.

We are sending copies of this report to the Secretary of Homeland Security, the Administrator of TSA and other interested parties. In addition, the report is available at no charge on the GAO website at http://www.gao.gov.

If you or your staff have questions about this report, please contact me at (202) 512-7141 or groverj@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report are listed in appendix I.

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Appendix I: GAO Contact and Staff Acknowledgments

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Appendix II: Accessible Data

Data Tables

Accessible Data for Figure 1: Transportation Security Administration's Process for Determining Transportation Security Officers Allocations at Airports

TSA evaluates and reviews staffing assumptions

Contractor evaluates 19 aspects of passenger and baggage screening processes in staffing model.

TSA officials at each airport review and update airport-specific information in the staffing model.

TSA modifies staffing model

TSA headquarters officials modify assumptions about passenger and baggage screening processes in the staffing model.

TSA headquarters officials modify other assumptions in the staffing model, such as rates of expedited screening use at individual airports.

TSA headquarters officials forecast passenger throughput for each airport and modify passenger throughput in the staffing model.

TSA tailors staffing allocations to individual airports' needs

TSA headquarters officials make line-item adjustments to account for factors that affect airports' passenger and baggage screening capabilities.

TSA headquarters officials make adjustments to staffing levels outside of the annual process to account for significant changes to airports' flight patterns or configurations.

Source: GAO analysis of TSA documents and interviews.GAO-18-236

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