2017-2026
AIR TRAFFIC CONTROLLER WORKFORCE PLAN

US Department of Transportation

Federal Aviation Administration

This 2017 report is the FAA's twelfth annual update to the controller workforce plan. The FAA issued the first comprehensive controller workforce plan in December 2004. It provides staffing ranges for all of the FAA's air traffic control facilities and actual on board controllers as of September 17, 2016.

The workforce levels in this report reflect policy levels assumed in the President's Budget. The Administration proposes to shift FAA's air traffic control function to a non-governmental, non-profit organization in 2021. Under this proposal, the non-governmental, non-profit organization would hire the necessary controller workforce beginning in 2021.

Section (221) of Public Law (108-176) (updated by Public Law 111-117) requires the FAA Administrator to transmit a report to the Senate Committee on Commerce, Science and Transportation and the House of Representatives Committee on Transportation and Infrastructure that describes the overall air traffic controller workforce plan. It is due by March 31 of each fiscal year, otherwise the FAA's appropriation is reduced by $100,000 for each day it is late.

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Executive Summary

Safety is the top priority of the Federal Aviation Administration (FAA) as it manages America's National Airspace System (NAS). The NAS is the common network of U.S. airspace — air navigation facilities, equipment and services; airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures; technical information; and manpower and material. Thanks to the expertise of people and the support of technology, tens of thousands of aircraft are guided safely and expeditiously every day through the NAS to their destinations.

Workload

An important part of managing the NAS involves actively aligning controller resources with demand. The FAA "staffs to traffic," matching the number of air traffic controllers at its facilities with traffic volume and workload. The FAA's staffing needs are dynamic due to the dynamic nature of the workload and traffic volume.

Traffic

Air traffic demand has declined significantly since 2000, the peak year for traffic. For the purposes of this plan, air traffic includes aircraft that are controlled, separated and managed by air traffic controllers. This includes commercial passenger and cargo aircraft as well as general aviation and military aircraft. Since 2000, traffic volume has declined by 22 percent. Although traffic is expected to grow, it is not expected to return to those levels in the near term. Although there have been decreases year over year for system-wide traffic counts, there are some facilities that have experienced traffic increases. The FAA's staffing standards incorporate location-specific traffic counts and forecasts to account for these changes.

New on the horizon is the introduction of Unmanned Aircraft Systems (UAS). These are different from manned aircraft and introducing them safely into the nation's airspace is challenging for both the FAA and the aviation community. The FAA is taking an incremental approach to safe UAS integration; this is aided by the FAA's new compliance philosophy designed to help identify and correct potential hazards before they result in an incident or accident. The extent of UAS' impact on air traffic control will most certainly evolve.

Headcount

In many facilities, the current Actual on Board (AOB) number may exceed the facility's target staffing ranges. This is because many facilities' current AOB (all controllers at the facility) numbers include many developmental controllers in training to offset expected future attrition. While the FAA strives to keep Certified Professional Controllers (CPCs) and Certified Professional Controllers in Training (CPC-ITs) within the range, individual facilities can be above the range due to advance hiring. The FAA hires and staffs facilities so that trainees are fully prepared to take over responsibilities when senior controllers leave.

Retirements

The long-anticipated wave of controller retirements peaked in 2007. Annual retirements decreased for a few years then increased during fiscal years 2010 to 2015, and are leveling off. In the last five years, 3,272 controllers have retired. Fiscal year 2016 retirements were lower than projected, and are expected to fall for the next decade. Cumulative Retirement Eligibility has also fallen. Tens of thousands of controllers were hired after the 1981 strike and at the end of FY 2016 only 189 controllers remain from those who were hired before 1984.

The FAA carefully tracks actual retirements and projects losses to ensure its recruitment and training keep pace.

Hiring

In FY 2016, H.R. 636 – FAA Extension, Safety, and Security Act (FESSA) of 2016 was enacted. The legislation established two separate pools of applicants within Track 1 with a mandate of no more than ten percent variance from each pool for final selections. The FESSA requires priority consideration of applicants with previous air traffic control experience (Track 2) and increased the maximum hiring age for those meeting certain qualifications to 35. Over 29,000 people applied to the associated Track 1 vacancy announcement that closed on August 15, 2016. Over 2,000 applicants responded to the Track 2 vacancy announcement in September 2016, and more than 1,100 were referred for employment consideration.

The first pool of applicants (Pool 1 under Track 1) included graduates from the Collegiate Training Initiative and military veterans. Applicants qualifying for Pool 1 were not required to pass the Biographical Assessment screen. Over 2,200 applicants have been referred for employment consideration from Pool 1.

The second pool of applicants (Pool 2 under Track 1) are considered as general public applicants. Applicants qualifying for Pool 2 were required to pass the Biographical Assessment screen. Over 3,000 applicants have been referred for employment consideration from Pool 2.

Once applicants are notified of selection, they will then be required to attain medical and security clearances. Upon successful completion of clearances, the applicants will then be scheduled for FAA Air Traffic Academy training as agency needs are identified.

In the last five years, the FAA has hired over 5,600 new air traffic controllers. We hired 1,680 new controllers in 2016 compared to a plan of 1,619.

Training

As the FAA brings these new employees on board, training continues to be closely monitored at all facilities. We must carefully manage the process to ensure that our trainees are hired in the places we need them and progress in a timely manner to become CPCs. The FAA will also continue to take action at the facility level should adjustments become necessary due to changes in traffic volume, retirements or other attrition.

In addition, the FAA has updated its training courses to support cumulative grading. This allows for student assessments at multiple points in training and allows for new training advancement decision points.

Ongoing hiring and training initiatives, as well as increased simulator use, are helping the FAA meet its goals. While the FAA is managing today's air traffic, we must also integrate new technologies into air traffic operations. From state-of-the-art simulators to satellite technology, air traffic is evolving into a more automated system. The FAA is working diligently to ensure well-trained controllers continue to uphold the highest safety standards as we plan for the future.

The FAA's goal is to ensure that the agency has the flexibility to match the number of controllers at each facility with traffic volume and workload. Staffing to traffic is just one of the ways we manage America's National Airspace System.

Introduction

Staffing to Traffic

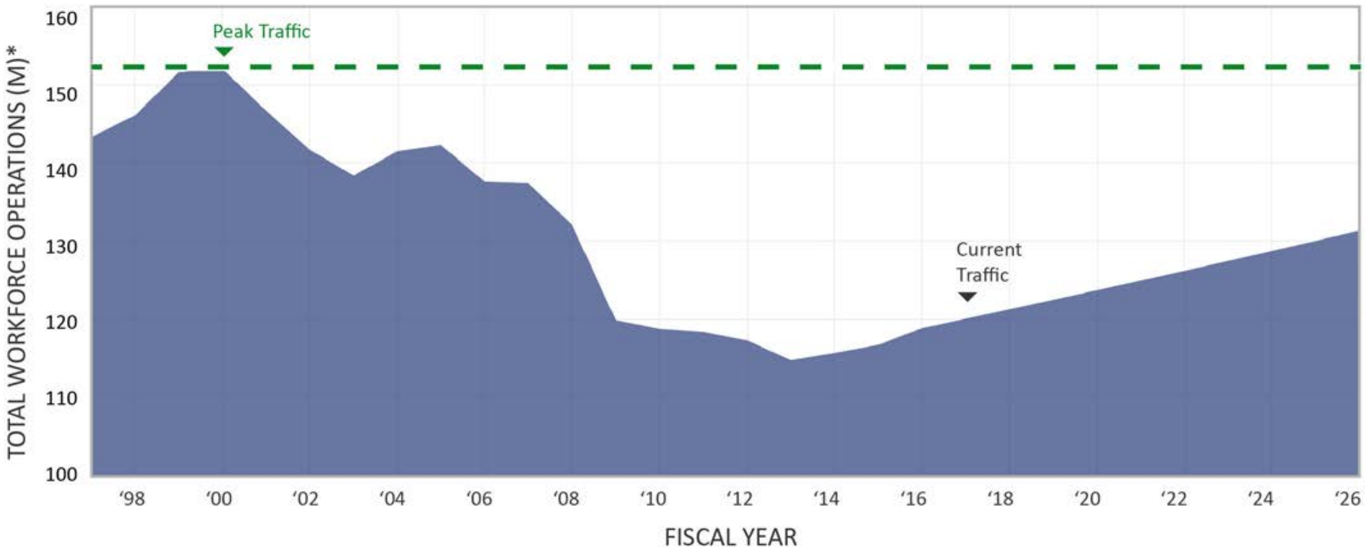
Air traffic controller workload and traffic volume are dynamic, and so are the FAA's staffing needs. A primary factor affecting controller workload is the demand created by air traffic, encompassing both commercial and non-commercial activity. Commercial activity includes air carrier and commuter/air taxi traffic. Non-commercial activity includes general aviation and military traffic.

Since the early 1990s, unmanned aircraft systems (UAS) have operated on a limited basis in the National Airspace System (NAS) and mainly supported public operations, such as military and border security operations. In recent years, UAS and operations have significantly increased in number, technical complexity and application. The list of uses has rapidly expanded to encompass a broad range of activities, including aerial photography, surveying, communications and broadcast, as well as hobby and recreation. In December 2015, the FAA began registration of all UAS. As policy and technology updates allow widespread use of UAS for commercial applications, the impact on the air traffic control workload will be incorporated into our models and forecasts. Oversight of UAS is aided by the FAA's new compliance philosophy which is designed to help identify and correct potential hazards before they result in an incident or accident.

Adequate numbers of controllers must be available to cover the peaks in traffic caused by weather and daily, weekly or seasonal variations, so we continue to "staff to traffic." Although the FAA generally staffs to traffic counts, it is not a one-to-one relationship. Safety rules and hours of operation require watch schedules that establish staffing during low-volume periods or in facilities with low traffic counts. This practice gives us the flexibility throughout each day to match the number of controllers at each facility with traffic volume and workload.

System-wide, air traffic has declined by 22 percent since peak year 2000. The chart in Figure 1.1 shows that air traffic volume is not expected to return to peak levels in the near term. Although there have been decreases year over year for system-wide traffic counts, there are some facilities that have experienced traffic increases. The FAA's staffing standards incorporate location-specific traffic counts and forecasts to account for these changes.

FIGURE 1.1 - Traffic Forecast



*Total Workforce Operations = Tower + TRACON + Aircraft Handled by En Route Centers

FIGURE 1.2 - System - Wide Traffic and Total Controller Trends

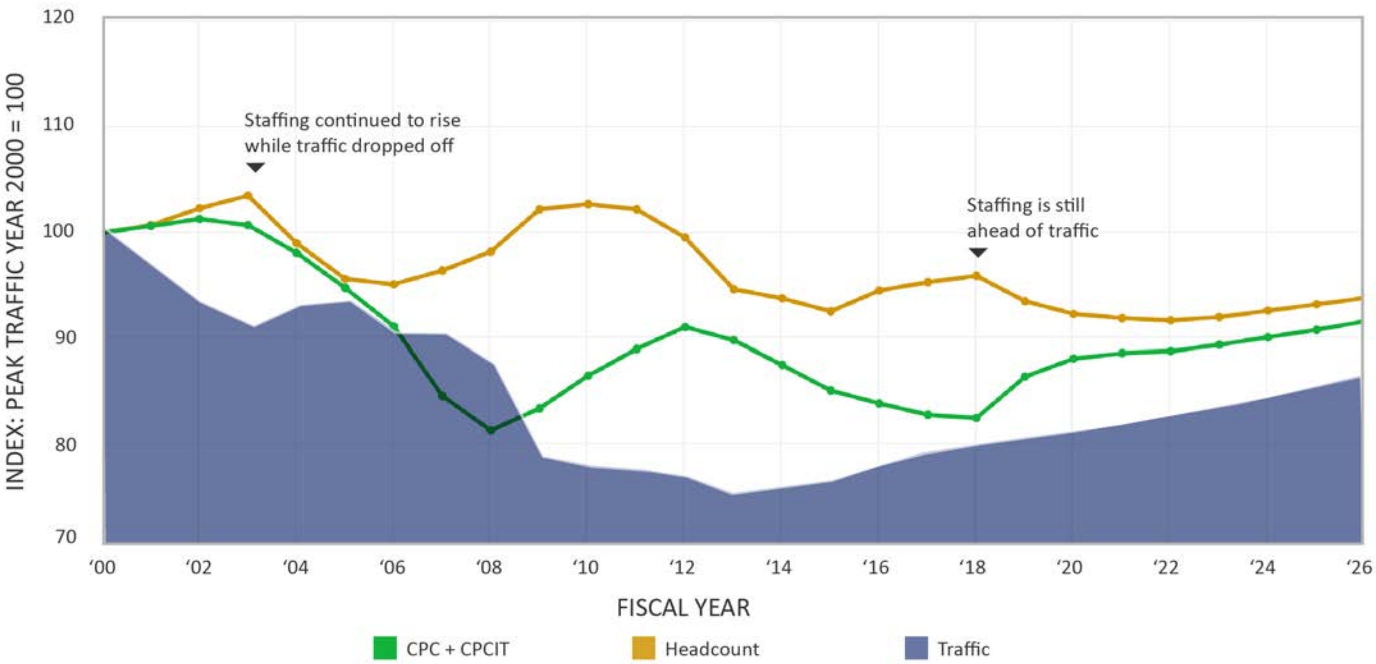
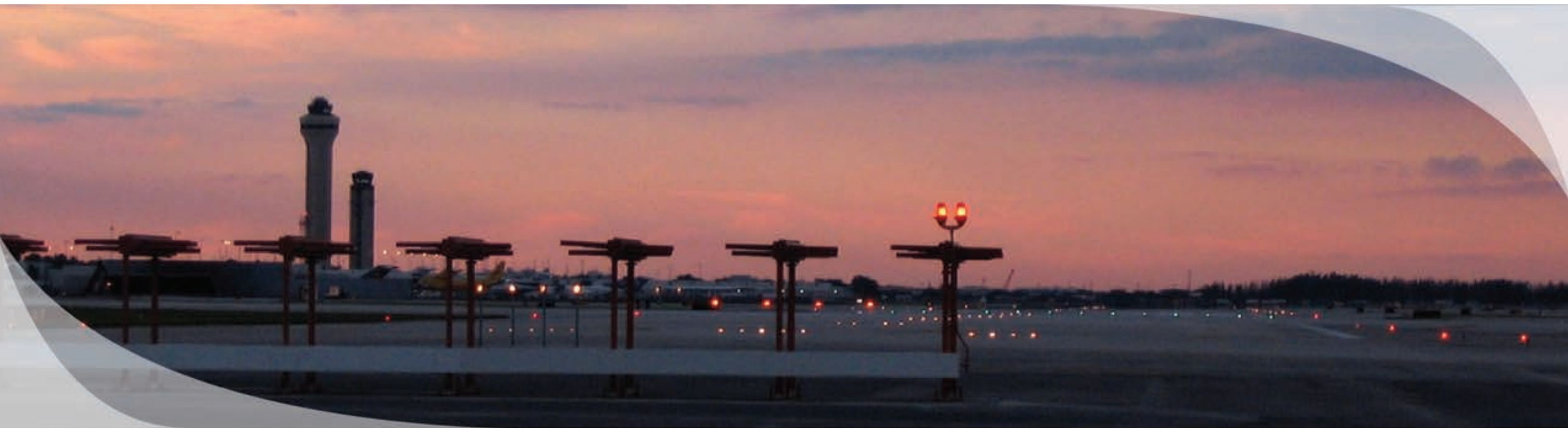


Figure 1.2 shows system-wide controller staffing and traffic, indexed from FY 2000 and projected through FY 2026. Indexing is a widely used technique which compares the change over time of two or more data series (in this case, total controller headcount, certified profession controllers (CPC) and certified professional controllers in training (CPC-IT) and traffic). The data series are set equal to each other (or indexed) at a particular point in time (in this case, FY 2000, a high mark for traffic) and measured relative to that index point in each successive year. This way we know how much growth or decline has occurred compared to the base value.

Staffing to traffic not only applies on a daily basis, but also means that we staff to satisfy expected needs two to three years in advance. We do this to ensure sufficient training time for new hires. Despite the decline in air traffic shown in Figure 1.2, "staffing to traffic" requires us to anticipate controller attrition, so that we plan and hire new controllers in advance of need. This is one reason that staffing remains well ahead of traffic. The gap between the gold line (Headcount) and the green line (CPC and CPC-IT staffing) is the advance hire trainee pipeline and is projected to close significantly by 2021. The headcount and CPC+CPCIT lines converge due to reduced retirements and other losses.



Meeting the Challenge

The FAA's hiring plan is designed to phase in new hires as needed over time. This will avoid creating another major spike in retirement eligibility in future years like the one resulting from the 1981 controller strike. Annual retirements are leveling off and still well below those experienced in 2007 when the long-anticipated wave of retirements peaked. Retirements are expected to continue to fall for the next decade.

The FAA hires to address all attrition, not just retirements.

We revised the hiring plan to increase FY 2016 through FY 2018 hiring to near-capacity levels so that we can catch up from a variety of challenges. They include: a nearly year-long hiring freeze resulting from sequestration in 2013 and effects from an Office of Personnel Management (OPM) security breach, which shut down the automated ability to process clearances to applicants for approximately one month. The combined impact of these issues disrupted the hiring pipeline and set us back in our staffing plans.

Hiring, however, is just one part of the challenge. Other challenges involve controller placement, controller training and controller scheduling. It is important that newly hired and transferring controllers are properly placed in the facilities where we will need them. Once they are placed, they need to be effectively and efficiently trained, and assigned to efficient work schedules.

To address these challenges, the FAA has:

- Expanded its air traffic control hiring process. In August 2016, the FAA posted a public announcement soliciting veterans without aviation experience, Collegiate Training Initiative graduates and general public applicants. In September 2016 the FAA posted another announcement for experienced candidates. The battery of tests collectively referenced as the Air Traffic Skills Assessment (ATSA) was tested, validated and introduced in 2016, replacing the Air Traffic Selection and Training (AT-SAT) battery.

- Revamped its placement process for air traffic controller trainees allowing increased flexibility for the agency and improved efficiency in both hiring and initial training of air traffic controllers.

- Introduced a new collaborative and centralized process to balance the controller ranks by revamping the employee requests for reassignments, matching employee requests with the agency's needs and establishing a national release policy aimed at expediting requests into facilities with the greatest staffing needs.

Effective and efficient training, as well as properly placing new and transferring controllers, are two important factors in the agency's success.

Systematically replacing air traffic controllers where we need them, as well as ensuring the knowledge transfer required to maintain a safe NAS, is the focus of this plan.

Chapter 2

Facilities and Services

America's NAS is a network of people, procedures and equipment. Pilots, controllers, technicians, engineers, inspectors and supervisors work together to make sure millions of passengers move through the airspace safely every day.

More than 14,000 federal air traffic controllers in airport traffic control towers, terminal radar approach control facilities and air route traffic control centers guide pilots through the system. An additional 1,297 civilian contract controllers and more than 10,000 military controllers also provide air traffic services for the NAS.

These controllers provide air navigation services to aircraft in domestic airspace, in addition to 24.6 million square miles of international oceanic airspace delegated to the United States by the International Civil Aviation Organization.

Terminal and En Route Air Traffic Services

Controller teams in airport towers and radar approach control facilities watch over all aircraft traveling through the Terminal airspace. Their main responsibility is to organize the flow of aircraft into and out of an airport. Relying on visual observation and radar, they closely monitor each aircraft to ensure a safe distance between all aircraft and to guide pilots during takeoff and landing. In addition, controllers keep pilots informed about changes in weather conditions.

Once airborne, the aircraft quickly departs the Terminal airspace surrounding the airport. At this point, controllers in the radar approach control notify En Route controllers, who take charge in the vast airspace between airports. There are 21 air route traffic control centers around the country. Each En Route center is assigned a block of airspace containing many defined routes. Aircraft fly along these designated routes to reach their destination.

En Route controllers use surveillance methods to maintain a safe distance between aircraft. En Route controllers also provide weather advisory and traffic information to aircraft under their control. As an aircraft nears its destination, En Route controllers transition it to the Terminal environment, where Terminal controllers guide it to a safe landing.

FAA Air Traffic Control Facilities

As of October 1, 2016, the FAA operated 315 air traffic control facilities. Table 2.1 lists the type and number of these FAA facilities. More than one type of facility may be collocated in the same building.

Each type of FAA facility has several classification levels based on numerous factors, including traffic volume, complexity and sustainability of traffic. To account for changes in traffic and the effect of investments that reduce complexity, as well as to compensate controllers that work the highest and most complex volume of traffic, facilities are monitored for downward and upward trends.

TABLE 2.1 - Types and Number of FAA Air Traffic Control Facilities

NAME	NUMBER OF FACILITIES	DESCRIPTION
Tower	131	An airport traffic control tower terminal that provides traffic advisories, spacing sequencing, and separation services to visual flight rules (VFR) and instrumental flight rules (IFR) aircraft operating in the vicinity of the airport, using a combination of radar and visual observations.
Approach Control*	26	An air traffic control facility that provides approach and departure services to IFR and VFR aircraft arriving or departing an airport and to aircraft transiting the terminals airspace using radar and/or non-radar separation.*These facilities are formally known as Terminal Radar Approach Control or TRACON
Tower and Approach Control	132	An airport traffic control facility divided into two functional areas, tower and approach and departure control, that provides services to IFR and VFR aircraft including aircraft traffic advisories, spacing sequencing, and separation services to aircraft operating in the vicinity of the airport, arriving or departing an airport and to aircraft transiting the terminals airspace using radar and/or non-radar separation.
Combined Control Facility	4	An air traffic control facility that provides approach control services for one or more airports as well as en route air traffic control (center control) for a large area of airspace. Some may provide tower services along with approach control and en route services. Also includes Combined Center Radar Approach (CERAP) facilities.
Air Route Traffic Control Center (ARTCC)/En Route	21	An air traffic control facility that provides air traffic control service to aircraft operating on IFR flight plans within controlled airspace and principally during the en route phase of flight. When equipment capabilities and controller workload permit, certain advisory/assistance services may be provided to VFR aircraft.
Air Traffic Control System Command Center	1	The Air Traffic Control System Command Center is responsible for the strategic aspects of the NAS. The Command Center modifies traffic flow and rates when congestion, weather, equipment outages, runway closures or other operational conditions affect the NAS.
TOTAL FACILITIES	**315**	

Chapter 3

Staffing Requirements

The FAA issued the first comprehensive controller workforce plan in December 2004. "A Plan for the Future: 10-Year Strategy for the Air Traffic Control Workforce" detailed the resources needed to keep the controller workforce sufficiently staffed. This report is updated each year to reflect changes in traffic forecasts, retirements and other factors.

"Staffing to traffic" requires the FAA to consider many facility-specific factors. They include traffic volumes based on FAA forecasts and hours of operation, as well as individualized forecasts of controller retirements and other non-retirement losses. In addition, staffing at each location can be affected by unique facility requirements such as temporary airport runway construction, seasonal activity and the number of controllers currently in training. Staffing numbers will vary as the requirements of the location dictate.

Proper staffing levels also depend on the efficient scheduling of employees, so the FAA tracks a number of indicators as part of its continuous staffing review. Some of these indicators are overtime, time on position, leave usage and the number of trainees. Time on position is defined as the amount of cumulative time controllers spend while "plugged in" to their position controlling live traffic. When not on position, controllers are on periodic breaks, in training, or performing other assigned duties.

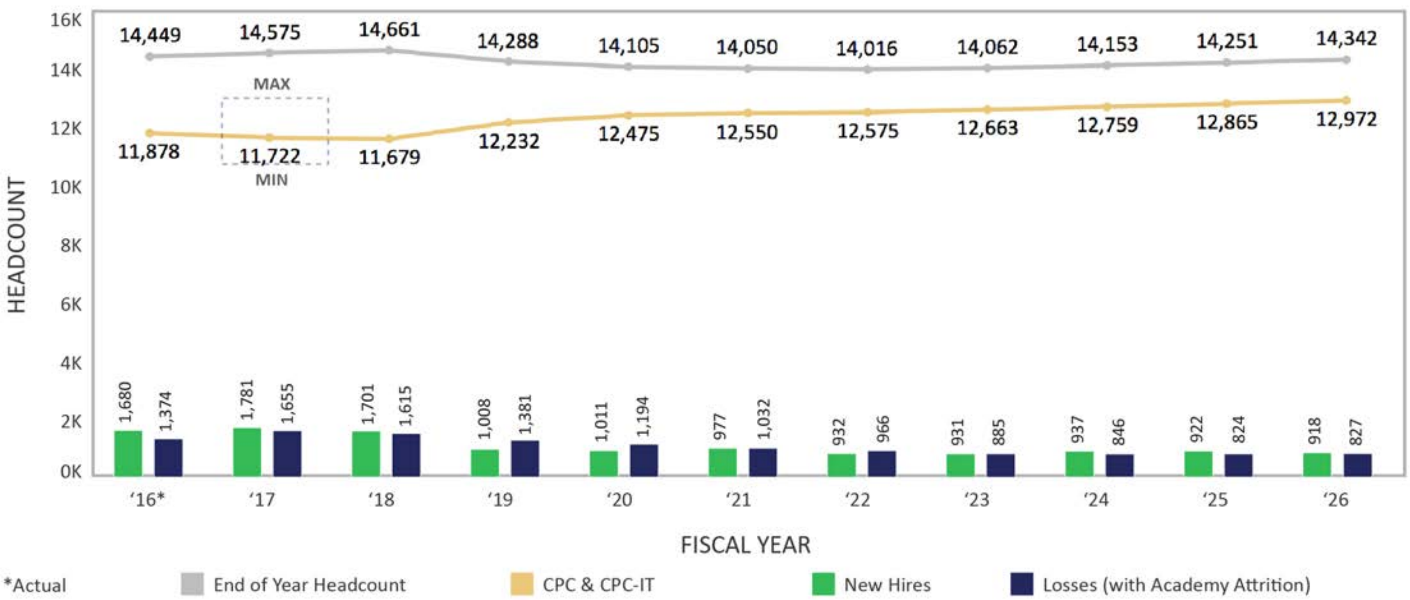
In FY 2016, the system average for overtime was 3.2 percent, a slight increase from the FY 2015 level. Meanwhile, cumulative average time on position per eight-hour shift was 4 hours and 8 minutes, a two-minute increase from FY 2015.

Figure 3.1 shows the expected end-of-year total headcount (gray line), CPC & CPC-IT headcount (yellow line), new hires and losses (green and blue bars) by year through FY 2026.

Figures for FY 2016 represent actual end-of-year headcount, losses and hires. Losses include retirements, promotions and transfers, resignations, removals, deaths, developmental attrition and academy attrition. Due to above plan hiring and below plan losses, the FAA ended FY 2016 with more than 250 controllers above the 2016 headcount plan.

In general, the FAA strives to keep the number of CPCs and CPC-ITs near the middle of the calculated staffing range. Figure 3.1 shows that FY 2017 staffing values are within the calculated staffing range shown by the "min" and "max" dotted lines. However, a facility's total staffing levels are often above the defined staffing range because new controllers are typically hired two to three years in advance of expected attrition to allow for sufficient training time. The total expected end-of-year staffing number shown in Figure 3.1 reflects this projected advanced hiring.

FIGURE 3.1 - Projected Controller Trends



The FAA hires and staffs facilities so that trainees are fully prepared to take over responsibilities when senior controllers retire.

THE FAA USES MANY METRICS TO MANAGE ITS FACILITIES

TIME ON POSITION

OVERTIME

PRODUCTIVE TIME

TRAINEES

STAFFING RANGES

RETIREMENTS

FIELD INPUT

SIMULATORS AND INSTRUCTORS

TRAFFIC

Staffing Ranges

Each of the FAA's 315 facilities typically staffs open positions with a combination of certified controllers who are proficient, or checked out, in specific sectors or positions. Because traffic and other factors are dynamic at these facilities, the FAA produces facility-level controller staffing ranges. These ranges are calculated to ensure that there are enough controllers to cover operating positions every day of the year.

Ensuring that we have enough controllers is not only important on a daily basis, but also means that we staff to satisfy expected needs two to three years in advance. We do this to ensure sufficient training time for new hires. The uptick caused by hiring two to three years ahead of time is one reason that staffing remains well ahead of traffic.

The FAA uses four data sources to calculate staffing ranges. Three are data driven; the other is based on field judgment. They are:

1. Staffing standards – output of mathematical models used to relate controller workload to air traffic activity.

2. Service unit input – the number of controllers required to staff the facility, typically based on past position utilization and other unique facility operational requirements. The service unit input is provided by field management.

3. Past productivity – the headcount required to match the historical best productivity for the facility. Productivity is defined as operations per controller. Facility productivity is calculated using operations and controller data from the 10-year period of 2007 to 2016. If any annual point falls outside +/- 5 percent of the 2007 to 2016 average, it is eliminated from the analysis. From the remaining data points, the highest productivity year is then used.

4. Peer productivity – the headcount required to match peer group productivity. Like facilities are grouped by type, level and part-time or full-time status, and their corresponding productivity is calculated. If the facility being considered is consistently above or below the peer group, the peer group figure is not used in the overall average and analysis.

The average of this data is calculated, multiplied by +/- 10 percent and then rounded to determine the high and low points in the staffing range.

Exceptional situations or outliers are removed from the averages (for example, if a change in the type or level of a facility occurred over the period of evaluation). By analyzing the remaining data points, staffing ranges are generated for each facility.

The 2017 staffing ranges for controllers are published by facility in the Appendix of this report. In general, the FAA strives to keep the number of CPCs and CPC-ITs near the middle of the range. In many facilities, the current Acutal on Board (AOB) number may appropriately exceed the range. This is because many facilities' current AOB (all controllers at the facility) numbers include larger numbers of developmental controllers in training to offset expected future attrition. Individual facilities can be above the range due to advance hiring. Facilities may also be above the range based upon facility-specific training and attrition forecasts.

In the longer term, the number of new hires and total controllers will decline. This is because the surge of developmental controllers that were hired to replace the long-expected retirement wave over the past decade will have become CPCs. In the future, the vast majority of the controllers will be CPCs and CPC-ITs, and more facilities will routinely fall within the ranges.

FIGURE 3.2 - Controller Staffing

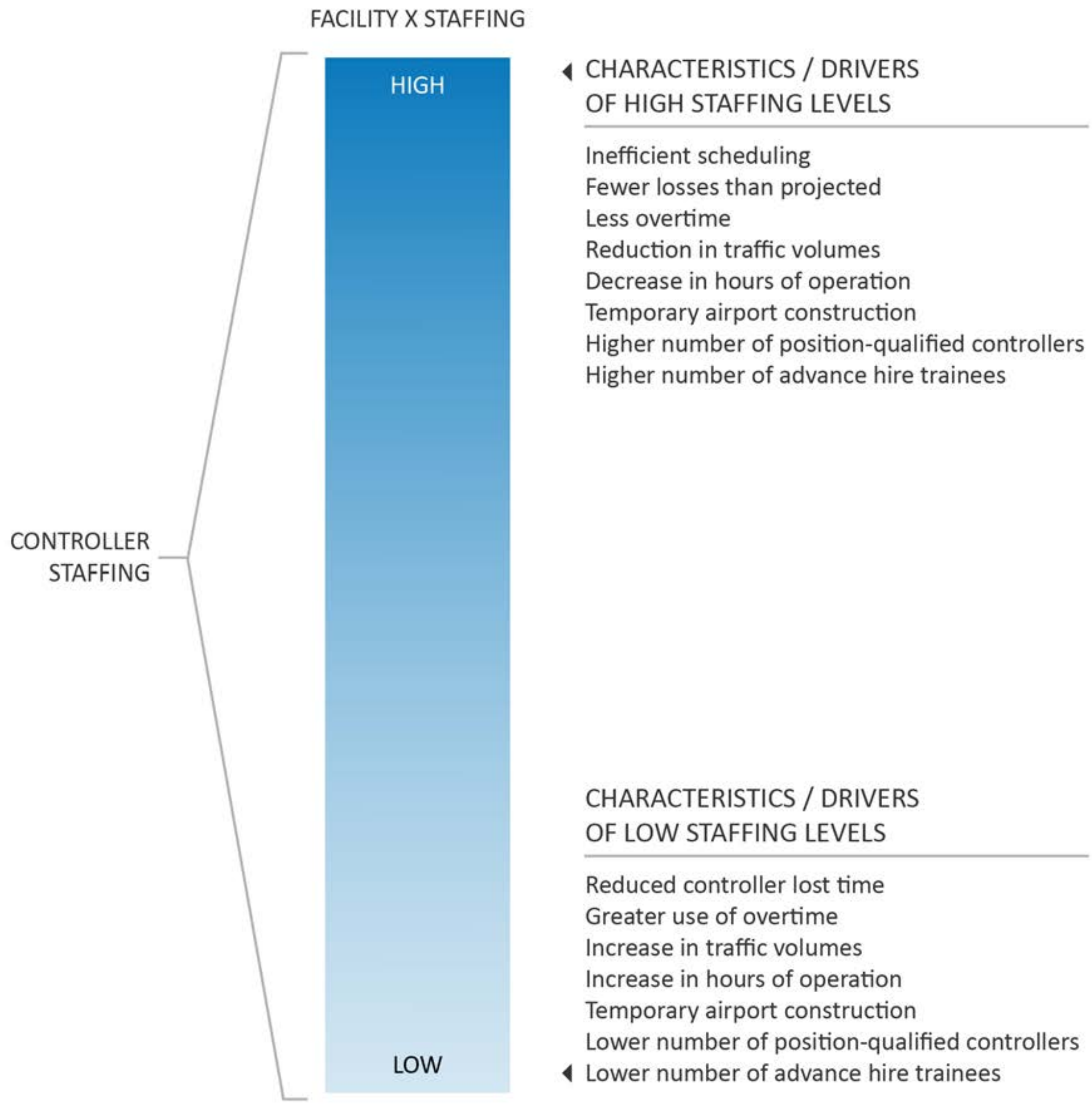
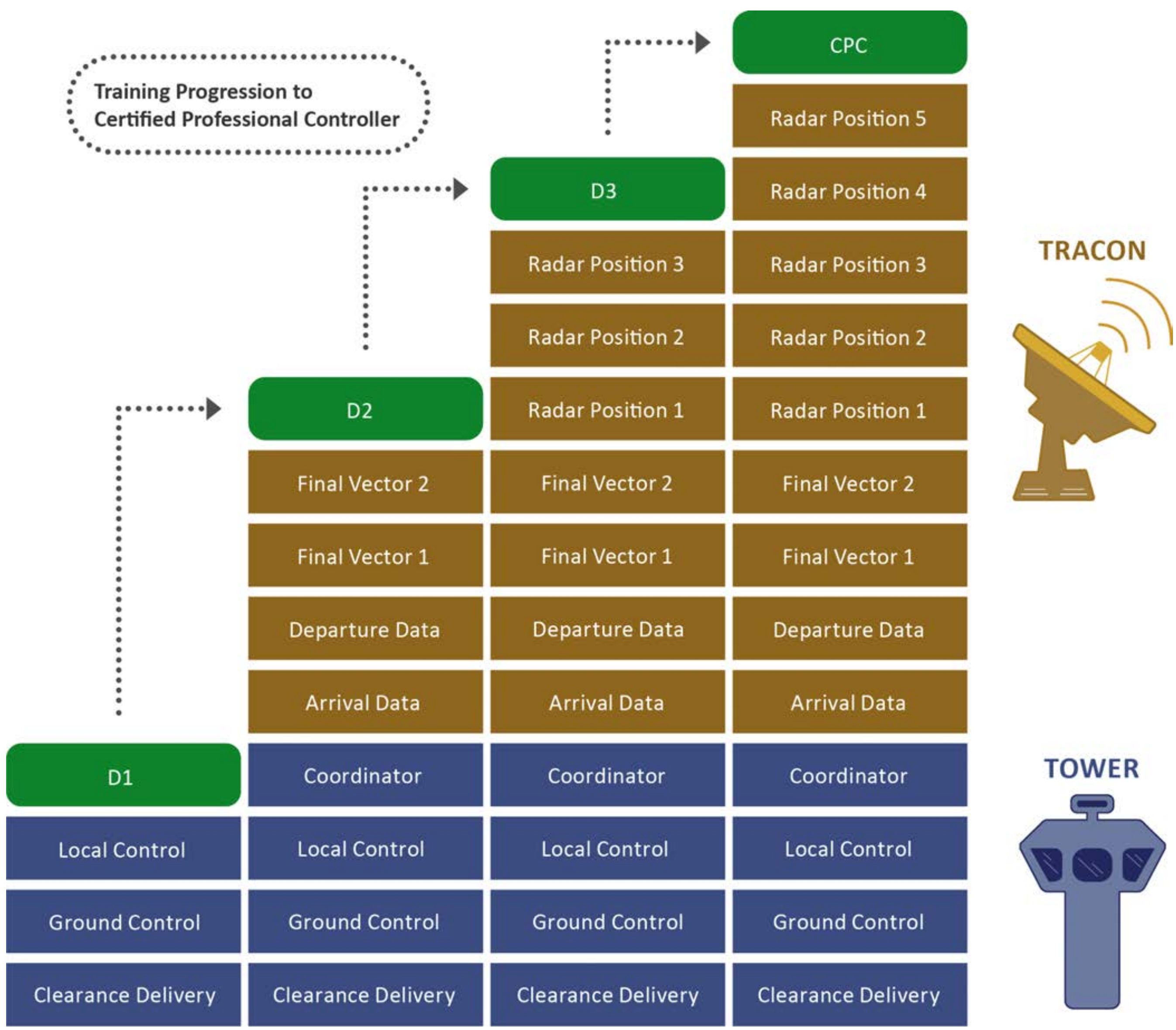


Figure 3.3 depicts an example of a large Tower and Approach Control facility. This facility is one in which controllers work in the tower cab portion and in the approach control or radar room (also known as a TRACON). To be a CPC in these types of facilities, controllers must be checked out on all positions in both the tower and the TRACON.

Trainees are awarded “D1” status (and the corresponding increase in pay) after being checked out on several positions. The levels of responsibility (and pay) gradually increase as the trainees progress through training. Once developmental controllers are checked out at the D1 level, they can work several positions in the tower independently and without training supervision (Clearance Delivery, Ground Control and Local Control). Once checked out on the Runway Crossing Coordinator position, developmental controllers would be tower certified and able to work any position in the tower cab independently and without training supervision. They would still not be a “D2” however, as there are also several positions in the TRACON to be checked out on (Arrival Data, Departure Data, Final Vector 1 and Final Vector 2). A controller in Figure 3.3 must be certified on all positions in the tower and TRACON to become a CPC.

NOTE: All air traffic control (ATC) facilities have individualized training progression to CPC based upon their type and level of complexity

FIGURE 3.3 - Example of Controller Training Progression



The levels of responsibility continue to increase as one progresses toward CPC status, but trainees can and do control traffic much earlier in the training process. Historically, the FAA has used these position-qualified controllers to staff operations and free up CPCs for more complex positions as well as to conduct training.

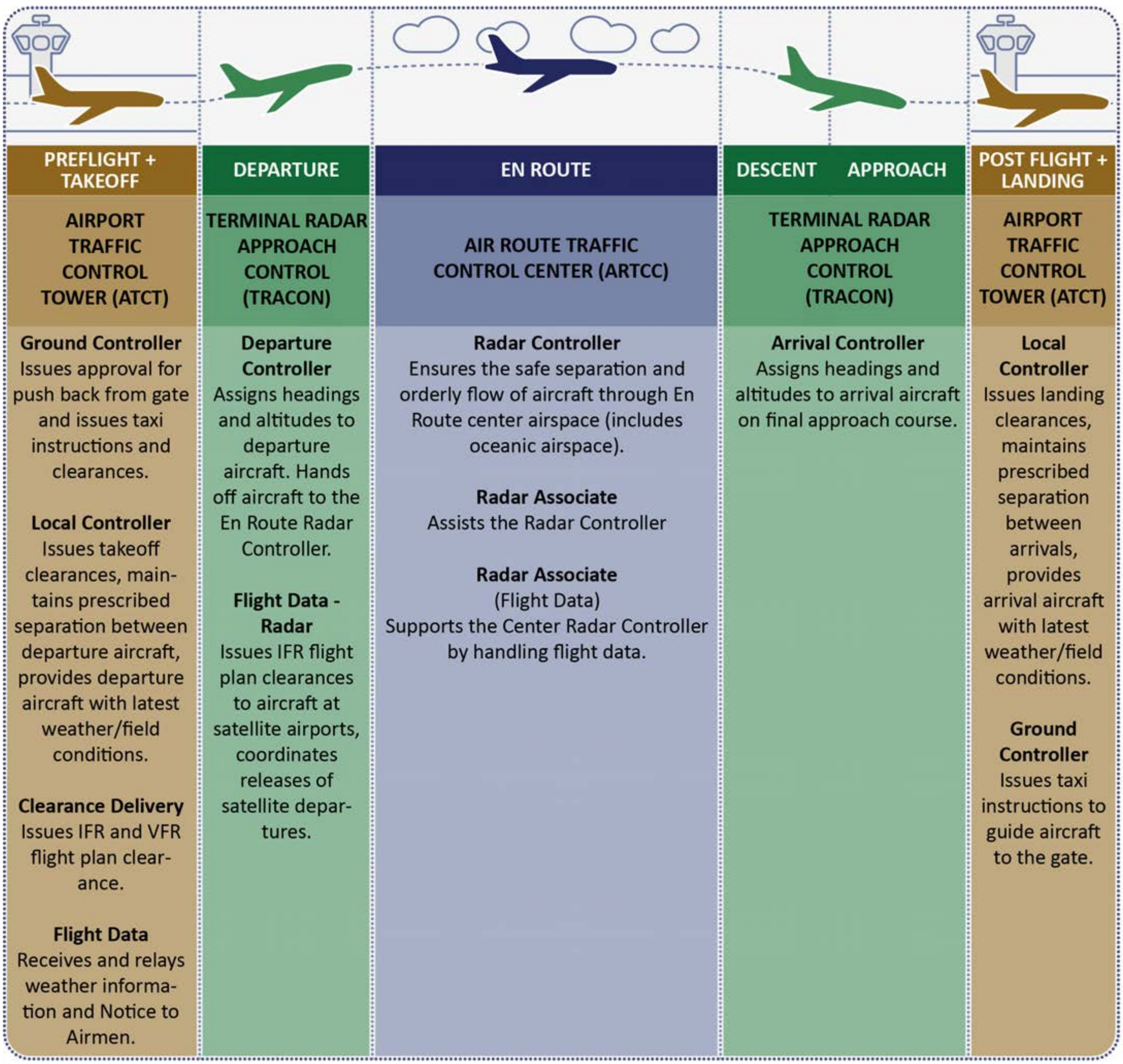
Having the majority of the workforce certified as CPCs makes the job of scheduling much easier at the facility. CPCs can cover all positions in their assigned area, whereas position-qualified developmentals require the manager to track who is qualified to work which positions independently. This task becomes much easier with a scheduling tool.

Trainees include both developmental controllers and certified professional controllers in training (CPC-IT). A CPC-IT is a controller who moves to another area within a facility or to a new facility and must be trained to the qualifications of that new environment. CPC-ITs are different from developmentals in that developmentals have never been fully checked out and certified as a CPC anywhere.

Air Traffic Staffing Standards Overview

The FAA has used air traffic staffing standards to help determine controller staffing levels since the 1970s. FAA facilities are currently identified and managed as either Terminal facilities where airport traffic control services are provided, including the immediate airspace around an airport, or En Route facilities where high-altitude separation services are provided using computer systems and surveillance technologies. Terminal facilities are further designated as tower cabs or TRACONs. These Terminal facilities may be collocated in the same building, but because of differences in workload, their staffing requirements are modeled separately. Figure 3.4 provides an overview of FAA facilities and air traffic control positions.

FIGURE 3.4 - Air Traffic Control Position and Facility Overview



The dynamic nature of air traffic controller workload coupled with traffic volume and facility staffing needs are all taken into account during the development of FAA staffing models and standards.

All FAA staffing models incorporate similar elements:

- Controller activity data is collected and processed quarterly, commensurate with the type of work being performed in the facilities.

- Models are developed that relate controller workload to air traffic activity. These requirements are entered into a scheduling algorithm.

- The modeled workload/traffic activity relationship is forecast for the 90th percentile (or 37th busiest) day for future years for each facility. Staffing based on the demands for the 90th percentile day assures that there are adequate numbers of controllers to meet traffic demands throughout the year.

- Allowances are applied for off-position activities such as vacation, training and additional supporting activities that must be accomplished off the control floor.

All staffing models go through similar development processes. Some components of the model-development phase vary as a function of the work being performed by the controllers. For example, a crew-based approach was used to model tower staffing requirements because the number and type of positions in a tower cab vary considerably as traffic changes, compared to those of a single sector in a TRACON or En Route center. All staffing models reflect the dynamic nature of staffing and traffic. Controller staffing requirements can vary throughout the day and throughout the year.

Tower Cab Overview

Air traffic controllers working in tower cabs manage traffic within a radius of a few miles of the airport. They instruct pilots during taxiing, takeoff and landing, and they grant clearance for aircraft to fly. Tower controllers ensure that aircraft maintain minimum separation distances between landing and departing aircraft, transfer control of aircraft to TRACON controllers when the aircraft leave their airspace, and receive control of aircraft for flights coming into their airspace.

- There are a variety of positions in the tower cab, such as Local Control, Ground Control, Flight Data, Coordinator, etc. Depending on the airport layout and/or size of the tower cabs (some airports have more than one tower), there can be more than one of the same types of position on duty.

- As traffic, workload and complexity increase, more or different positions are opened; as traffic, workload and complexity decrease, positions are closed or combined with other positions. In practice, minimum staffing levels may be determined by hours of operation and work rules.

Important factors that surfaced during the tower staffing model development included the availability, accessibility and increased reliability of traffic data and controller on-position reporting systems. The FAA is now able to analyze much larger quantities of tower data at a level of granularity previously unattainable. Staffing data and traffic volumes are collected for every facility.

The revised tower cab staffing models were developed using regression analysis as the primary method for modeling the relationship between staffing and workload drivers. The models relate observed, on-position controllers to the type and amount of traffic they actually handle. Regression analysis allows us to relate modeled controller staffing requirements with traffic activity and then use this relationship to predict future staffing requirements (standards) based on traffic projections.

TRACON Overview

Air traffic controllers working in TRACONs typically manage traffic within a 40-mile radius of the primary airport; however, this radius varies by facility. They instruct departing and arriving flights, and they grant clearance for aircraft to fly through the TRACON's airspace. TRACON controllers ensure that aircraft maintain minimum separation distances between landing and departing aircraft, transfer control of aircraft to tower or En Route center controllers when the aircraft leave their airspace, and receive control of aircraft for flights coming into their airspace.

- TRACON airspace is divided into sectors that often provide services to multiple airports. Consolidated or large TRACONs in major metropolitan areas provide service to several primary airports. Their airspace is divided into areas of specialization, each of which contains groups of sectors.

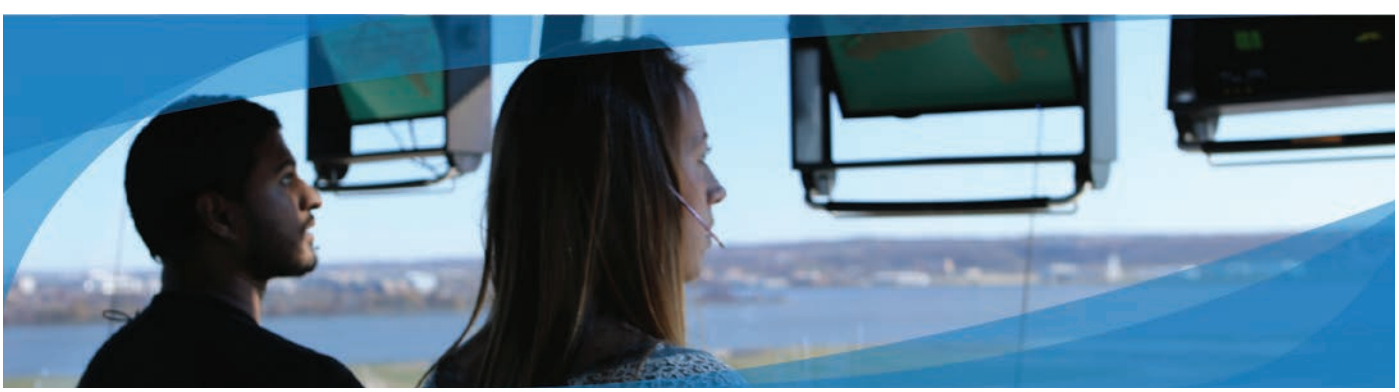
- Controllers are assigned to various positions such as Radar, Final Vector, Departure Data, etc., to work traffic within each sector. These positions may be combined or de-combined based on changes in air traffic operations.

- As traffic, workload and complexity increase, the sectors may be subdivided (de-combined) and additional positions opened, or the sector sizes can be maintained with an additional controller assigned to an assistant position within the same sector.

- Similarly, when traffic, workload and complexity decline, the additional positions can be closed or the sectors recombined. In practice, minimum staffing levels may be determined by hours of operation and work rules.

Like the tower analysis, the FAA is able to analyze much larger quantities of TRACON data at a level of granularity previously unattainable. Important factors surfaced during the TRACON staffing model review including the availability, accessibility and increased reliability of traffic data and controller on-position reporting systems. Staffing data and traffic volumes were collected for every facility.

The TRACON staffing models were updated in early 2009. These revised TRACON models were developed using regression analysis as the primary method for modeling the relationship between staffing and workload drivers. The models relate observed, on-position controllers to the type and amount of traffic they actually handled. Regression allows us to relate modeled controller staffing requirements with traffic activity and then use this relationship to predict future staffing requirements (standards) based on traffic projections.



En Route Overview

Air traffic controllers assigned to En Route centers guide aircrafts flying outside of Terminal airspace. They also provide approach control services to small airports around the country where no Terminal service is provided. As aircraft fly across the country, pilots talk to controllers in successive En Route centers.

- En Route center airspace is divided into smaller, more manageable blocks of airspace called areas and sectors.
- Areas are distinct, and rarely change based on changes in traffic. Within those areas, sectors may be combined or de-combined based on changes in air traffic operations.
- Controllers are assigned to positions within the sectors (e.g., Radar, Radar Associate, Tracker). As traffic increases, sectors can be de-combined and additional positions opened, or the sector sizes can be maintained but additional controllers added to assistant positions within the sectors.
- Similarly, when traffic declines, the additional positions can be closed or the sectors recombined. In practice, minimum staffing levels may be determined by hours of operation and work rules.

The FAA's Federally Funded Research and Development Center, operated by the MITRE Corporation, developed a model to generate data needed for the FAA's staffing models. Like the tower and TRACON standards models, this approach incorporated actual traffic and more facility-specific data.

MITRE's modeling approach reflects the dynamic nature of the traffic characteristics in a sector. It estimates the number of controllers, in teams of one to three people, necessary to work the traffic for that sector in 15-minute intervals. Differences in traffic characteristics in a sector could require different numbers of controllers to handle the same volume of traffic. For example, at one time most traffic might be cruising through a sector toward another location requiring minimal controller intervention. At another time, traffic might be climbing and descending through the same sector, a more complex scenario requiring more controllers. The same modeling techniques were applied uniformly to all sectors, providing results based on a common methodology across the country.

During FY 2013 and FY 2014, MITRE collaborated with the FAA and the National Air Traffic Controllers Association (NATCA) to conduct an evaluation of the En Route on-position staffing model at the request of the National Academy of Sciences to validate its core assumptions and parameters via empirical data collection. The evaluation, completed in the field and in a controlled laboratory setting, established values for model parameters, identified additional controller tasks for coverage by the model, and informed other enhancements to the model. In FY 2015, these updates were made and the on-position staffing model was re-calibrated. The evaluation results were shared with the FAA, NATCA and the National Academy of Sciences. In FY 2016, the evaluation results were incorporated into the on-position staffing model.

Summary

The FAA's staffing models incorporate output provided by the Tower, TRACON and En Route workload models which is run through a shift scheduling algorithm. Next, factors are applied to cover vacation time, break time, training, etc. Lastly, traffic growth forecasts are applied to provide the annual staffing standards that are incorporated into the staffing ranges presented in this plan for each facility.

Air Traffic Staffing Standards Review

For more than 50 years, the FAA has developed and applied staffing standard models to help establish staffing requirements for its ATC facilities. Over this period, independent groups, including the Transportation Research Board (TRB), have scrutinized the data sources and methods used by the FAA. A 1997 report, for example, recommended an approach that combines formal modeled predictions with less formal methods based on expert judgment concerning staffing requirements at individual facilities (TRB 1997). That report noted that controller workforce planning is not a one-size-fits-all problem and observed that national planning needs to recognize features specific to individual ATC facilities. A more recent report reviewed the task load “complexity model” used in generating staffing standards for En Route facilities and offered advice on “ways to improve the modeling process going forward” (TRB 2010, 6).

In July 2014, the National Academy of Sciences completed its latest review of FAA staffing standards. The study committee consisted of academicians, consultants and a current NATCA controller as well as retired air traffic controllers. Overall, the committee found the FAA’s staffing standards for Terminal ATC facilities to be reasonable for use in developing initial estimates of the number of controllers needed for managing traffic at each facility. However, it had concerns about the validity of the mathematical model used for En Route facilities and the resulting estimates of controller staffing needs. It also “felt the steps taken by FAA to create a controller staffing plan from the staffing standards and then execute such plan were obscure. As a result, the committee was unable to determine the extent to which FAA staffing imbalances are being corrected over time to help ensure cost-effective staffing.”

In 2015, the FAA met with the National Academy of Sciences and NATCA to collaborate on controller staffing model review and validation. These meetings also provided an opportunity to review the July 2014 NAS report findings and recommendations, and to develop a path forward. The FAA is currently using this collaborative path forward by continuing to consult with the National Academy and NATCA regarding controller staffing models, scheduling practices and the execution of hiring plans.

In 2016, the agency implemented a nationwide and centrally managed internal reassignment process and a national release policy. These processes are facilitating timely release of employees requesting transfer, while seeking to improve the distribution of the workforce. In 2017, we will continue to work collaboratively with the union to refine our distribution model.

Air Traffic Controller Scheduling

Optimizing controller schedules is a critical aspect of efficient workforce planning, since inefficient facility schedules can lead to excess staffing and/or increased overtime. Currently, the FAA's air traffic facilities do not have access to a standardized, automated tool to assist them in developing optimal schedules and analyzing long-term workforce planning requirements. FAA facilities currently use a variety of non-standard methods that do not fully incorporate the complex resource management requirements that exist in today's environment.

To address this need, the FAA is in the process of implementing a widely used, commercially available "off-the-shelf" system that has been configured to FAA-specific requirements (e.g., national labor contract terms, FAA policy). The FAA's Operational Planning and Scheduling (OPAS) tool will provide a common tool set for FAA facilities to effectively develop and maintain optimal schedules based on traffic, staffing, work rules and employee qualifications. Similar systems are being used by air navigation service providers worldwide and are commonplace in best-practice companies.

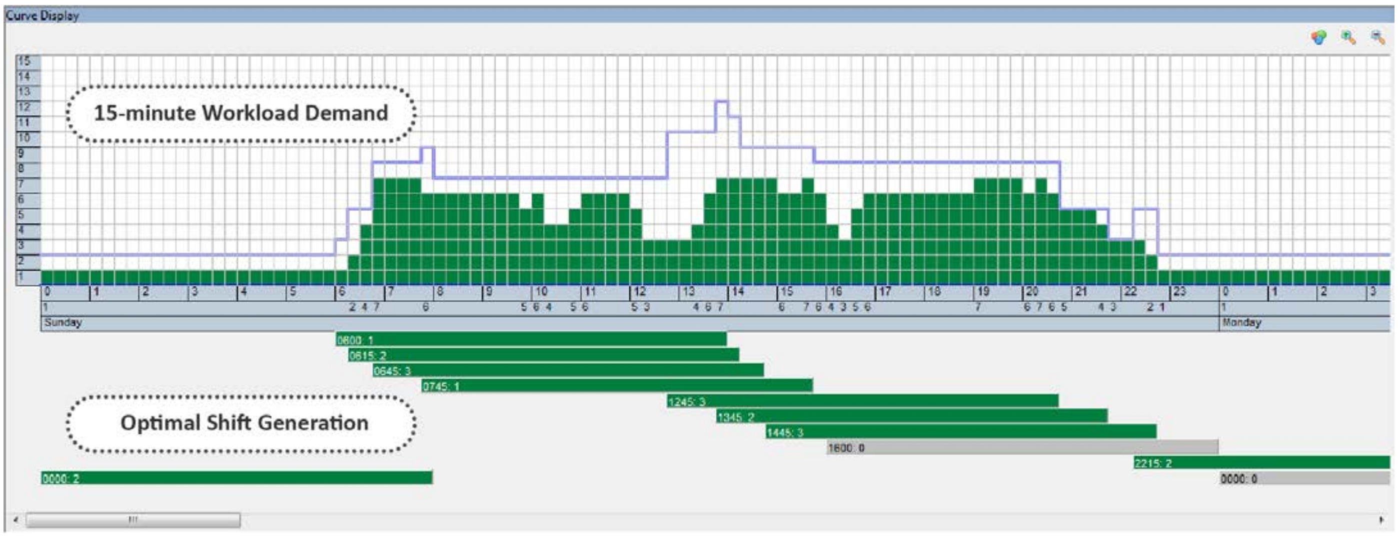
More specifically, the FAA envisions the system can be used to create and analyze optimized schedules over variable time frames, with viewing capability in days, weeks, months, seasons and years. The system is able to:

- Generate optimal schedules for a given period (day, pay period, month and year) based on demand, business rule constraints, employee qualification requirements and available resources.
- Calculate optimal shift start times and associated demand in support of national and local bargaining.
- Propose various shifts in the most efficient way to cover demand while abiding by business and contractual rules.
- Calculate projected time on position (signed on and controlling traffic) to staff an area by shift, schedule segment and/or person.
- Run what-if analyses.
- Aid in the assignment of efficiently scheduled overtime.
- Automate shift requests, bid process and other scheduling-related tasks.

The major functionalities in the OPAS application are split into long-term (typically annually), mid-term (generating schedules), and short-term (day of operations). A typical work flow is shown below:

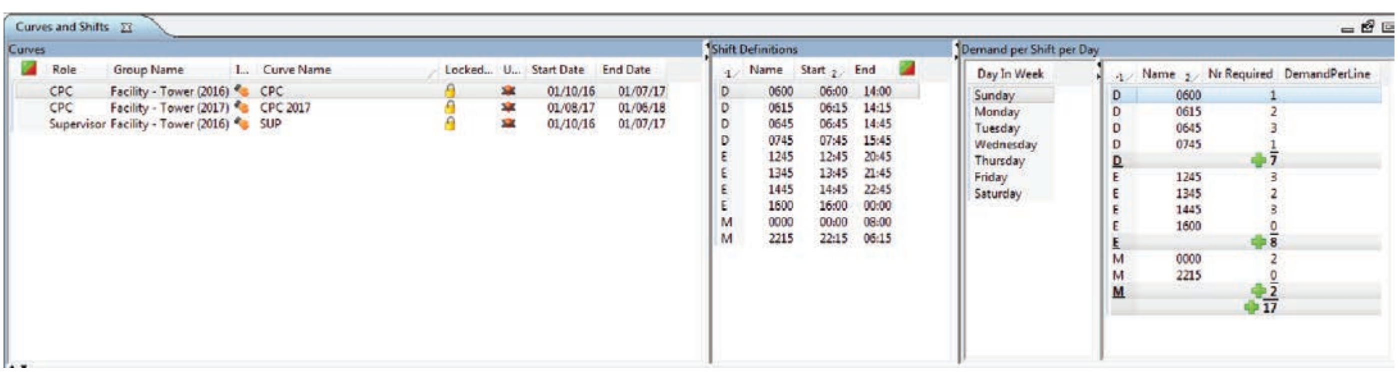
OPAS determines the minimum number of controllers required to manage traffic based on an inputted demand curve. The demand curve gives the raw staffing required per 15-minute interval in a series of one-week periods. The number of different curves used can vary from one to 52 one-week curves. For example, one demand curve may describe the period from January to February and another the period from February to May, etc. If the summer is a particularly busy time, two separate demand curves can be used (one for the summer and one for the winter).

OPAS uses a mathematical algorithm to minimize the number of controllers needed to satisfy these demand periods. The first optimizer defines the shift start times and the demand associated with each shift on a daily basis. This minimum demand number helps the facility determine whether it is possible to approve leave, or whether someone needs to be moved from an evening shift to a day shift to adequately cover the traffic demand.



The above diagram shows how OPAS uses the 15-minute demand (green blocks) to create the required shifts in the lower part of the diagram.

OPAS allows for a different demand curve for different roles (e.g., controller versus supervisor), thus allowing for optimal schedules to be made for all positions in a facility. The blue line above the green blocks shows how the staffing per shift generated by OPAS more than adequately covers the inputted green demand curve.



In the above diagram, the left pane gives the category, names, and start and end times for the optimal shifts. There are three core shifts (for the day shift, evening shift and midnight shift) and three ancillary shifts per shift category. The last two panes give the demand per shift per day. In this example, since “Sunday” is selected, the last pane gives the minimum demand per shift on Sunday.

Manage a Schedule/Day of Operation Views

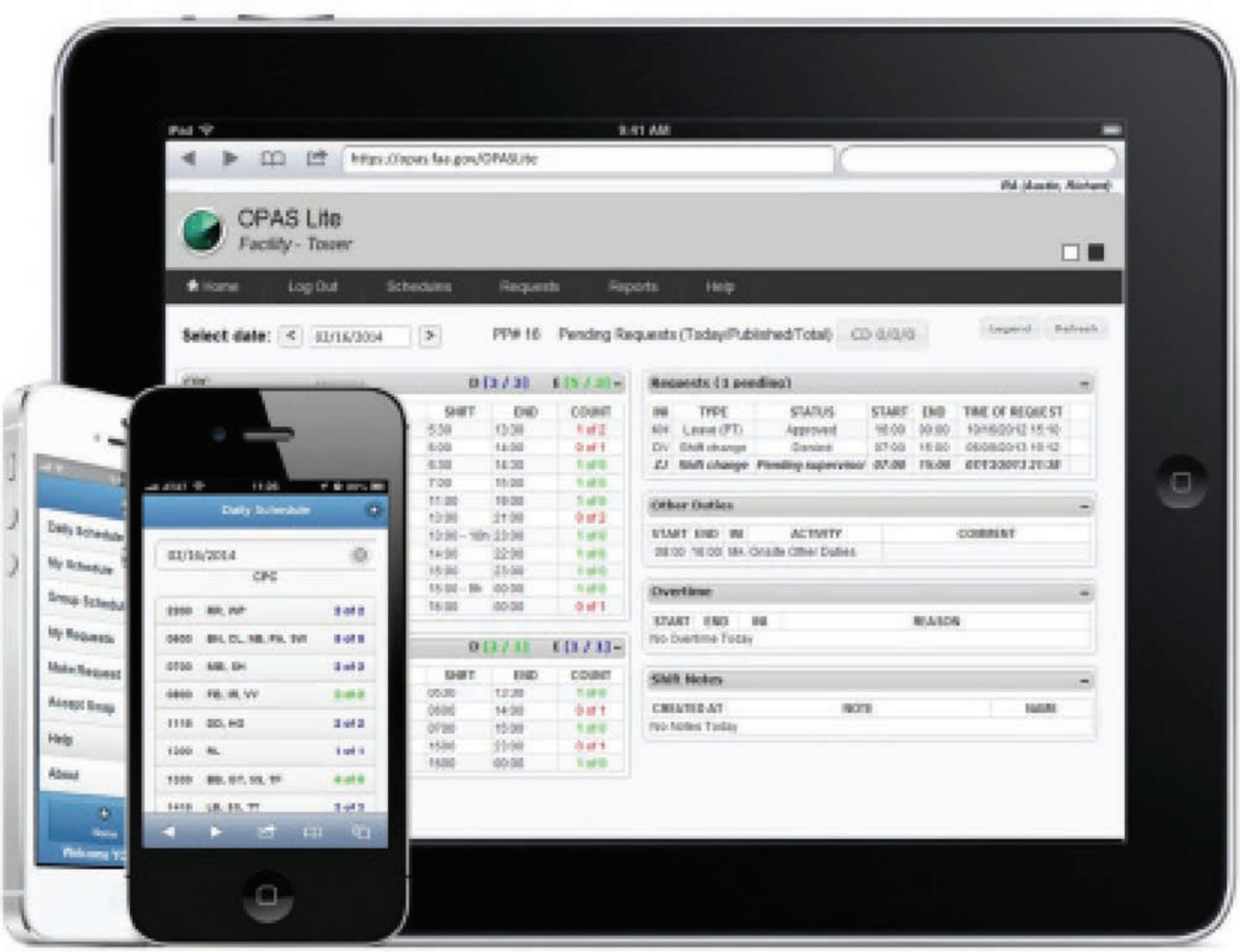
Other views drill down to show the details of a single day. They allow the user to get a quick overview of what is happening on a given day, including leave, overtime, briefing periods and other duties (like training or special assignments). These views are updated in real time for all viewers as employees enter requests, and changes are made to the schedule.

The views can also address questions such as:

- "Who is scheduled to work today and when?"
- "Who is scheduled to work overtime?"
- "Who has a leave request for today, pending or approved?"

OPAS Lite

OPAS Lite is a mobile web application developed to provide access to many of the major functions within OPAS. It is accessible on modern browsers and devices such as smartphones and tablets. OPAS Lite allows users to view and interact with their schedule anywhere, anytime. Functionality in OPAS Lite also includes a desktop kiosk (view-only mode), quick changing of kiosk users, viewing schedules, submitting requests and proxy requests, and viewing and acting on requests.



Air Traffic Scheduling Software Review

The National Academy of Sciences listed in its 2014 report the following potential benefits of sophisticated scheduling software. The software:

- Provides a consistent basis for establishing work schedules that minimize or mitigate the safety risks associated with controller fatigue.

- Ensures that diverse facilities are all capable of generating efficient schedules, particularly at larger facilities where economies of scale may be possible.

- Provides a consistent basis for informing the development of staffing standards at FAA headquarters and the creation of work schedules at the facility level.

The report further stated, "Schedule changes significantly affect the controller workforce. FAA should, as a matter of priority, continue its efforts to develop an improved scheduling tool capable of creating efficient controller work schedules that incorporate fatigue mitigation strategies. The agency should collaborate closely with the National Air Traffic Controllers Association in implementing this improved scheduling capability, notably in adopting schedules that reflect science-based strategies for managing the risks associated with controller fatigue."

Air Traffic Scheduling Software Implementation

In accordance with Article 118 of the July 2016 Collective Bargaining Agreement (CBA) between NATCA and the FAA, OPAS will be implemented at ARTCC, TRACON and Tower facilities. In accordance with Article 118, Section 5, the implementation team will place a priority on implementing OPAS at the following 32 facilities, as listed in Appendix N of the CBA, by the summer of 2018. We expect to implement OPAS at all 315 facilities within the next three years.

- A80 – Atlanta TRACON
- A90 – Boston TRACON
- ATCSCC – Air Traffic Control System Command Center
- C90 – Chicago TRACON
- D10 – Dallas TRACON
- F11 – Central Florida TRACON
- I90 – Houston TRACON
- N90 – New York TRACON
- NCT – Northern California TRACON
- PCT – Potomac TRACON
- SCT – Southern California TRACON
- ZAB – Albuquerque ARTCC
- ZAN – Anchorage ARTCC
- ZAU – Chicago ARTCC
- ZBW – Boston ARTCC
- ZDC – Washington ARTCC
- ZDV – Denver ARTCC
- ZFW – Fort Worth ARTCC
- ZHU – Houston ARTCC
- ZID – Indianapolis ARTCC
- ZJX – Jacksonville ARTCC
- ZKC – Kansas City ARTCC
- ZLA – Los Angeles ARTCC
- ZLC – Salt Lake ARTCC
- ZMA – Miami ARTCC
- ZME – Memphis ARTCC
- ZMP – Minneapolis ARTCC
- ZNY – New York ARTCC
- ZOA – Oakland ARTCC
- ZOB – Cleveland ARTCC
- ZSE – Seattle ARTCC
- ZTL – Atlanta ARTCC

Air Navigation Service Providers "in other countries including Australia, Canada, and Germany have replaced their legacy scheduling tools with sophisticated software capable of incorporating all constraints while generating efficient controller schedules." – National Academy of Sciences

Technological Advances

The year 2016 marked major steps forward in completing the foundational infrastructure and transformational programs that are modernizing the National Airspace System (NAS) as part of the Next Generation Air Transportation System (NextGen).

While some programs, like En Route Automation Modernization (ERAM) and Automatic Dependent Surveillance–Broadcast (ADS-B), have been fully implemented and are being used today by controllers, other programs and capabilities are in various stages of implementation. These include programs that have been deployed and are now adding enhanced capabilities such as System Wide Information Management and decision support systems such as Time Based Flow Management, and systems in development such as the NAS Voice System. For Terminal controllers, two of the most significant advances of 2016 were the completion of Data Communications (Data Comm) Controller Pilot Data Link Communications (CPDLC) Departure Clearance (DCL) services to 55 airport towers, and the Terminal Automation Modernization and Replacement (TAMR) program's automation upgrades at 11 Terminal Radar Approach Control (TRACON) facilities.

Data Comm, a key NextGen transformational program, provides a digital data mode of communication between air traffic controllers and pilots for safety-of-flight ATC clearances, instructions, traffic flow management, flight crew requests and reports. Data Comm will reduce the impact of ground delay programs, airport reconfigurations, convective weather, congestion, and other causes; reduce communication errors; improve controller and pilot efficiency through automated information exchange; enable NextGen services (e.g., enhanced re-routes, trajectory operations); and increase controller productivity leading to increased capacity.

The Data Comm Tower Services deployment was completed in December 2016, two and a half years ahead of schedule. Over 62 million passengers on 466,833 flights benefitted from Data Comm DCL services in 2016. The FAA is realizing quantitative and qualitative benefits from the use of Data Comm services at these towers. These benefits include reduced taxi-out delays, reduced gate delays and improved pilot and controller efficiency due to less time spent communicating over voice.

In late 2014, the FAA made the final investment decision and defined the technical scope, cost and schedule for Data Comm initial En Route services and then did the same in 2016 for full En Route services. With initial En Route Data Comm starting to deploy in 2019, controllers will be able to provide frequency handoffs, altitude changes and re-routes via Data Comm. Pilots will also be able to send requests to controllers using the data link. When full En Route services are available beginning in 2022, additional messages will become possible, including full holding instructions, crossing restrictions, direct-to-fix messages, controller-initiated routes and advisory messages.

The TAMR program upgrades multiple air traffic control technologies to a single, state-of-the-art platform: the Standard Terminal Automation Replacement System (STARS). STARS, like the ERAM system, is an FAA foundational technology supporting NextGen. It enables ADS-B and other NextGen capabilities, giving air traffic controllers a more complete airspace picture.

STARS offers new features that will make the system easier for controllers to use than the aging systems it is replacing. Keyboard backlighting can be adjusted to improve visibility for easier data entry while flat-panel LED displays increase the traffic picture quality. Controllers can assign a color to an aircraft to make it easier to follow, and with a recall capability, workstation settings preferred by an individual controller can be saved and retrieved at the touch of a button.

Weather displays show six different levels of radar returns to provide a better view of storms for controllers as they work with pilots to steer aircraft around hazardous weather. Using multiple radars and ADS-B, STARS can track 1,300 aircraft in a 400-square-nautical-mile area to provide controllers with a clearer view of overall operations.

STARS also assists with terrain avoidance and conflict alerts. A minimum separation capability enables controllers to select two aircraft and ensure the required separation will be maintained, and a data block feature automatically lists the number of aircraft in a formation—a function that previously had to be performed manually.

Reliability should improve as STARS includes two redundant systems to provide a backup capability that can be activated with the flip of a switch, and an infrastructure that is easier for technicians to maintain since a common system will be present at all TRACONs.

ADS-B, which by January 1, 2020, is mandated for aircraft operating in most controlled U.S. airspace, has been integrated into automation platforms at all En Route air traffic control facilities and major Terminal radar facilities. Full TRACON deployment is expected to be completed by 2020. As of November 2016, more than 22,000 aircraft have been equipped with ADS-B avionics. The FAA completed the nationwide deployment of ADS-B ground stations in 2014, and ADS-B traffic and weather broadcasts are available nationwide.

After the NextGen Advisory Committee (NAC) identified high-priority, high-readiness NextGen capabilities in 2014, the FAA agreed to emphasize increasing the use of Performance Based Navigation, making multiple runway operations more efficient, improving surface operations and data sharing, and implementing Data Communications. The FAA continues to meet its NAC commitments in these areas.

Increased productivity and efficiency, and their ultimate impact on the size and composition of the FAA's workforce, depend on many factors. The scope and precise impact of NextGen enhancements are still under development. The final impacts are less precisely known given the complex nature of the interaction of controllers and their tools.

The relationship between pilots and air traffic controllers as well as the relationship between controllers and automated systems will evolve. These changes will occur gradually and require continued testing and analysis to ensure the safety of the NAS.

Chapter 4

Losses

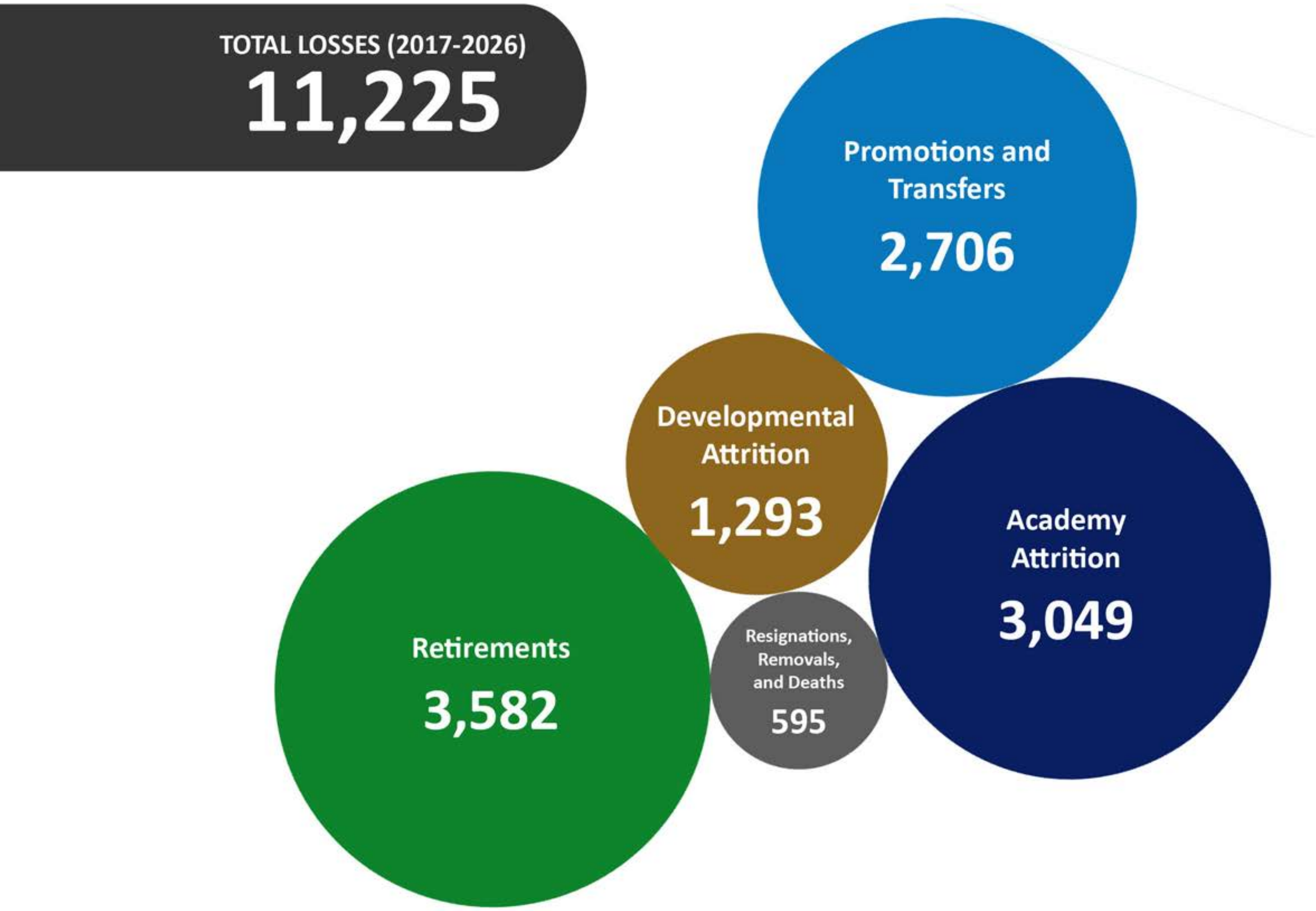
In total, the FAA expects to lose over 1,600 controllers due to retirements, promotions and other losses this fiscal year. Other controller losses include transfers, resignations, removals, deaths, developmental attrition and academy attrition.

The FAA hires and staffs facilities so that trainees are fully prepared to take over responsibilities when senior controllers leave.

Controller Loss Summary

Table 4.1 shows the total estimated number of controllers that will be lost, by category, over the period FY 2017 through FY 2026.

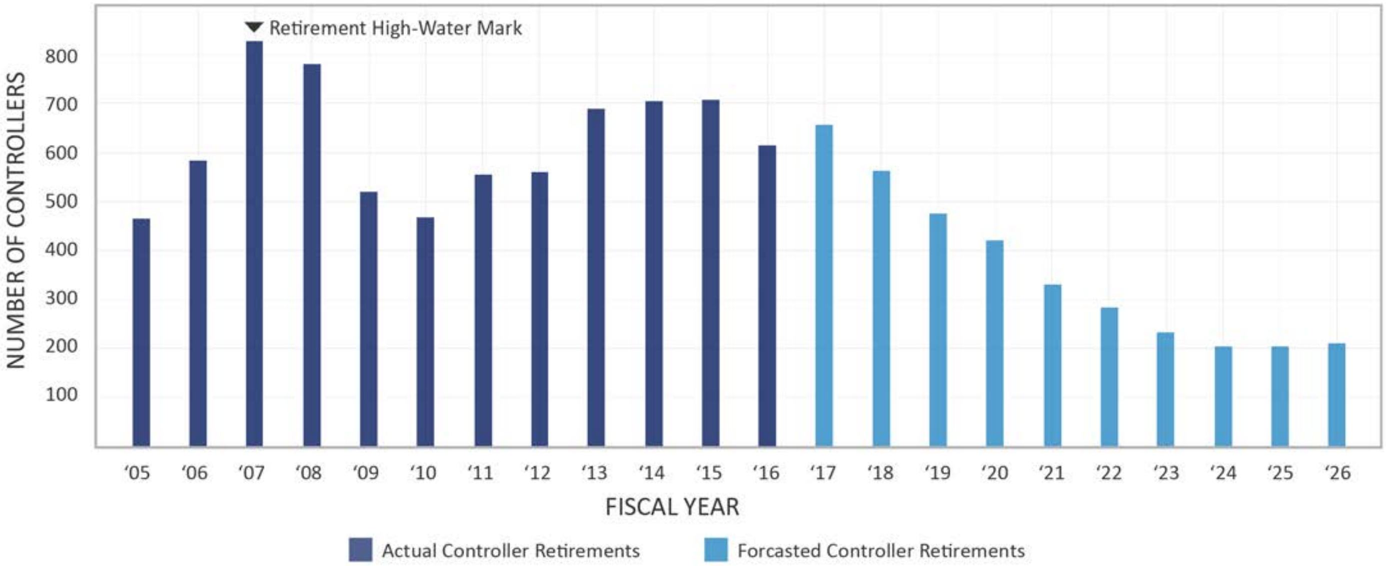
TABLE 4.1 - Controller Loss Summary



Actual Controller Retirements

Fiscal year 2007 was correctly projected to be a peak year for retirements of controllers hired in the early 1980s. The long-anticipated retirement wave has passed. Annual retirements decreased for a few years then increased during fiscal years 2010 to 2015, and are leveling off. In the last five years, 3,272 controllers have retired. Fiscal year 2016 retirements were lower than projected, and are expected to fall over the next decade.

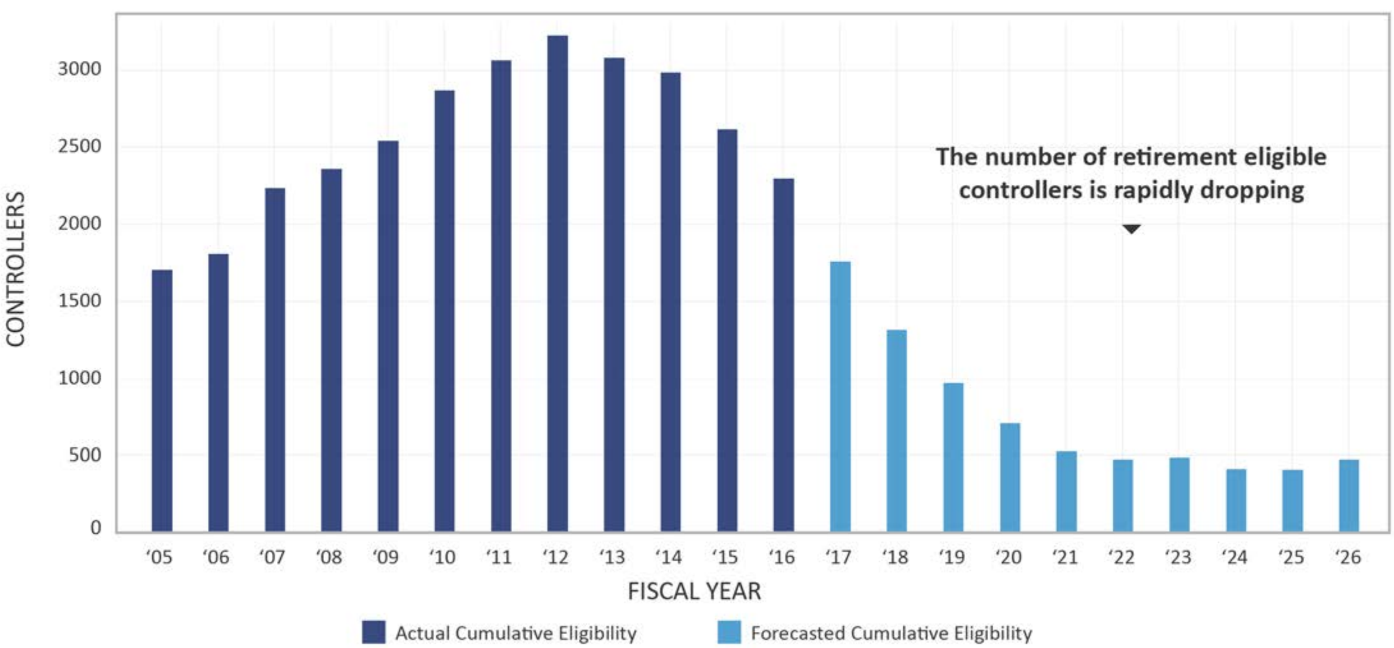
FIGURE 4.1a - Actual Controller Retirements



Cumulative Retirement Eligibility

The table below shows historical and forecasted Controller Retirement Eligibility from FY 2005 to FY 2026. Data shows a significant decline in the number of controllers eligible to retire from FY 2012 to FY 2026. At the end of fiscal year 2016 only 189 controllers remain from those who were hired before 1984. This clearly demonstrates that the controller retirement wave is over.

FIGURE 4.1b- Cumulative Retirement Eligibility

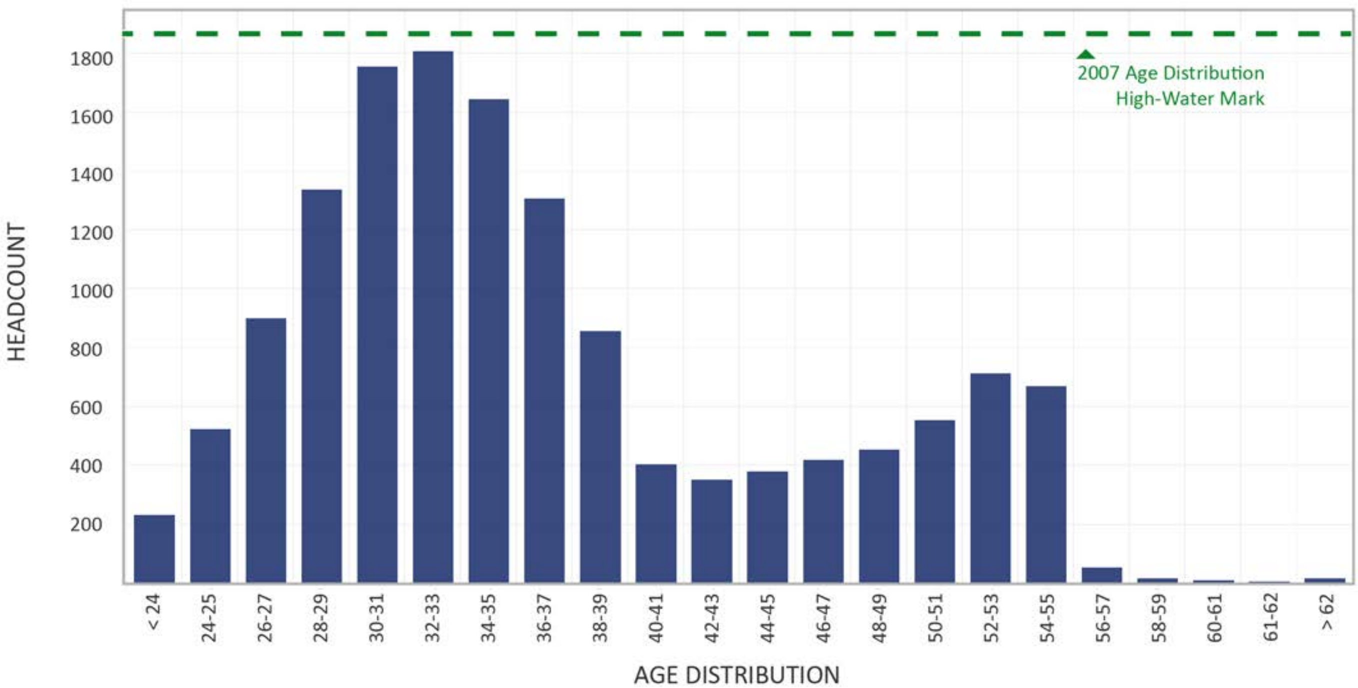


Controller Workforce Age Distribution

The agency hired a substantial number of controllers in the years immediately following the 1981 strike. This concentrated hiring wave meant a large portion of the controller workforce would reach retirement age in roughly the same time period. In September 2005, the age distribution peak on the right side of Figure 4.2 was greater than 1,900 controllers. Today, the magnitude of that remaining peak is down to less than 800 controllers because the majority of the controllers hired shortly after the 1981 strike have already retired and been replaced.

The FAA's hiring plan is designed to phase in new hires as needed. Two distinct age bands can be seen in Figure 4.2. Controllers hired in the past several years can be seen in the 24 to 37 age band, which spans 14 years. The age band of those hired after the 1981 strike is shown in the 46-55 age band and covers only 10 years. By phasing in new hires, the age band of recent hires has become wider and is designed to avoid a spike in retirement eligibility in future years.

FIGURE 4.2 - Controller Workforce Age Distribution as of September 17, 2016



The FAA's hiring plan is designed to phase in new hires as needed.

Controller Retirement Eligibility

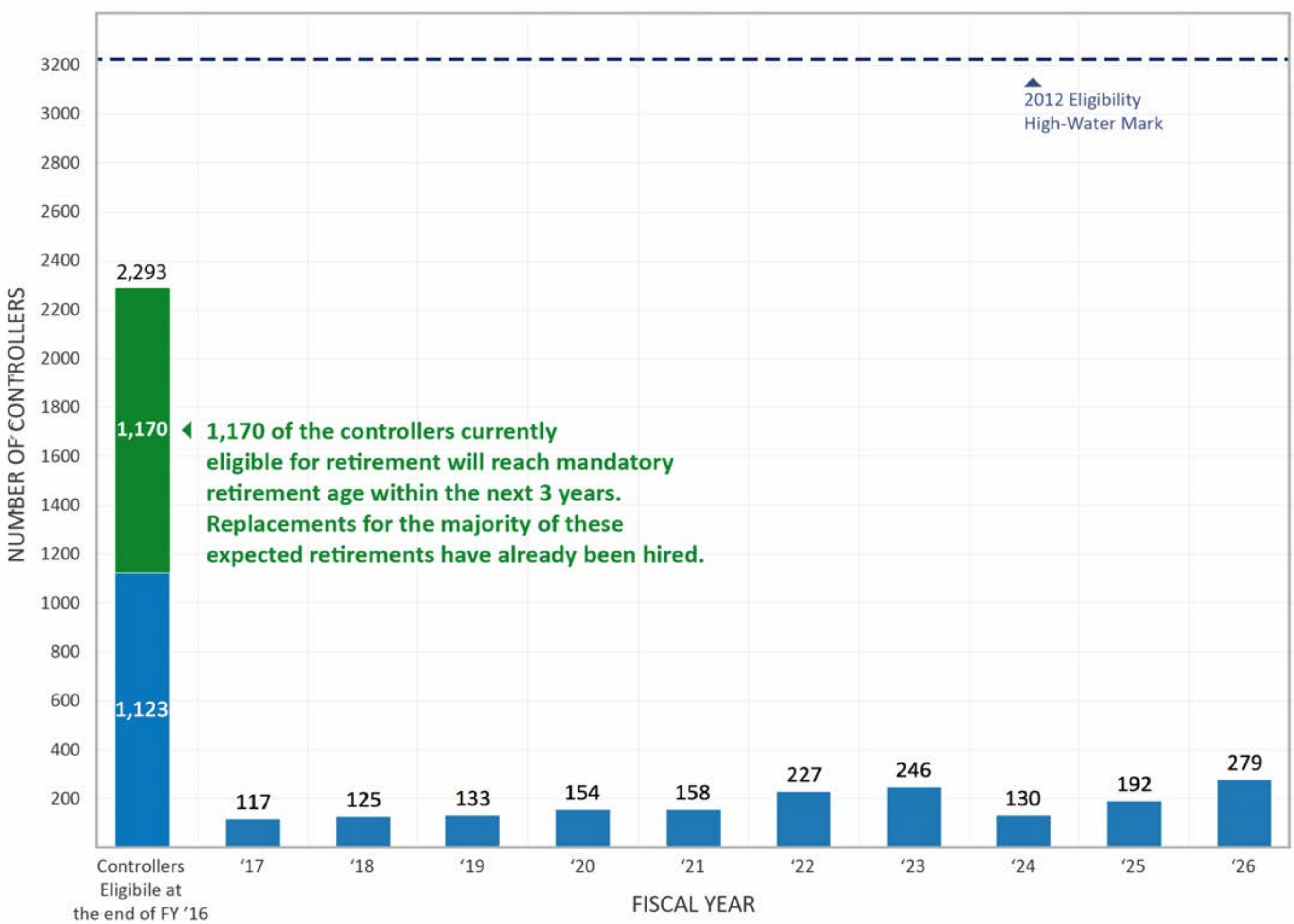
In addition to normal civil service retirement criteria, controllers can become eligible under special retirement criteria for air traffic controllers (age 50 with 20 years of "good time" service or any age with 25 years "good time" service). "Good time" is defined as service in a covered position, as defined in Public Law 92-297. Under Public Law 92-297, air traffic controllers are usually required to retire at age 56.

After computing eligibility dates using all criteria, the FAA assigns the earliest of the dates as the eligibility date. Eligibility dates are then aggregated into classes based on the fiscal year in which eligibility occurs.

Figure 4.3 shows the number of controllers who are currently retirement eligible as of September 2016 and those projected to become retirement eligible each fiscal year through FY 2026. Agency projections show that an additional 117 controllers will become eligible to retire in FY 2017. The number of retirement eligible controllers has been in decline in recent years from the peak, and should continue to do so for the next few years.

Because of advance hiring, we have already replaced many of the controllers currently eligible to retire. The FAA strives to minimize retirement, hiring and training spikes through the process of examining trends and pro-actively planning years in advance of expected activity.

FIGURE 4.3 - Retirement Eligibility



Controller Retirement Pattern

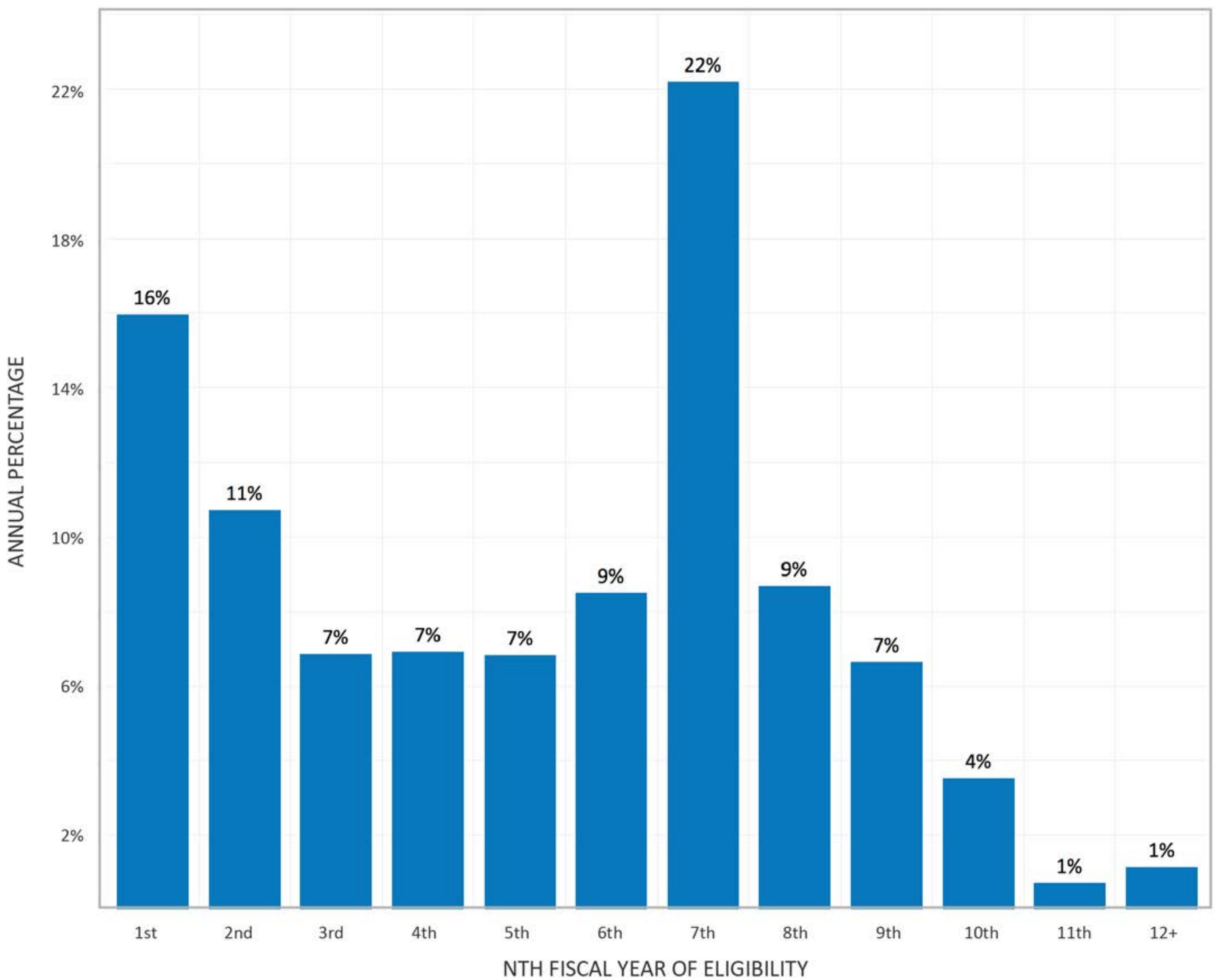
History shows that not all controllers retire when they first become eligible. In 2016, 16 percent of controllers who first became eligible actually retired.

Since the economic downturn began in 2008, the FAA has observed that many controllers are delaying retirement until they get closer to the mandatory retirement age of 56. Because most controllers are retirement eligible at the age of 50, they typically reach mandatory retirement age in their seventh year of eligibility.

These trends are seen in Figure 4.4 below, which shows fewer controllers are retiring earlier in their eligibility and are waiting until closer to their mandatory retirement age.

Despite the increased likelihood of delayed retirement, the majority of controllers still leave the controller workforce prior to reaching the mandatory age.

FIGURE 4.4 - Percent of Controllers Retiring in the Nth Fiscal Year of Their Eligibility



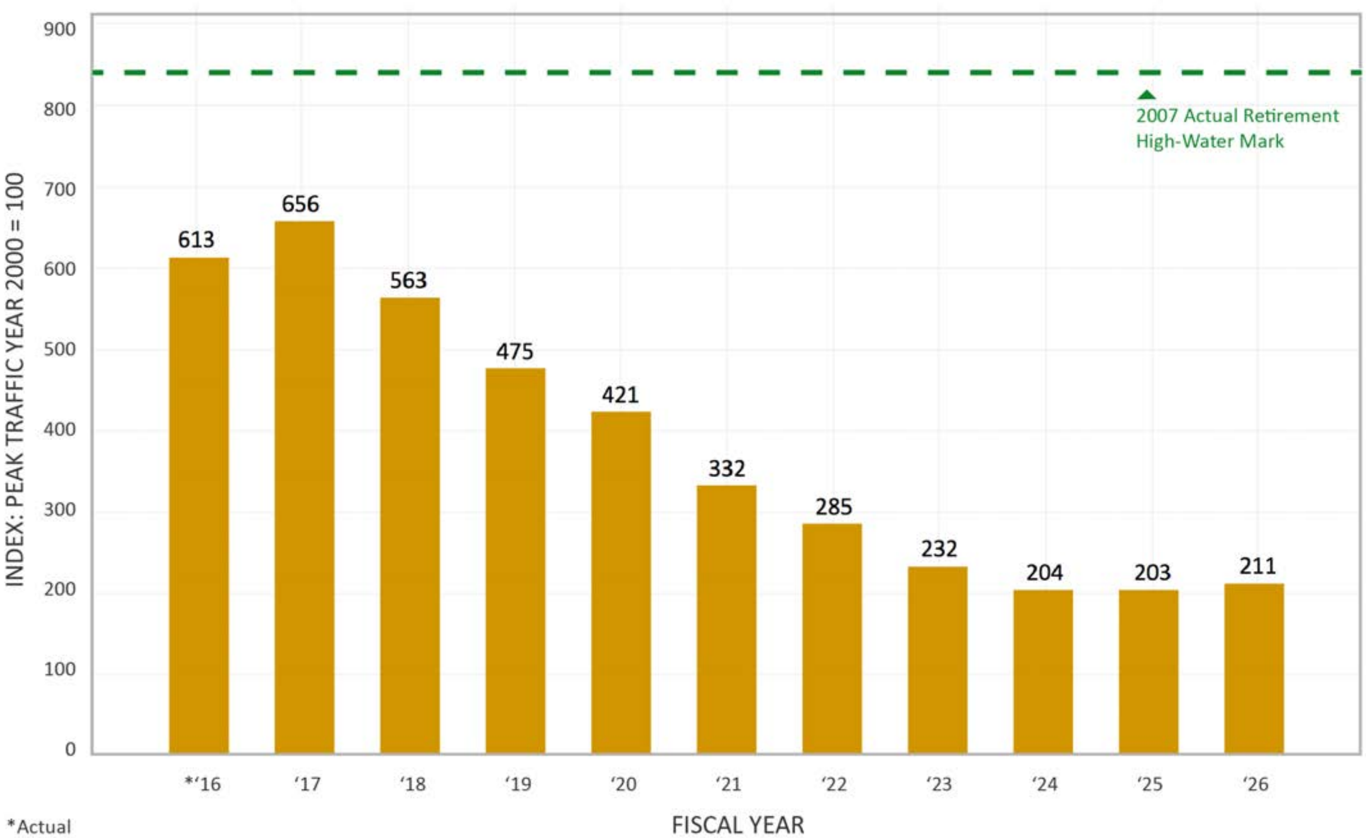
Controller Losses Due to Retirements

For the current plan, the agency incorporated FY 2016 retirement data into the retirement histogram used for future retirement.

As in prior years, the FAA projected future retirements by analyzing both the eligibility criteria of the workforce (Figure 4.3) and the pattern of retirement based on eligibility (Figure 4.4).

For each eligibility class (the fiscal year the controller first becomes eligible to retire), the agency applied the histogram percentage to estimate in Figure 4.5 the retirements for each class by year.

FIGURE 4.5 - Retirement Projection



FY 2007 provided the high-water mark for controller retirements. Annual retirements are expected to continue to decline for the next decade.

Controller Losses Due to Resignations, Removals and Deaths

Estimated controller losses due to resignations, removals (excluding developmental attrition) and deaths are based on historical rates and shown in Table 4.2.

TABLE 4.2 - Controller Losses Due to Resignations, Removals and Deaths

FISCAL YEAR	2016 (actual)	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
NUMBER OF CONTROLLERS	79	58	59	59	59	59	60	60	60	60	61

Developmental Attrition

Estimated losses of trainees who terminate from the FAA while still in developmental status are shown in Table 4.3. Hiring during FY 2015 was lower than projected, which caused the need for increased hiring at near-capacity levels from FY 2016 through FY 2018. Correspondingly, this plan incorporates a projected increase in developmental attrition for FY 2016 through FY 2020 as hires from these years progress through their training program.

TABLE 4.3 - Developmental Attrition

FISCAL YEAR	2016 (actual)	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
NUMBER OF CONTROLLERS	101	153	203	175	136	110	106	104	102	102	102

Academy Attrition

Estimates of losses from new hires that are not successful in the FAA Academy training program are based on both historical rates as well as projections and are shown in Table 4.4. The projected academy attrition in this plan is higher than the projections in prior plans. This was driven by observed higher failure rates at the FAA Academy in FY 2014 and FY 2015. FAA will continue to monitor academy failure rates moving forward for the impact of these changes and adjust future projections accordingly. In addition, hiring during FY 2015 was lower than projected, which causes the need for increased hiring at near-capacity levels from FY 2016 through FY 2018. Correspondingly, this plan incorporates a projected increase in academy attrition for FY 2016 through FY 2019 as hires from these years progress through their training program.

TABLE 4.4 - Academy Attrition

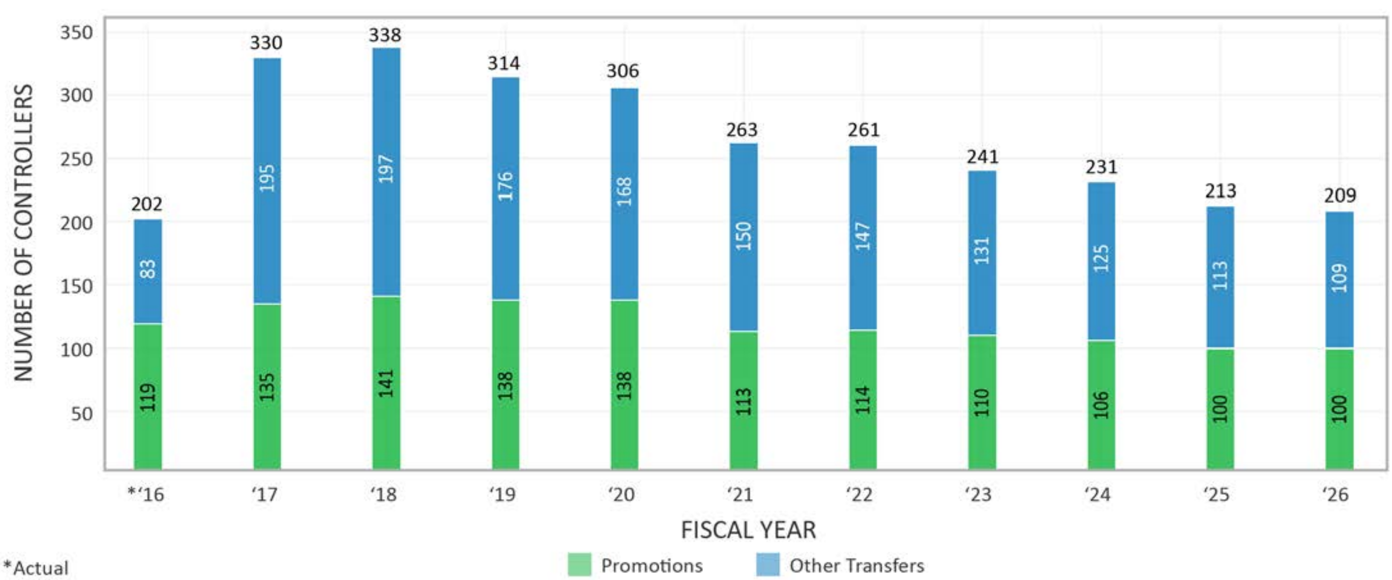
FISCAL YEAR	2016 (actual)	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
NUMBER OF CONTROLLERS	379	458	452	358	272	268	254	248	249	246	244

Controller Losses Due to Promotions and Other Transfers

This section presents FAA estimates of controller losses due to internal transfers to other positions (staff support specialists, traffic management coordinators, etc.) and controller losses due to promotions to front line manager (FLM) or air traffic management/supervisory positions.

Over the past five years, we've observed an average of 163 net promotions each year from CPC to supervisory positions. The majority of these promotions replace retiring supervisors. We expect net transfers to promotions to increase slightly and to peak at 338 in FY 2018 and slightly fall in future years as seen in Figure 4.6.

FIGURE 4.6 - Controller Losses Due to Promotions and Other Transfers



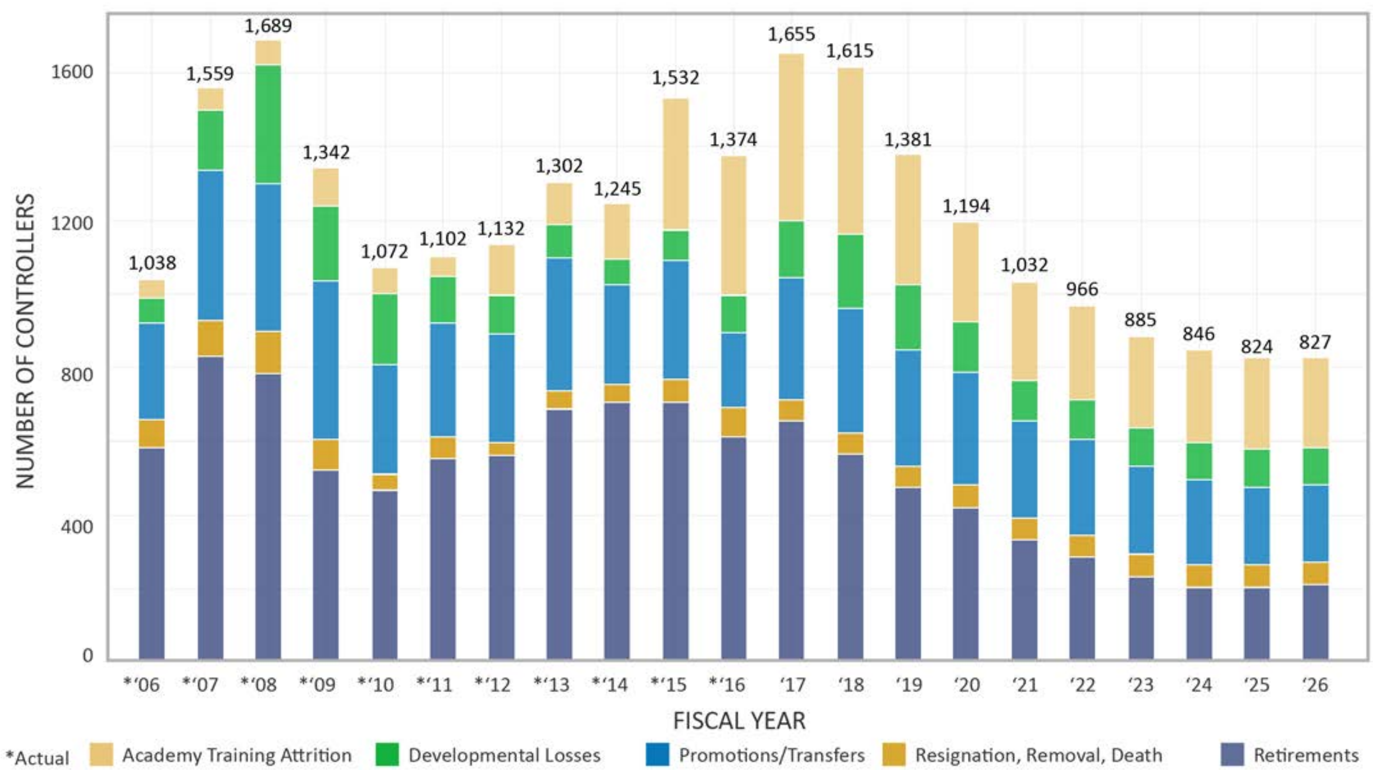
*Actual

Total Controller Losses

The FAA projects a total loss of 11,225 controllers over the next 10 years.

Should losses outpace projections for FY 2017, the FAA will hire additional controllers to reach the end-of-year goal of 14,575 air traffic controllers on board.

FIGURE 4.7 - Total Controller Losses



Chapter 5

Hiring Plan

The FAA safely operates and maintains the NAS because of the combined expertise of its people, the support of technology and the application of standardized procedures. Every day tens of thousands of aircraft are guided safely and expeditiously through the NAS to their destinations.

Deploying a well-trained and well-staffed air traffic control workforce plays an essential role in fulfilling this responsibility. The FAA's current hiring plan has been designed to phase in new hires as needed. To staff the right number of people in the right places at the right time, the FAA develops annual hiring plans that are responsive to changes in traffic and in the controller workforce.

The FAA hires new developmental controllers in advance of the agency's staffing needs in order to have ample time to train them to offset future attrition, including retirements, promotions, etc. Proper execution of the hiring plan, while flexibly adapting to the dynamic nature of traffic and attrition, is critical to the plan's success. If the new developmentals are not placed correctly or if CPCs are not transferred from other facilities, shortages could occur at individual facilities that may affect schedules, increase overtime usage or require the use of more developmentals on position.

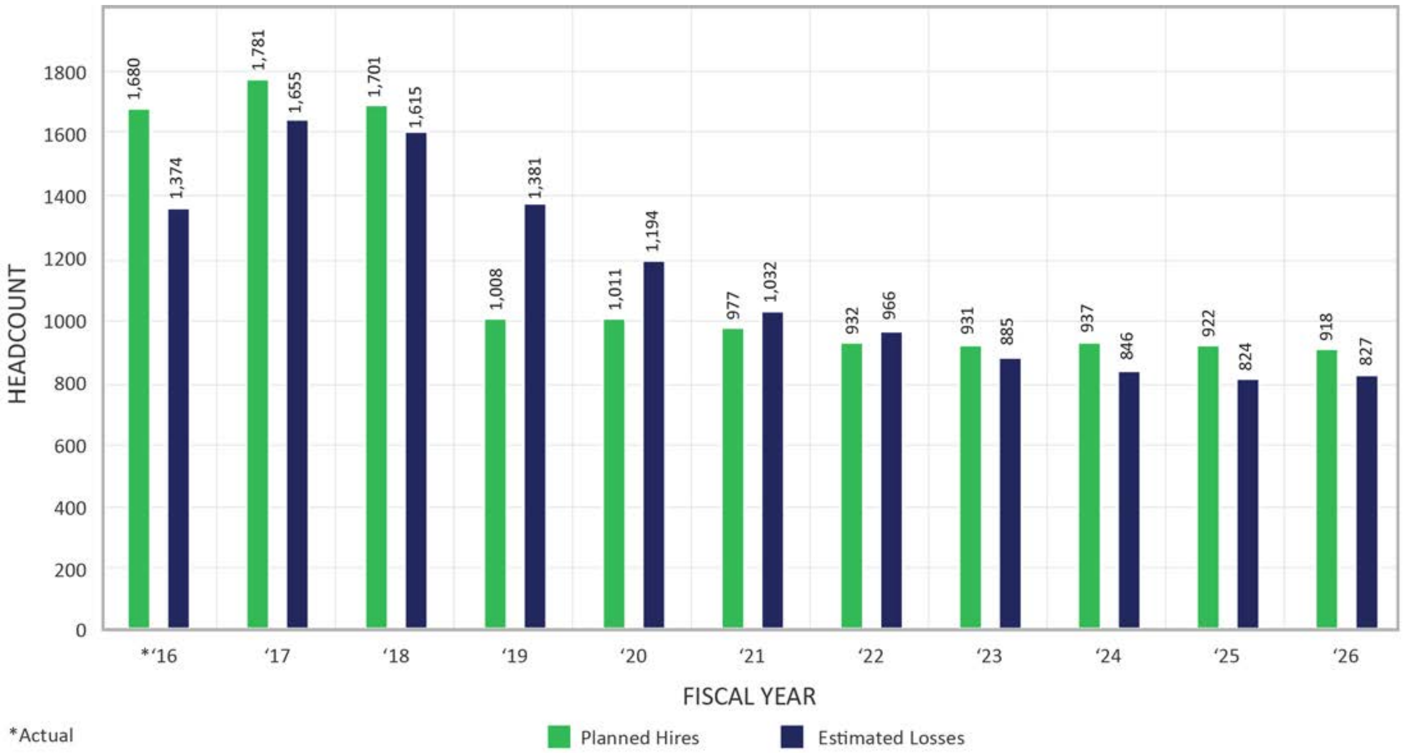
Staffing is and will continue to be monitored at all facilities throughout the year. The agency will continue to modify the hiring plan at the facility level should adjustments become necessary due to changes in traffic volume, retirements or other attrition.

There are thousands of qualified controller candidates eager to be hired. The FAA has again been able to attract large numbers of qualified controller candidates. Through a revised two-track controller hiring process, and use of the updated Employee Request Reassignment process, the FAA will attract and recruit a sufficient number of applicants to achieve this hiring plan.

Controller Hiring Profile

The controller hiring profile is shown in Figure 5.1. The FAA hired 1,680 controllers compared to the plan of 1,619 controllers in FY 2016. Missed hiring goals in prior years created a significant backlog and subsequently increased the need for new controller hiring for several fiscal years into the future. We currently plan to spread through FY 2018, raising hiring projections in those years relative to last year's plan. We spread the hiring to support better predictability at the academy and facilities, and to smooth out workload for our medical and security personnel. The number of controllers projected to be hired through FY 2026 is 10,869.

FIGURE 5.1 - Controller Hiring Profile



The FAA hired 1,345 controllers in FY 2015 and 1,680 in FY 2016

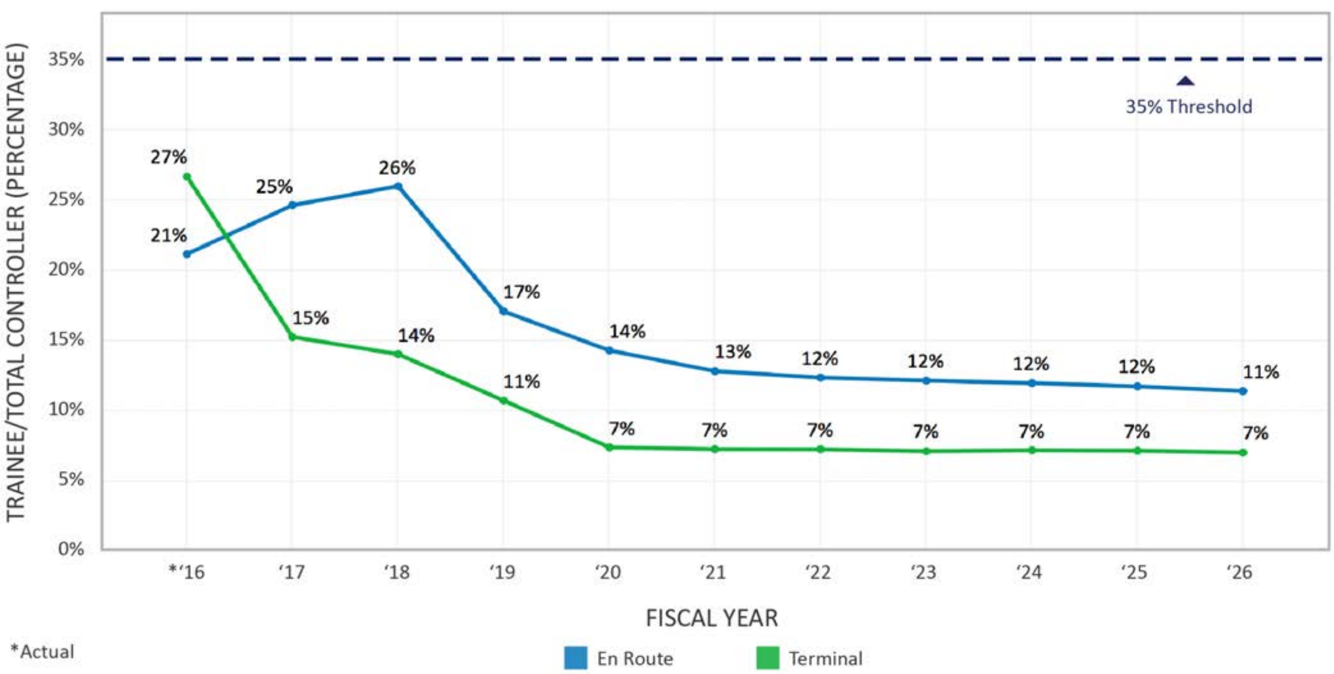
Trainee-to-Total-Controller Percentage

The hiring plan allows the FAA to maintain an appropriate number of trainees (developmental and CPC-IT) in the workforce. The percentage shown is calculated as the sum of CPC-ITs plus developmentals divided by all controllers. While the FAA strives to keep the trainee percentage below 35 percent for both Terminal and En Route controllers, it is not the only metric used by the agency to measure trainee progress.

Figure 5.2 shows the projected trainee-to-total-controller percentages for En Route and Terminal by year to 2026.

While Terminal facilities are showing a decline through 2020, there is a slight uptick in the En Route percentage for the next couple of years as controllers in the current developmental pipeline become fully certified. Note the trainee percentage for both En Route and Terminal is still well below 35 percent. In general, the En Route trainee ratio exceeds the Terminal ratio primarily because of the longer times to certify (on average) in En Route facilities.

FIGURE 5.2 - Trainee-to-Total-Controller Percentage



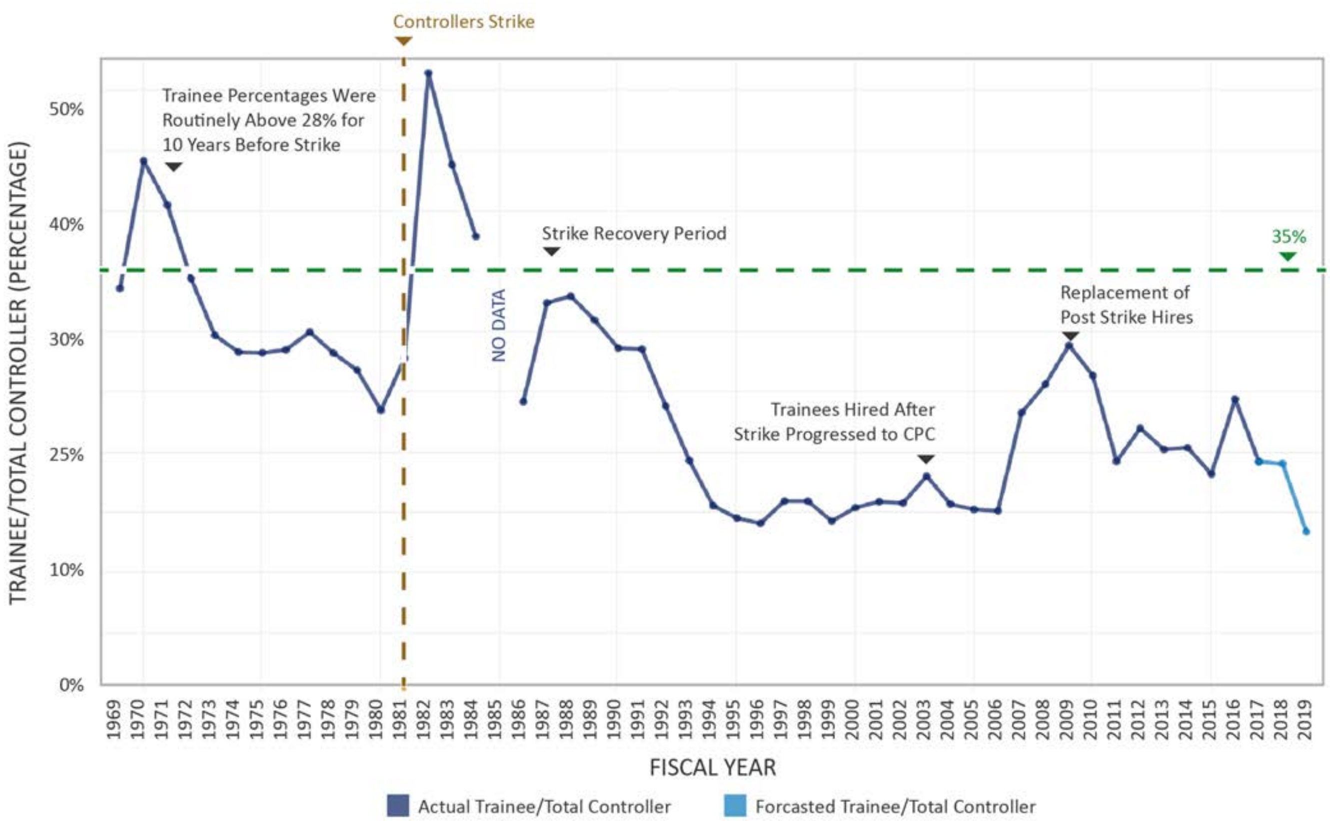
Before the 1981 strike, the FAA experienced trainee percentages ranging from 23 to 44 percent. Following the strike, through the end of the hiring wave in 1992, the trainee percentage ranged from 24 to 52 percent. When the post-strike hires became fully certified by the end of the decade, the trainee percentage declined.

As the new controllers hired en masse in the early 1980s achieved full certification, the subsequent need for new hires dropped significantly from 1993 to 2006. This caused trainee percentages to reach unusually low levels. The FAA's current hiring plans return trainee percentages to their historical averages.

By phasing in new hires as needed, the FAA will level out the significant training spikes and troughs experienced over the last 40 years. Even though there was a long-expected trainee peak in 2009, the trainee percentage remains low as thousands of trainees hired over the past decade have become certified controllers.

Figure 5.3 shows historical trainee percentages from 1969 to the present.

FIGURE 5.3 - Historical Trainee Percentage



The FAA uses many metrics (e.g., 35 percent trainee to total controllers) to manage the flow of trainees while accomplishing daily operations. Facilities meter training to coincide with a number of dynamic factors, including technology upgrades, new runway construction and recurrent proficiency training for existing CPCs. Facility training is enabled by many factors. Examples include the use of contract instructors, access to simulators, scheduled overtime, and the seasonality and complexity of operations.

In itself, the actual number of trainees does not indicate the progress of each individual in the training program or the additional utility they provide that can help to supplement other on-the-job training instruction and support operations. A key facility measure of training performance is the measurement of trainee completion time against the goals. The goal ranges from one and one-half years at our lower-level Terminal facilities to three years at our En Route facilities.

The FAA is striving to meet these goals by improving training and scheduling processes through increased use of simulators and better tracking of controller training using the FAA's national training database.

The FAA will continue to closely monitor facilities to make sure trainees are progressing through each stage of training while also maintaining the safe and efficient operation of the NAS.

Chapter 6

Hiring Process

Controller Hiring Sources

The FAA has two primary categories of controller hiring sources.

- Track 1: No prior air traffic control specialist (ATCS) experience: These individuals are not required to have prior air traffic control experience and may apply for vacancies announced by the FAA.

- Track 2: Prior ATCS experience: These individuals have at least 52 weeks of certified air traffic control experience and may apply for vacancies announced by the FAA.

Recruitment

The agency continues to attract and recruit high-quality applicants into the controller workforce to meet staffing requirements.

In FY 2014, the FAA instituted an interim change to the air traffic control hiring process. The changes allowed the FAA to more efficiently compare applicants across previous hiring sources to select those candidates most likely to succeed as air traffic control specialists. The new approach included: (1) a single vacancy announcement; (2) a single set of minimum qualifications/eligibility requirements; (3) a multi-hurdle selection process with increased validity and efficiency; and (4) elimination the Centralized Selection Panel process and Interview.

In January 2015, the FAA modified the interim changes by establishing a two-track announcement process for hiring air traffic control specialists. The first track targeted candidates without operational air traffic control experience. The second track included an announcement targeting applicants who have at least 52 weeks of certified air traffic control experience in either civilian or military air traffic control facilities. In December 2015, the FAA launched an extended announcement for applicants with previous experience.

In FY 2016, H.R. 636 – FAA Extension, Safety, and Security Act (FESSA) of 2016 was enacted. The legislation established two separate pools of applicants within Track 1 with a mandate of no more than ten percent variance from each pool for final selections. The FESSA requires priority consideration of applicants with previous air traffic control experience (Track 2) and increased the maximum hiring age for those meeting certain qualifications to 35. Over 29,000 people applied to the associated Track 1 vacancy announcement that closed on August 15, 2016. Over 2,000 applicants responded to the Track 2 vacancy announcement in September 2016, and more than 1,100 were referred for employment consideration.

The first pool of applicants (Pool 1 under Track 1) included graduates from the Collegiate Training Initiative and military veterans. Applicants qualifying for Pool 1 were not required to pass the Biographical Assessment screen. Over 2,200 applicants have been referred for employment consideration from Pool 1.

The second pool of applicants (Pool 2 under Track 1) are considered as general public applicants. Applicants qualifying for Pool 2 were required to pass the Biographical Assessment screen. Over 3,000 applicants have been referred for employment consideration from Pool 2.

Once applicants are notified of selection, they will then be required to attain medical and security clearances. Upon successful completion of clearances, the applicants will then be scheduled for FAA Air Traffic Academy training as agency needs are identified.

In FY 2017, the FAA will continue to recruit and hire air traffic control specialists to meet staffing requirements through the use of the two-track announcement process.

Chapter 7

Training

The FAA develops the national training curriculum and learning tools that increase the knowledge of its technical workforce who serve the world's largest, most efficient and safest National Airspace System – today and for the future.

The cohort of air traffic professionals we are hiring now will be essential to our nation's transition to the Next Generation Air Transportation System. Already, employees increasingly use real-time information to direct aircraft more efficiently while reducing delays. Capabilities such as Performance Based Navigation and Data Communications increase controller productivity while reducing communication errors. They must also, in coming years, effectively incorporate new entrants such as Unmanned Aircraft Systems (UAS) and commercial space into routine operations.

We are meeting the challenge of training both new and experienced controllers by streamlining the training process, refreshing course content and modernizing our technologies used for learning. The training program, directed by FAA Order 3120.4, Air Traffic Technical Training, is reviewed annually to ensure its technical accuracy. We regularly review performance metrics and work with research centers to identify areas for improvement and innovation so the training program evolves with operations.

The Training Process

New hires with no previous air traffic control experience begin their federal career training at the FAA Academy, where they learn foundational aviation knowledge through classroom lectures, team exercises and computer-based instruction, and practice basic air traffic control skills using low-, medium- and high-fidelity simulation devices.

The academy lays the foundation for employee development by teaching common, fundamental air traffic control principles and procedures that are used at facilities throughout the country. After successfully completing training at the FAA Academy, developmental controllers are assigned to a field location, where they enter additional, site-specific qualification training and hone their technical abilities in the operational environment. This phase of training begins in the classroom, where students learn facility-specific equipment, rules and procedures. After students master initial learning objectives, the instruction transitions to simulators where learners can apply their knowledge and improve their skills in a hands-on, repetitive and safe environment. Finally, employees enter the on-the-job training phase working the control position, where their performance is carefully monitored by certified professional controllers who help trainees develop their techniques in a progressively more difficult live-traffic environment.

New hires with previous air traffic experience are selected directly for a field facility and usually begin their federal service in an accelerated training program customized for their prior aviation experience. They are able to bypass certain phases of training, but they are required to meet the same certification standards for each control position as new hires with no previous experience.

The goal of all new employees is to become a CPC, which is when they are finally considered to be at the full-performance level. Once developmental controllers are certified on control positions, they often work independently in those positions under the direction of a supervisor to gain experience and to supplement staffing.

All controllers are assigned periodic proficiency training and participate in both mandatory and optional supplemental training. One of the most successful uses of optional supplemental training is the Flight Deck Training (FDT) program. The program provides controllers real time experience of air traffic control from the flight crew's perspective by observing flight operations from the cockpit.

The FAA's recurrent training program is administered every six months as a combination of classroom and computer-based instruction for all operational personnel. It delivers evidence-based topics derived from a number of data sources. As contrasted with annually required refresher training on static topics, recurrent training delivers timely and relevant training based on safety trends and lessons learned from our analysis. Recurrent training is developed in collaboration with subject matter experts from the controller workforce.

Designing and Delivering Effective Training

Experienced instructors, CPCs and contractors provide both classroom and simulation training at the FAA Academy and at many field locations. The FAA ensures everyone who instructs developmental controllers – whether they are federal employees or contractors – has the background and skills needed to train new employees.

The FAA completed a comprehensive update to three training courses for on-the-job-training field instructors to incorporate modern learning theory, human factors and process changes. It is especially important for field instructors to maintain proficiency on all of the latest skills, new procedures and technologies coming into the system through NextGen improvements as well as prepare to instruct students who represent a new generation.

Infrastructure Investments

The FAA continues to expand accessibility of the high-fidelity Tower Simulator System (TSS), a training device that has provided an interactive, realistic environment for controller training. There are 56 simulators installed at 38 locations and these systems support training for 163 airports using a "hub and spoke" arrangement where employees at remote facilities travel to central locations to use the simulator.

In February 2016, the U.S. Marine Corps began transferring eight small-footprint simulation systems to the FAA. These systems complement the original procurement and provide us with a capability of installing a smaller-sized simulator at locations where it would have been cost-prohibitive for the full-sized system. The last of the eight systems will be installed by mid 2017.

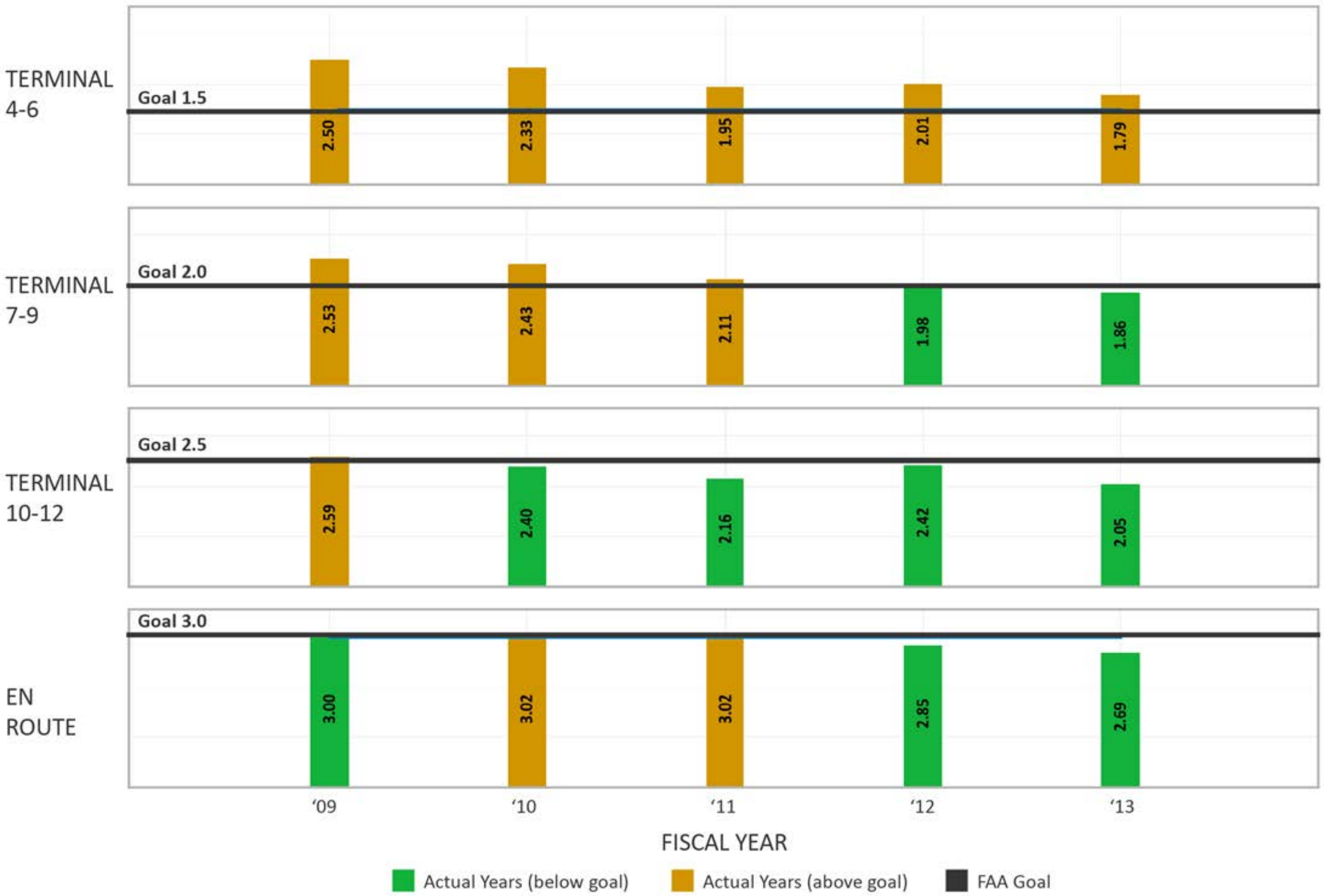
Time to Certification

The FAA continues to meet its overall goals for time to certification and number of controllers certified. Implementation of foundational NextGen platforms, such as ERAM and TAMR, and new training requirements are factors that affect overall time to CPC. Depending on the type of facility, facility level (complexity) and the number of candidates to certify, controllers are expected to complete certification in one and one-half to three years.

Over 84 percent of those who began training in fiscal years 2009 through 2013 successfully completed training at their first facility or a subsequent facility. Completion means that employees achieved FAA CPC status. The remaining members of the hiring classes (16 percent) have been removed from the agency, resigned or are still in training. Developmental controllers who fail to certify at a facility may be removed from service or reassigned to a less complex facility in accordance with agency policies and directives.

Table 7.1 shows the FAA's training targets and average training completion time by facility type for those who began training in fiscal year 2009 through 2013. Only those who achieved CPC status at their first facility assignment are included in the average training completion times displayed because incorporation of training times at additional facilities can skew the average. Additionally, training data for hiring classes after fiscal year 2014 are not reported here because greater than 10 percent of the students are still in active phases of training, resulting in continuously changing metrics as those students certify or fail.

TABLE 7.1 - Years to Certify (First Assigned Facility Only)



Investing for the Future

As the FAA transitions to the Next Generation Air Transportation System, the key to providing safe, reliable and efficient air traffic services remains the same: highly skilled, trained and certified professionals. The FAA must maintain curricula to keep pace with the evolving NAS, modernize how it trains employees, incorporate new techniques and technologies for learning, and improve data collection and sharing. Training professionals are part of an FAA team that evaluates how NextGen will change the air traffic work environment and what competencies will be required for the future workforce. The FAA is incorporating what it learns from this evolving and ongoing process into training programs as new systems are implemented. Outcomes-based training aligns NextGen functionality with job tasks as well, so that the training organization can make predictions on how programs will need to change as NextGen matures.

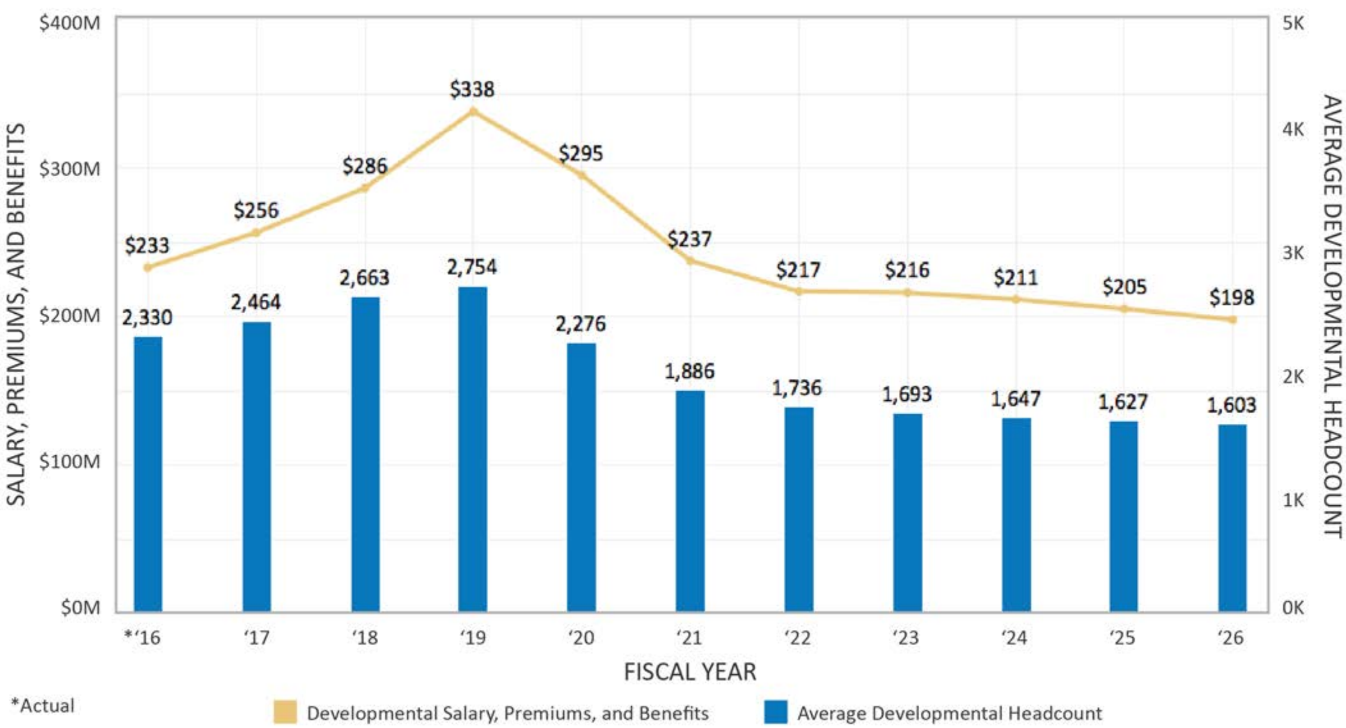
Chapter 8

Funding Status

In addition to direct training costs, the FAA will incur salary and other costs for developmental controllers before they certify. The average compensation cost of a developmental in FY 2017 is projected to be $104,080.

Figure 8.1 depicts expected annual compensation costs of developmentals, as well as the expected number of developmentals by year through 2026. As training takes one and one-half to three years, the chart depicts a rolling total of hires and costs from the current and previous years. It also incorporates the effect of the controller contract.

FIGURE 8.1 - Estimated Cost of Developmentals Before Certification



Appendix

2017 Facility Staffing Ranges

The Appendix below presents controller staffing ranges, by facility, for En Route and Terminal air traffic control facilities for FY 2017. Additional detail on how the staffing ranges are calculated is provided in Chapter 3.

In general, the FAA strives to keep the number of CPCs and CPC-ITs near the middle of the range. While most of the work is accomplished by CPCs, work is also being performed in facilities by CPC-IT and position-qualified developmental controllers who are proficient, or checked out, in specific sectors or positions and handle work independently. Accordingly, facilities can safely operate even with CPC staffing levels below the defined staffing range.

Conversely, a facility's total staffing levels are often above the defined staffing range because new controllers are typically hired two to three years in advance of expected attrition to allow for sufficient training time. The total expected end-of-year staffing number shown in Figure 3.1 reflects this projected advanced hiring.

En Route

		Actual on board as of 09/17/16				Staffing Range	
ID	FACILITY NAME	CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
ZAB	Albuquerque ARTCC	154	9	25	188	173	211
ZAN	Anchorage ARTCC	71	10	44	125	83	101
ZAU	Chicago ARTCC	293	15	36	344	288	352
ZBW	Boston ARTCC	202	3	37	242	176	215
ZDC	Washington ARTCC	267	9	45	321	256	313
ZDV	Denver ARTCC	224	11	28	263	236	288
ZFW	Fort Worth ARTCC	240	24	51	315	248	303
ZHU	Houston ARTCC	219	19	70	308	230	281
ZID	Indianapolis ARTCC	257	17	71	345	252	307
ZJX	Jacksonville ARTCC	251	3	8	262	239	292
ZKC	Kansas City ARTCC	206	7	24	237	202	247
ZLA	Los Angeles ARTCC	206	23	40	269	227	278
ZLC	Salt Lake City ARTCC	140	1	24	165	149	182
ZMA	Miami ARTCC	205	9	81	295	221	270
ZME	Memphis ARTCC	233	5	45	283	232	283
ZMP	Minneapolis ARTCC	206	7	74	287	223	272
ZNY	New York ARTCC	235	7	88	330	239	292

En Route

		Actual on board as of 09/17/16				Staffing Range	
ID	FACILITY NAME	CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
ZOA	Oakland ARTCC	165	17	90	272	185	226
ZOB	Cleveland ARTCC	301	9	31	341	282	344
ZSE	Seattle ARTCC	133	9	37	179	134	164
ZSU	San Juan ARTCC	37	5	21	63	44	54
ZTL	Atlanta ARTCC	304	4	31	339	309	378
ZUA	Guam ARTCC	13	1	2	16	14	17
ENROUTE TOTAL		4,562	224	1,003	5,789	4,642	5,670

Note: Facility numbers do not include new hires at the FAA Academy.

Terminal

		Actual on board as of 09/17/16				Staffing Range	
ID	FACILITY NAME	CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
A11	Anchorage TRACON	25	9	1	35	21	25
A80	Atlanta TRACON	69	17	13	99	83	101
A90	Boston TRACON	55	7	0	62	51	63
ABE	Allentown Tower	17	7	10	34	20	25
ABI	Abilene Tower	13	0	10	23	16	19
ABQ	Albuquerque Tower	22	6	2	30	22	27
ACK	Nantucket Tower	11	0	0	11	8	10
ACT	Waco Tower	16	1	13	30	17	20
ACY	Atlantic City Tower	12	2	18	32	20	24
ADS	Addison Tower	9	1	1	11	10	12
ADW	Andrews Tower	11	1	2	14	10	12
AFW	Alliance Tower	13	2	2	17	13	15
AGC	Allegheny Tower	12	0	3	15	10	13
AGS	Augusta Tower	12	1	7	20	13	16
ALB	Albany Tower	16	0	16	32	20	24
ALO	Waterloo Tower	8	1	3	12	9	11
AMA	Amarillo Tower	11	0	12	23	15	18

Terminal

ID	FACILITY NAME	Actual on board as of 09/17/16 CPC	CPC-IT	DEVELOPMENTAL	TOTAL	Staffing Range LOW	HIGH
ANC	Anchorage Tower	18	6	3	27	23	28
APA	Centennial Tower	18	3	1	22	20	25
APC	Napa Tower	5	0	3	8	6	8
ARB	Ann Arbor Tower	9	0	0	9	7	8
ARR	Aurora Tower	9	0	3	12	8	9
ASE	Aspen Tower	10	0	9	19	10	12
ATL	Atlanta Tower	42	7	0	49	44	53
AUS	Austin Tower	31	11	0	42	34	41
AVL	Asheville Tower	15	0	4	19	13	16
AVP	Wilkes-Barre Tower	16	0	7	23	17	20
AZO	Kalamazoo Tower	13	2	8	23	17	20
BDL	Bradley Tower	13	0	1	14	11	14
BED	Hanscom Tower	14	0	2	16	10	13
BFI	Boeing Tower	20	2	2	24	18	21
BFL	Bakersfield Tower	13	2	14	29	15	18
BGM	Binghamton Tower	13	1	8	22	10	12
BGR	Bangor Tower	18	0	9	27	17	21
BHM	Birmingham Tower	18	3	9	30	22	27
BIL	Billings Tower	11	1	13	25	17	20
BIS	Bismarck Tower	11	0	4	15	11	14
BJC	Broomfield Tower	12	0	0	12	10	12
BNA	Nashville Tower	31	10	3	44	36	44
BOI	Boise Tower	27	3	1	31	24	29
BOS	Boston Tower	28	1	0	29	29	35
BPT	Beaumont Tower	9	0	0	9	8	10
BTR	Baton Rouge Tower	17	0	12	29	16	19
BTV	Burlington Tower	14	1	16	31	16	19
BUF	Buffalo Tower	25	2	4	31	23	28
BUR	Burbank Tower	17	2	6	25	15	19
BWI	Baltimore Tower	31	0	0	31	20	25
C90	Chicago TRACON	64	28	2	94	83	101
CAE	Columbia Tower	19	0	4	23	18	22

Terminal

ID	FACILITY NAME	Actual on board as of 09/17/16 CPC	CPC-IT	DEVELOPMENTAL	TOTAL	Staffing Range LOW	HIGH
CAK	Akron-Canton Tower	17	2	7	26	18	22
CCR	Concord Tower	10	0	2	12	10	12
CDW	Caldwell Tower	12	0	1	13	9	11
CHA	Chattanooga Tower	15	2	6	23	16	20
CHS	Charleston Tower	20	0	8	28	20	24
CID	Cedar Rapids Tower	14	0	5	19	13	16
CKB	Clarksburg Tower	9	0	7	16	12	15
CLE	Cleveland Tower	42	2	3	47	29	35
CLT	Charlotte Tower	68	26	1	95	73	89
CMA	Camarillo Tower	8	1	3	12	9	11
CMH	Columbus Tower	41	7	1	49	38	46
CMI	Champaign Tower	16	1	4	21	13	15
CNO	Chino Tower	10	2	2	14	9	11
COS	Colorado Springs Tower	19	7	4	30	23	28
CPR	Casper Tower	9	0	7	16	10	12
CPS	Downtown Tower	9	0	1	10	11	13
CRP	Corpus Christi Tower	21	4	7	32	28	35
CRQ	Palomar Tower	13	0	0	13	10	12
CRW	Charleston Tower	21	1	4	26	17	21
CSG	Columbus Tower	6	1	0	7	5	6
CVG	Cincinnati Tower	34	7	5	46	40	48
D01	Denver TRACON	65	20	1	86	70	85
D10	Dallas-Fort Worth TRACON	62	29	14	105	77	94
D21	Detroit TRACON	42	14	0	56	47	57
DAB	Daytona Beach Tower	38	15	9	62	49	59
DAL	Dallas Love Tower	19	4	0	23	20	24
DAY	Dayton Tower	13	1	1	15	11	14
DCA	Washington National	26	2	0	28	25	31
DEN	Denver Tower	31	5	0	36	34	41
DFW	DFW Tower	45	13	0	58	49	60
DLH	Duluth Tower	15	0	7	22	17	21
DPA	Dupage Tower	12	0	2	14	12	15

Terminal

ID	FACILITY NAME	Actual on board as of 09/17/16 CPC	CPC-IT	DEVELOPMENTAL	TOTAL	Staffing Range LOW	HIGH
DSM	Des Moines Tower	16	5	5	26	17	20
DTW	Detroit Tower	31	9	0	40	27	34
DVT	Deer Valley Tower	15	3	0	18	16	20
DWH	Hooks Tower	13	0	2	15	9	11
ELM	Elmira Tower	12	0	3	15	9	12
ELP	El Paso Tower	15	1	10	26	20	24
EMT	El Monte Tower	10	0	0	10	9	11
ERI	Erie Tower	13	0	9	22	15	18
EUG	Eugene Tower	18	1	3	22	17	21
EVV	Evansville Tower	9	1	14	24	12	15
EWR	Newark Tower	25	11	0	36	32	39
F11	Central Florida TRACON	35	5	0	40	46	56
FAI	Fairbanks Tower	17	1	12	30	19	23
FAR	Fargo Tower	16	1	1	18	15	19
FAT	Fresno Tower	19	5	5	29	20	24
FAY	Fayetteville Tower	14	2	11	27	18	23
FCM	Flying Cloud Tower	12	0	0	12	9	11
FFZ	Falcon Tower	12	0	0	12	13	15
FLL	Fort Lauderdale Tower	21	2	1	24	23	28
FLO	Florence Tower	7	1	7	15	10	13
FNT	Flint Tower	13	0	3	16	12	15
FPR	St Lucie Tower	10	2	0	12	10	12
FRG	Farmingdale Tower	10	0	5	15	12	15
FSD	Sioux Falls Tower	15	2	5	22	15	19
FSM	Fort Smith Tower	18	3	16	37	23	28
FTW	Meacham Tower	12	1	2	15	15	18
FWA	Fort Wayne Tower	18	0	6	24	17	21
FXE	Fort Lauderdale Tower	12	1	2	15	14	17
GCN	Grand Canyon Tower	8	0	1	9	8	10
GEG	Spokane Tower	24	7	4	35	21	26
GFK	Grand Forks Tower	21	3	0	24	18	22
GGG	Longview Tower	13	1	10	24	14	18

Terminal

ID	FACILITY NAME	Actual on board as of 09/17/16 CPC	CPC-IT	DEVELOPMENTAL	TOTAL	Staffing Range LOW	HIGH
GPT	Gulfport Tower	15	1	3	19	13	16
GRB	Green Bay Tower	15	4	7	26	17	21
GRR	Grand Rapids Tower	19	1	5	25	18	22
GSO	Greensboro Tower	19	3	9	31	22	26
GSP	Greer Tower	13	0	9	22	17	21
GTF	Great Falls Tower	9	0	9	18	13	16
HCF	Honolulu Control Facility	64	13	18	95	86	105
HEF	Manassas Tower	9	1	0	10	9	11
HIO	Hillsboro Tower	12	3	4	19	12	14
HLN	Helena Tower	7	0	6	13	7	9
HOU	Hobby Tower	16	4	1	21	18	22
HPN	Westchester Tower	10	2	5	17	11	14
HSV	Huntsville Tower	14	2	3	19	15	18
HTS	Huntington Tower	11	0	9	20	15	18
HUF	Terre Haute Tower	11	0	9	20	14	18
HWD	Hayward Tower	10	1	2	13	9	11
I90	Houston TRACON	71	26	0	97	80	98
IAD	Dulles Tower	32	4	1	37	25	31
IAH	Houston Intercontinential	35	3	0	38	29	35
ICT	Wichita Tower	22	4	6	32	26	32
ILG	Wilmington Tower	9	1	0	10	8	10
ILM	Wilmington Tower	13	4	8	25	15	18
IND	Indianapolis Tower	29	10	4	43	35	42
ISP	Islip Tower	14	3	3	20	11	14
ITO	Hilo Tower	11	1	4	16	11	13
JAN	Jackson Tower	11	0	9	20	14	17
JAX	Jacksonville Tower	30	8	11	49	38	46
JCF	Joshua Control Facility	19	6	4	29	20	24
JFK	Kennedy Tower	27	8	0	35	29	35
JNU	Juneau Tower	14	0	1	15	10	13
K90	Cape TRACON	21	0	2	23	17	21
L30	Las Vegas TRACON	38	11	0	49	41	50

Terminal

ID	FACILITY NAME	Actual on board as of 09/17/16 CPC	CPC-IT	DEVELOPMENTAL	TOTAL	Staffing Range LOW	HIGH
LAF	Lafayette Tower	8	1	0	9	8	9
LAN	Lansing Tower	19	1	6	26	18	22
LAS	Las Vegas Tower	37	8	0	45	33	41
LAX	Los Angeles Tower	38	16	0	54	43	52
LBB	Lubbock Tower	13	3	6	22	15	18
LCH	Lake Charles Tower	10	0	9	19	11	13
LEX	Lexington Tower	19	2	10	31	20	24
LFT	Lafayette Tower	15	1	7	23	14	17
LGA	La Guardia Tower	31	7	0	38	29	36
LGB	Long Beach Tower	19	3	0	22	18	22
LIT	Little Rock Tower	17	4	6	27	22	27
LNK	Lincoln Tower	9	1	0	10	9	11
LOU	Bowman Tower	11	0	1	12	9	11
LVK	Livermore Tower	10	0	1	11	8	10
M03	Memphis TRACON	24	1	4	29	32	39
M98	Minneapolis TRACON	43	13	0	56	48	59
MAF	Midland Tower	15	1	7	23	16	20
MBS	Saginaw Tower	9	0	8	17	11	13
MCI	Kansas City Tower	30	5	4	39	30	37
MCO	Orlando Tower	27	3	0	30	23	29
MDT	Harrisburg Tower	22	1	9	32	20	24
MDW	Midway Tower	19	9	0	28	20	24
MEM	Memphis Tower	22	3	0	25	22	27
MFD	Mansfield Tower	12	1	10	23	13	16
MGM	Montgomery Tower	12	1	10	23	15	19
MHT	Manchester Tower	13	0	0	13	11	14
MIA	Miami Tower	65	32	0	97	82	100
MIC	Crystal Tower	10	0	1	11	9	10
MKC	Downtown Tower	11	3	2	16	11	13
MKE	Milwaukee Tower	33	13	0	46	32	39
MKG	Muskegon Tower	12	0	11	23	12	15
MLI	Quad City Tower	11	0	15	26	14	17

Terminal

ID	FACILITY NAME	Actual on board as of 09/17/16 CPC	CPC-IT	DEVELOPMENTAL	TOTAL	Staffing Range LOW	HIGH
MLU	Monroe Tower	13	0	6	19	11	13
MMU	Morristown Tower	10	0	0	10	9	11
MOB	Mobile Tower	15	5	4	24	18	22
MRI	Merrill Tower	12	0	0	12	9	11
MRY	Monterey Tower	7	2	2	11	9	10
MSN	Madison Tower	16	1	1	18	17	20
MSP	Minneapolis Tower	35	5	0	40	29	36
MSY	New Orleans Tower	28	6	1	35	30	37
MWH	Grant County Tower	5	2	10	17	12	15
MYF	Montgomery Tower	11	2	0	13	10	13
MYR	Myrtle Beach Tower	18	2	4	24	24	29
N90	New York TRACON	137	22	8	167	178	217
NCT	Northern California	135	22	0	157	153	187
NEW	Lakefront Tower	9	0	1	10	6	8
OAK	Oakland Tower	19	5	0	24	19	24
OGG	Maui Tower	9	1	6	16	9	12
OKC	Oklahoma City Tower	22	3	7	32	27	34
OMA	Eppley Tower	12	1	2	15	11	13
ONT	Ontario Tower	12	1	1	14	12	15
ORD	Chicago O'Hare Tower	50	20	4	74	58	71
ORF	Norfolk Tower	26	3	10	39	25	31
ORL	Orlando Executive Tower	11	2	1	14	10	12
P31	Pensacola TRACON	25	11	2	38	29	35
P50	Phoenix TRACON	46	18	2	66	54	67
P80	Portland TRACON	20	6	3	29	25	31
PAE	Paine Tower	12	1	1	14	9	10
PAO	Palo Alto Tower	8	0	1	9	8	10
PBI	Palm Beach Tower	37	11	4	52	36	44
PCT	Potomac TRACON	132	25	17	174	137	168
PDK	DeKalb-Peachtree Tower	12	2	2	16	13	16
PDX	Portland Tower	21	6	2	29	21	25
PHF	Patrick Henry Tower	10	1	1	12	9	11

Terminal

ID	FACILITY NAME	Actual on board as of 09/17/16 CPC	CPC-IT	DEVELOPMENTAL	TOTAL	Staffing Range LOW	HIGH
PHL	Philadelphia Tower	68	11	0	79	62	75
PHX	Phoenix Tower	29	4	0	33	27	33
PIA	Peoria Tower	12	0	12	24	15	19
PIE	St Petersburg Tower	6	0	4	10	9	11
PIT	Pittsburgh Tower	31	5	6	42	33	40
PNE	Northeast Philadelphia	8	1	3	12	7	9
PNS	Pensacola Tower	11	0	2	13	9	11
POC	Brackett Tower	14	0	0	14	8	10
POU	Poughkeepsie Tower	10	0	1	11	8	9
PRC	Prescott Tower	10	2	2	14	12	15
PSC	Pasco Tower	16	3	4	23	16	19
PSP	Palm Springs Tower	11	0	2	13	8	10
PTK	Pontiac Tower	9	1	1	11	10	12
PUB	Pueblo Tower	9	0	2	11	11	14
PVD	Providence Tower	23	3	7	33	23	29
PWK	Chicago Executive Tower	10	1	3	14	9	11
PWM	Portland Tower	17	0	4	21	17	21
R90	Omaha TRACON	21	1	0	22	18	22
RDG	Reading Tower	13	0	8	21	15	18
RDU	Raleigh-Durham Tower	34	9	4	47	36	43
RFD	Rockford Tower	20	0	4	24	19	23
RHV	Reid-Hillview Tower	13	0	1	14	11	13
RIC	Richmond Tower	13	1	3	17	11	14
RNO	Reno Tower	12	1	2	15	12	14
ROA	Roanoke Tower	19	1	3	23	19	23
ROC	Rochester Tower	22	0	9	31	21	25
ROW	Roswell Tower	10	1	9	20	10	13
RST	Rochester Tower	10	1	5	16	13	15
RSW	Fort Myers Tower	18	7	9	34	25	31
RVS	Riverside Tower	10	0	2	12	11	13
S46	Seattle TRACON	39	7	0	46	47	57
S56	Salt Lake City TRACON	33	8	7	48	37	45

Terminal

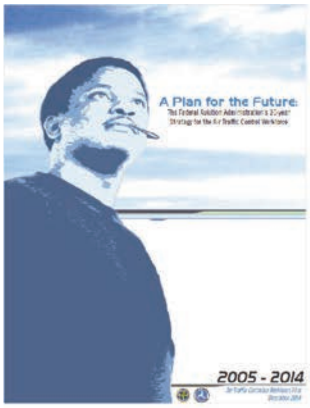
ID	FACILITY NAME	Actual on board as of 09/17/16 CPC	CPC-IT	DEVELOPMENTAL	TOTAL	Staffing Range LOW	HIGH
SAN	San Diego Tower	23	3	1	27	19	23
SAT	San Antonio Tower	35	13	2	50	37	45
SAV	Savannah Tower	20	3	3	26	20	24
SBA	Santa Barbara Tower	26	4	3	33	22	27
SBN	South Bend Tower	14	1	16	31	19	23
SCK	Stockton Tower	12	0	1	13	8	10
SCT	Southern California	197	35	12	244	196	240
SDF	Standiford Tower	33	9	3	45	36	44
SDL	Scottsdale Tower	11	0	1	12	10	12
SEA	Seattle Tower	28	0	0	28	27	34
SEE	Gillespie Tower	11	2	1	14	11	14
SFB	Sanford Tower	16	0	2	18	15	19
SFO	San Francisco Tower	27	7	0	34	29	36
SGF	Springfield Tower	19	1	11	31	23	28
SHV	Shreveport Tower	18	0	13	31	17	21
SJC	San Jose Tower	11	0	1	12	12	14
SJU	San Juan Tower	16	0	3	19	13	16
SLC	Salt Lake City Tower	26	7	1	34	25	31
SMF	Sacramento Tower	12	2	1	15	11	14
SMO	Santa Monica Tower	9	5	1	15	11	13
SNA	John Wayne Tower	20	3	1	24	20	24
SPI	Springfield Tower	9	0	4	13	10	12
SRQ	Sarasota Tower	12	0	0	12	10	12
STL	St Louis Tower	17	0	0	17	16	20
STP	St Paul Tower	11	0	0	11	9	11
STS	Sonoma Tower	8	1	0	9	7	8
STT	St Thomas Tower	9	1	1	11	8	10
SUS	Spirit Tower	13	0	0	13	10	12
SUX	Sioux Gateway Tower	10	0	6	16	9	11
SYR	Syracuse Tower	16	0	6	22	18	22
T75	St Louis TRACON	29	2	0	31	28	34
TEB	Teterboro Tower	16	1	4	21	21	26

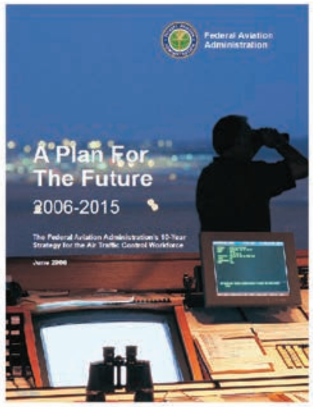
Terminal

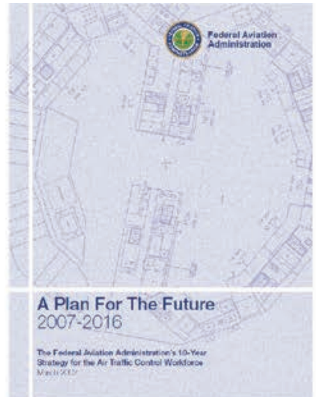
ID	FACILITY NAME	Actual on board as of 09/17/16 CPC	CPC-IT	DEVELOPMENTAL	TOTAL	Staffing Range LOW	HIGH
TLH	Tallahassee Tower	17	0	2	19	14	18
TMB	Tamiami Tower	13	4	0	17	15	19
TOA	Torrance Tower	12	1	2	15	9	10
TOL	Toledo Tower	14	0	9	23	17	21
TPA	Tampa Tower	41	24	0	65	46	56
TRI	Tri-Cities Tower	14	0	8	22	14	17
TUL	Tulsa Tower	26	3	3	32	25	30
TUS	Tucson Tower	13	2	4	19	12	15
TVC	Traverse City Tower	9	0	2	11	8	9
TWF	Twin Falls Tower	8	0	4	12	7	8
TYS	Knoxville Tower	19	1	19	39	22	26
U90	Tucson TRACON	13	6	0	19	15	19
VGT	North Las Vegas Tower	9	1	0	10	10	13
VNY	Van Nuys Tower	15	7	0	22	16	19
VRB	Vero Beach Tower	10	0	0	10	11	13
Y90	Yankee TRACON	15	0	3	18	20	24
YIP	Willow Run Tower	15	0	1	16	10	12
YNG	Youngstown Tower	16	1	3	20	16	20
TERMINAL TOTAL		6,054	1,035	1,169	8,258	6,358	7,762

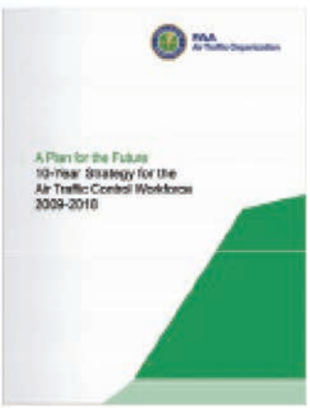
Note: Facility numbers do not include new hires at the FAA Academy.

EN ROUTE TOTAL	4,562	224	1,003	5,789	4,642	5,670
TERMINAL TOTAL	6,054	1,035	1,169	8,258	6,358	7,762
GRAND TOTAL	10,616	1,259	2,172	14,047	11,000	13,432









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