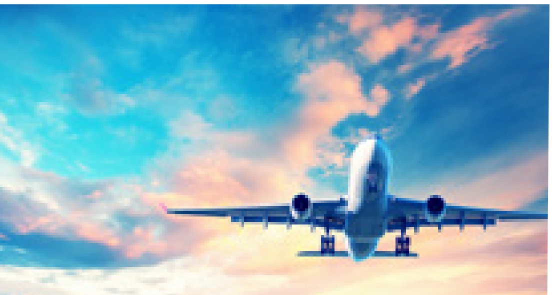
THE

AIR TRAFFIC CONTROLLER WORKFORCE PLAN

2022 | 2031

Federal Aviation Administration



This Fiscal Year (FY) 2022 report is the FAA's seventeenth 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 onboard controllers as of September 25, 2021. Section 221 of Public Law 108-176 (amended by Public Law 117-103) 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.

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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 FAA's mission is to provide the safest, most efficient aerospace system in the world and encourage global aerospace excellence. 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.

While safety is the top priority of the FAA as it manages the NAS, efficiency is also an important priority for the FAA.

IMPACT OF CORONAVIRUS DISEASE 2019 (COVID-19)

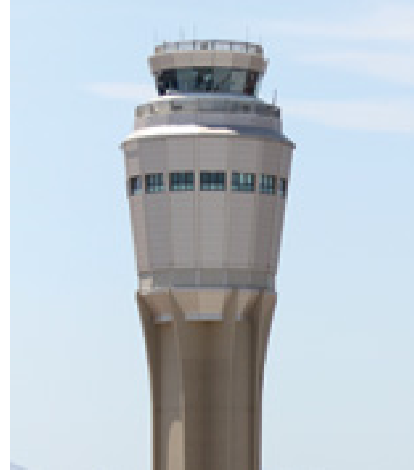
The COVID-19 pandemic has had substantial impact on the aviation industry and the FAA. At the onset of the pandemic, in order to protect employees and help ensure continuity of operations, certain activities were eliminated or significantly reduced at our air traffic control facilities. On-the-job training of developmental air traffic controllers was significantly reduced. This will result in delayed certification for most existing developmental controllers. In order to help the training pipeline recover and due to a significant drop in air traffic volume at most of our facilities, the FAA reduced the FY 2021 hiring target from 910 to 500. For FY 2022, the hiring target has increased to 1,020. Throughout the entire pandemic, the FAA has taken all necessary steps to continue to operate the NAS with minimal disruption and at minimal risk to our air traffic control professionals. As always, the FAA will continue to assess the aviation industry and make future adjustments to plans as warranted. This plan reflects impacts of the pandemic on controller hiring plans given current projections of recovery.

WORKLOAD & TRAFFIC

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.

For the purposes of this plan, air traffic includes aircraft that are controlled, separated and managed by FAA air traffic controllers. This includes commercial passenger and cargo aircraft, as well as general aviation and military aircraft. Due to the COVID-19 pandemic, air traffic volume dropped precipitously beginning in late March 2020. The traffic began to increase in 2021 and is forecast to exceed pre-COVID-19 numbers by 2024.

The FAA also incorporates location-specific traffic counts and forecasts in its staffing standards process to account for air traffic volume projections at individual facilities.



Also, Unmanned Aircraft Systems (UAS) are changing the way we see the future of flight. Keeping pace with the technological advances in this growing industry presents unique challenges and innovative opportunities for the FAA and the aviation community. The FAA is taking an incremental approach to safe UAS integration. The impact of UAS on air traffic control will continue to evolve as the FAA pursues its vision for fully integrating unmanned systems into the NAS.

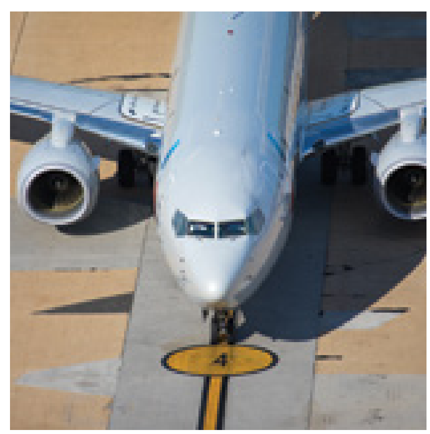
The FAA's goal is to ensure that it has the flexibility to match the number of controllers at each facility with traffic volume and workload. Staffing to traffic is just one of the ways we manage America's NAS.

HEADCOUNT

At individual facilities, the current Actual on Board (AOB) number may exceed the facility's target staffing range. This is because many facilities' current AOB numbers (all controllers at the facility) include 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, once fully certified, are prepared to take over responsibilities when senior controllers leave. Current staffing levels and ranges can be seen in the Appendix of this plan.

RETIREMENTS

The long-anticipated wave of controller retirements peaked more than a decade ago, in 2007, at 828 retirements. Over the past five years, the FAA has averaged 437 controller retirements per year. Due to the shifting demographics of the workforce, controller retirements are expected to continue to decline for the next five years to a new average of 249 per year through 2031. In the last five years, 2,185 controllers have retired. Cumulative retirement eligibility has also fallen. More than 10,000 controllers were hired after the 1981 strike, and at the end of FY 2021 only 7 controllers remain from those who were hired before 1984. By the end of FY 2022, fewer than 610 controllers will be eligible to retire, which is the lowest number since the 2005 Controller Workforce Plan.



This clearly demonstrates that the controller retirement wave that peaked more than a decade ago is over.

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

HIRING

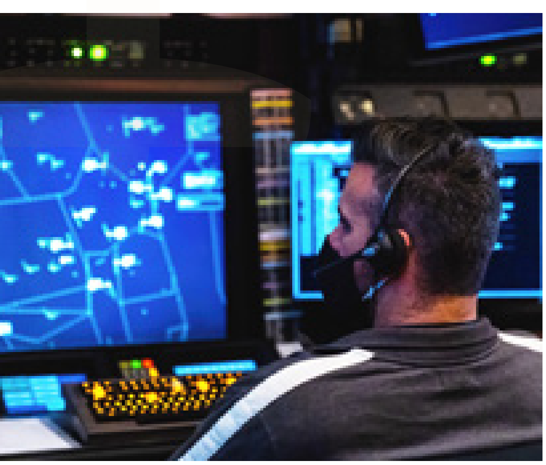
Over the past five years, the FAA has hired over 6,100 new air traffic controllers. In FY 2021, we exceeded our target with 509 controller hires versus a plan of 500 in the midst of the COVID-19 pandemic. This was the sixth consecutive year that FAA met its hiring goal. The anticipated number of new controller hires in FY 2022 is 1,020.

FY 2021 hiring was significantly challenged by the COVID-19 pandemic. Despite those challenges, the FAA continued to recruit and hire, utilizing virtual onboarding as well as virtual training. This consisted of new hires beginning their employment from their current residence and completing the Air Traffic Basics training virtually. After Basics training was completed, they reported to the FAA Academy in Oklahoma City for the next portion of their training.

The FAA is fully committed in both controller hiring and training to the tenets of Diversity, Equity, Inclusion and Accessibility (DEIA) as outlined in the agency's Diversity and Inclusion Strategic Plan. These principles are supported by focusing and increasing outreach and recruitment to underrepresented communities through intern programs, outreach to colleges, universities, and community organizations and partnerships with other federal agencies. In addition to technical training, the agency's Office of Civil Rights will ensure continued development and delivery of training to employees and managers that support DEIA principles.

During FY 2022, the FAA will continue to recruit and hire air traffic control specialists to meet its staffing requirements.

Over the past five years, the FAA has hired over 6,100 new air traffic controllers.



TRAINING

In July 2019, the FAA implemented the National Training Initiative (NTI), providing minimum training hours per week for all trainees. Since implementation of the NTI, the FAA made significant increases in the certification of trainees to CPCs. NTI was temporarily paused as a result of COVID-19 for several months and training was significantly impacted. NTI was relaunched in August of 2021 and we are already seeing gains in our CPC staffing with the increased focus on meeting training minimums. We must carefully manage the process to ensure that our trainees are hired into locations with need and progress in a timely manner to become CPCs. NTI is critical to our continued efforts to build a stable trainee pipeline and develop our workforce.

Ongoing hiring and training initiatives, as well as 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.

Ch. 1 Introduction

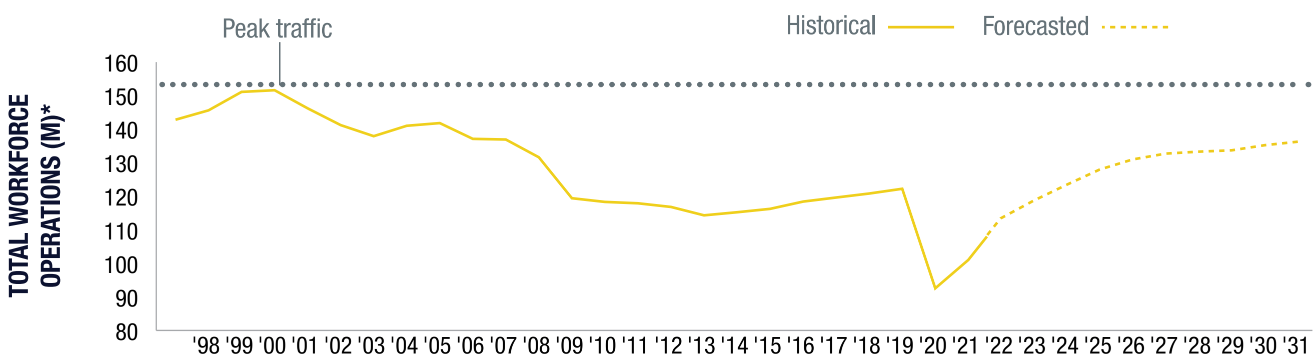
STAFFING TO TRAFFIC

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 operations, 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.

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 operating hours 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.

FIGURE 1.1 TRAFFIC TRENDS



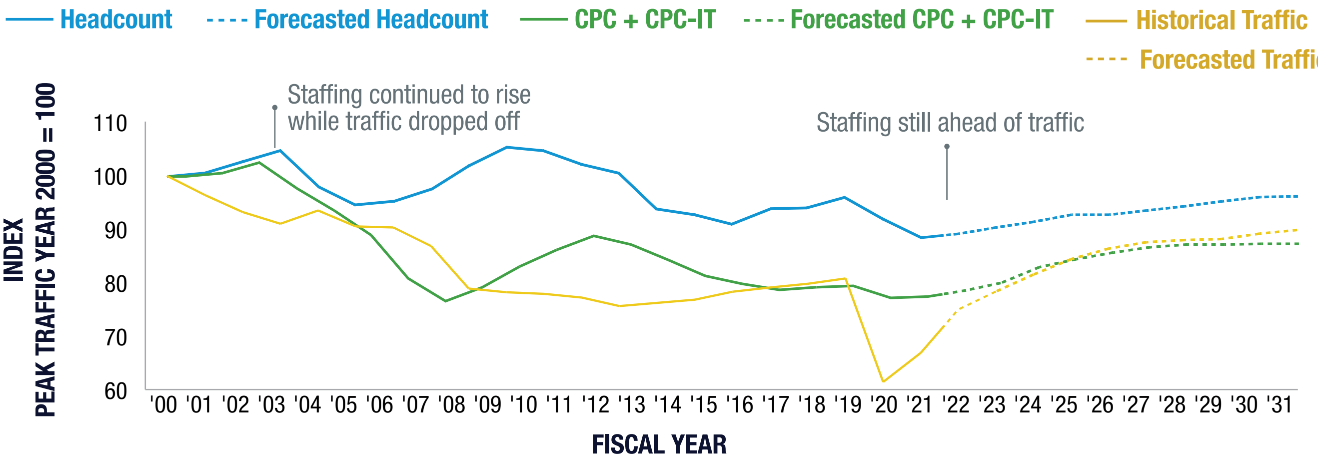
*Total Workforce Operations = Tower + TRACON + Aircraft Handled by En Route Centers

Air traffic was severely impacted by the COVID-19 pandemic. In late March 2020, air traffic dropped dramatically.

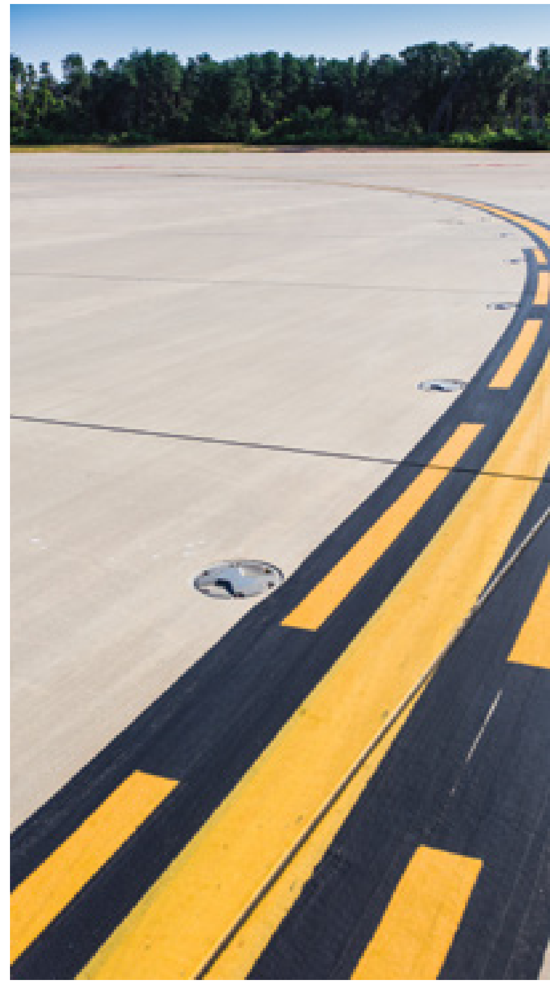
Figure 1.2 shows system-wide controller staffing and traffic, indexed from FY 2000 and projected through FY 2031. Indexing is a widely used technique that compares the change over time of two or more data series (in this case, total controller headcount, CPC plus CPC-IT and traffic). The data series 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 with 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

FIGURE 1.2 SYSTEM-WIDE TRAFFIC AND TOTAL CONTROLLER TRENDS



hire new controllers in advance of need. This is one reason that staffing remains ahead of traffic. The gap between the blue line (Headcount) and the green line (CPC and CPC-IT staffing) is the advance hire trainee pipeline and is projected to continue to narrow through 2025. The head-count and CPC+CPC-IT lines converge due to reduced retirements and other losses. The FAA periodically validates its staffing models to check for fundamental changes in the nature of the air traffic control job.

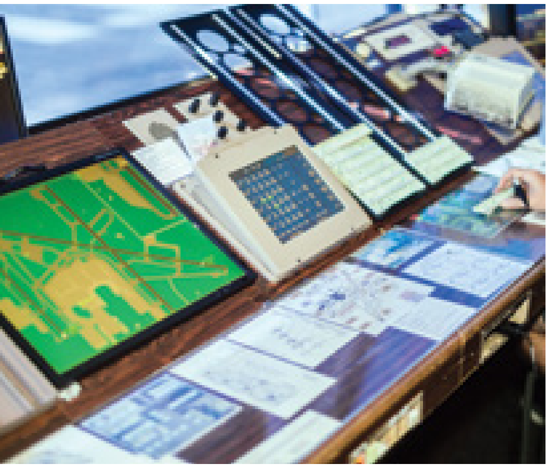


The FAA will update its staffing models when there are significant changes in air traffic controller workload. Future workload shifts could be driven by new entrants such as increased UAS activity and increases in commercial space launch activity, but they have not had much impact on controller workload yet.

NEW ENTRANTS

In December 2015, the FAA began registration of all UAS. Initially UAS operated on a limited basis in the NAS and mainly supported public operations, such as military and border security operations. In recent years, UAS 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 2017, the FAA launched a prototype version of the Low Altitude Authorization and Notification Capability (LAANC). It provides UAS with access to controlled airspace near airports through near real-time processing of authorization requests. LAANC is a collaboration in which FAA supplies the source data and technical requirements, and industry builds mobile applications for commercial drone operators to plan their flights and access controlled airspace.



The Remote Identification (Remote ID) of Unmanned Aircraft Final Rule is the next incremental step towards further integration of Unmanned Aircraft (UA) in the National Airspace System. In its most basic form, remote identification can be described as a "digital license plate" for UA. Remote ID is necessary to address aviation safety and security issues regarding UA operations in the NAS, and is an essential building block toward safely allowing more complex UA operations.

In December 2019, the FAA issued a notice of proposed rulemaking regarding remote identification of unmanned aircraft systems. This new regulation would continue the safe integration of drones into the nation's airspace by requiring them to be identifiable remotely. In the 60-day comment period following publication, the FAA received over 53,000 comments. We reviewed all of the comments and considered them when writing the final rule, which was published in the Federal Register on January 15, 2021.

As policy and technology updates allow widespread use of UAS for commercial applications, the impact on Air Traffic Controller (ATC) workload will be incorporated into our models and forecasts. Oversight of UAS is aided by the FAA's compliance program, which is designed to help identify and correct potential hazards before they result in an incident or accident.

Commercial space launch activity is growing in the United States. There continues to be strong investment in startup space ventures. The level of activity from air traffic controllers to coordinate airspace closures to support launch and re-entry will likely grow in areas of the country where commercial space activity is concentrated. The FAA will continue to monitor controller workload associated with commercial space activities and adjust our models and forecasts accordingly.

MEETING THE CHALLENGE

The FAA's hiring plan is designed to phase in new hires as needed over time. To do so, the FAA plans its hiring vacancy announcement strategy to provide a sufficient pipeline to meet the hiring need. The hiring process is prolonged from announcement to onboarding, as it includes various screening activities that can take time (e.g., medical, security, aptitude). The primary goal of the FAA's hiring pipeline strategy is to ensure the pipeline of in-process candidates is sufficient to replace controllers who retire or leave due to other sources of attrition.

Annual retirements are dropping and well below those experienced in 2007, when the long-anticipated wave of retirements peaked.

Retirements are expected to fall for the next five years and remain at relatively low levels for the next decade.

Hiring, however, is just one 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 they are needed. Once they are placed, they need to be effectively and efficiently trained, and assigned to efficient work schedules.

To address these challenges, the FAA:

- Revamped its placement process for ATC trainees, allowing increased flexibility for the FAA and improved efficiency in both hiring and initial training of air traffic controllers;
- Introduced a 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 FAA's success.

Systematically placing 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.

Ch. 2 Facilities & Services

En Route controllers use surveillance methods to maintain safe distances among aircraft.

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.

As of October 1, 2021, more than 13,800 federal air traffic controllers in airport traffic control towers, TRACONs and air route traffic control centers guided pilots through the system. More than 1,400 civilian contract controllers and over 10,800 military controllers also provide air traffic services for the NAS.

These controllers provide air navigation services to aircraft in 5.3 million square miles of domestic airspace, in addition to 24.1 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 TRACONs watch over aircraft traveling through their Terminal airspace. Their main responsibility is to organize the flow of aircraft into and out of airports. Relying on visual observation, radar and satellite navigation, they closely monitor each aircraft to ensure safe distances among all aircraft and to guide pilots during takeoff and landing. In addition, controllers keep pilots informed about changes in weather conditions.

Once airborne, aircraft quickly depart 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 of these 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 destinations.

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 aircraft near their destinations, En Route controllers transition them to the Terminal environment, where Terminal controllers guide them to a safe landing.

FAA AIR TRAFFIC CONTROL FACILITIES

As of October 1, 2021, the FAA operated 313 air traffic control facilities. Table 2.1 lists the type and number of these FAA facilities. More than one type of facility may be co-located in the same building.

TABLE 2.1 TYPES AND NUMBER OF FAA AIR TRAFFIC CONTROL FACILITIES

NAME	NUMBER OF FACILITIES	DESCRIPTION
Tower	139	An ATC tower that provides traffic advisories, spacing sequencing and separation services to visual flight rules (VFR) and instrument flight rules (IFR) aircraft operating in the vicinity of the airport, using a combination of satellite, radar and visual observations.
Approach Control*	25	An ATC facility that provides approach and departure services to IFR and VFR aircraft arriving or departing an airport and to aircraft transiting the terminal airspace using satellite, radar and/or non-radar separation. *These facilities are also known as Terminal Radar Approach Control or TRACON
Tower and Approach Control	124	An ATC 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 transiting the terminal airspace using satellite, radar and/or non-radar separation.
Combined Control Facility	4	An ATC facility that provides approach control services for one or more airports, as well as En Route ATC (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 En Route	21	An ATC facility that provides 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.

313 Total Facilities

Ch. 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.

The FAA also tracks a number of indicators as part of its continuous staffing review. Some of these indicators are overtime, average time on position per shift, 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 2021, the system average for overtime was 2.3 percent, a decrease from the FY 2020 level. Cumulative average time on position per 8-hour shift was 4 hours and 4 minutes, up from 3 hours and 59 minutes, in 2020.

FIGURE 3.1 PROJECTED CONTROLLER TRENDS

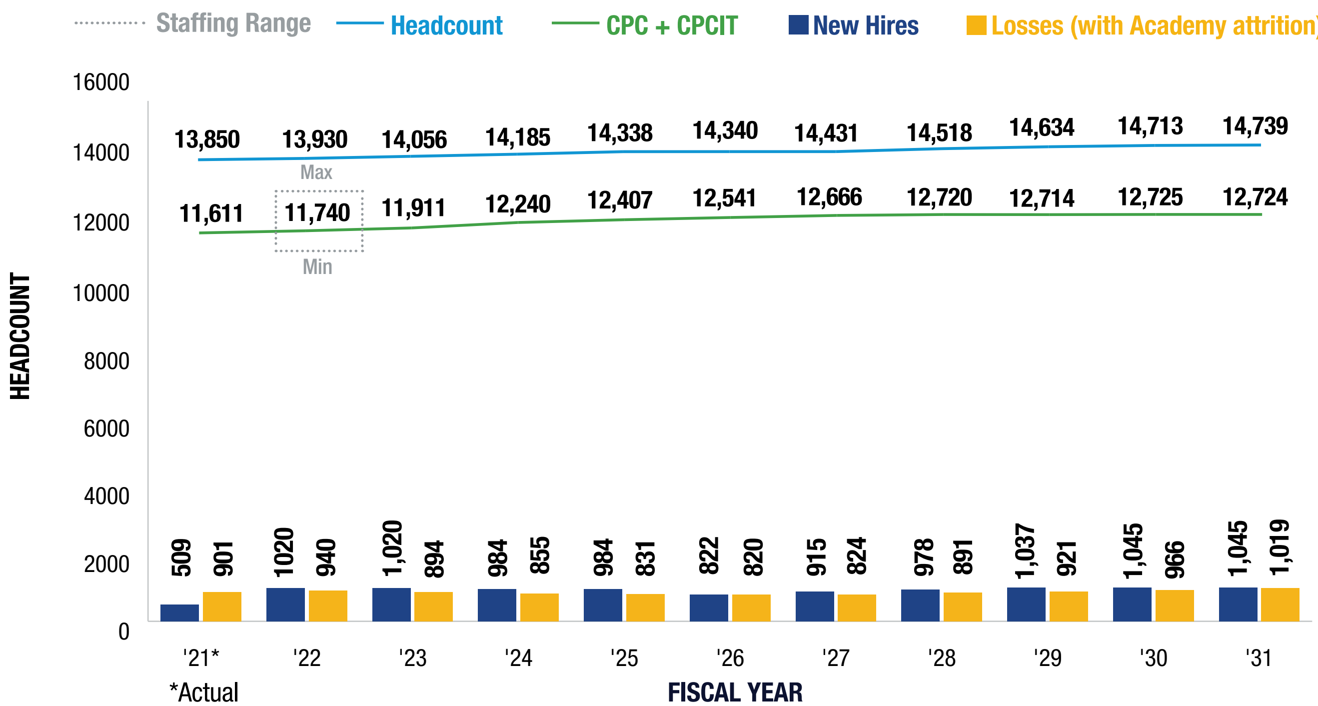


Figure 3.1 shows the expected end-of-year total headcount (blue line), CPC + CPC-IT headcount (green line), and new hires and losses (blue and gold bars) by year through FY 2031.

Figures for FY 2021 represent actual end-of-year headcount, losses and hires. Losses include retirements, promotions and transfers, resignations, removals, deaths, developmental attrition, and Academy attrition. The FAA ended FY 2021 with 90 controllers above the 2021 headcount plan. Because the FAA is targeting CPC + CPC-ITs headcount to be in the middle of the staffing range, the annual headcount forecast should not be viewed as a "target." Rather, it is a byproduct of the number of CPC + CPC-ITs in the system, as well as the developmental pipeline hired in advance of future needs.

In general, the FAA strives to keep the number of CPCs + CPC-ITs near the middle of the calculated staffing range. Figure 3.1 shows that FY 2022 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 headcount number shown in Figure 3.1 reflects this projected advanced hiring.

The FAA hires and staffs facilities so that trainees, once certified, are prepared to take over responsibilities when senior controllers retire or others transfer to other positions or facilities.

THE FAA USES MANY METRICS TO MANAGE ITS FACILITIES

TIME ON POSITION

PRODUCTIVE TIME

STAFFING RANGES

TRAINEES

OVERTIME

RETIREMENTS

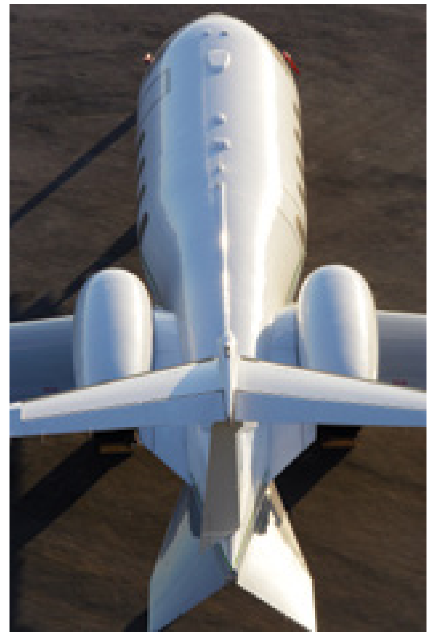
FIELD INPUT

TRAFFIC

SIMULATORS & INSTRUCTORS

STAFFING RANGES

Air traffic facilities staff open positions with a combination of certified controllers and developmentals. 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 inputs 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 requested 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 most recent 10-year period. If any annual point falls outside +/- 5 percent of the historical 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. Given the drop in current traffic levels due to the COVID-19 pandemic, we kept the staffing ranges at 2020 levels and will review again in future plans when traffic stabilizes.

FIGURE 3.2 CONTROLLER STAFFING

FACILITY STAFFING

HIGH

LOW

CHARACTERISTICS/DRIVERS OF HIGH STAFFING LEVELS

- Inefficient scheduling
- Fewer losses than projected
- Less overtime
- Reduction in traffic volume
- Decrease in hours of operation
- Higher number of position-qualified controllers
- Higher number of advance hire trainees

CHARACTERISTICS/DRIVERS OF LOW STAFFING LEVELS

- Higher than expected attrition
- Greater use of overtime
- Increase in traffic volume
- Increase in hours of operation
- Lower number of position-qualified controllers
- Lower number of advance hire trainees

Staffing ranges for controllers are published for each facility in the appendix of this report. In many facilities, the current AOB number may appropriately exceed the range. This is because many facilities' current AOB numbers (all controllers at the facility) include significant 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.

Over the next 10 years, the total number of controllers will steadily increase, as the number of new hires is expected to exceed controller attrition by an average of approximately 90 per year. In the future, the vast majority of controllers will be CPCs and CPC-ITs, and more facilities will routinely fall within the ranges.

FIGURE 3.3 EXAMPLE OF CONTROLLER TRAINING PROGRESSION

Training Progression To Certified Professional Controller

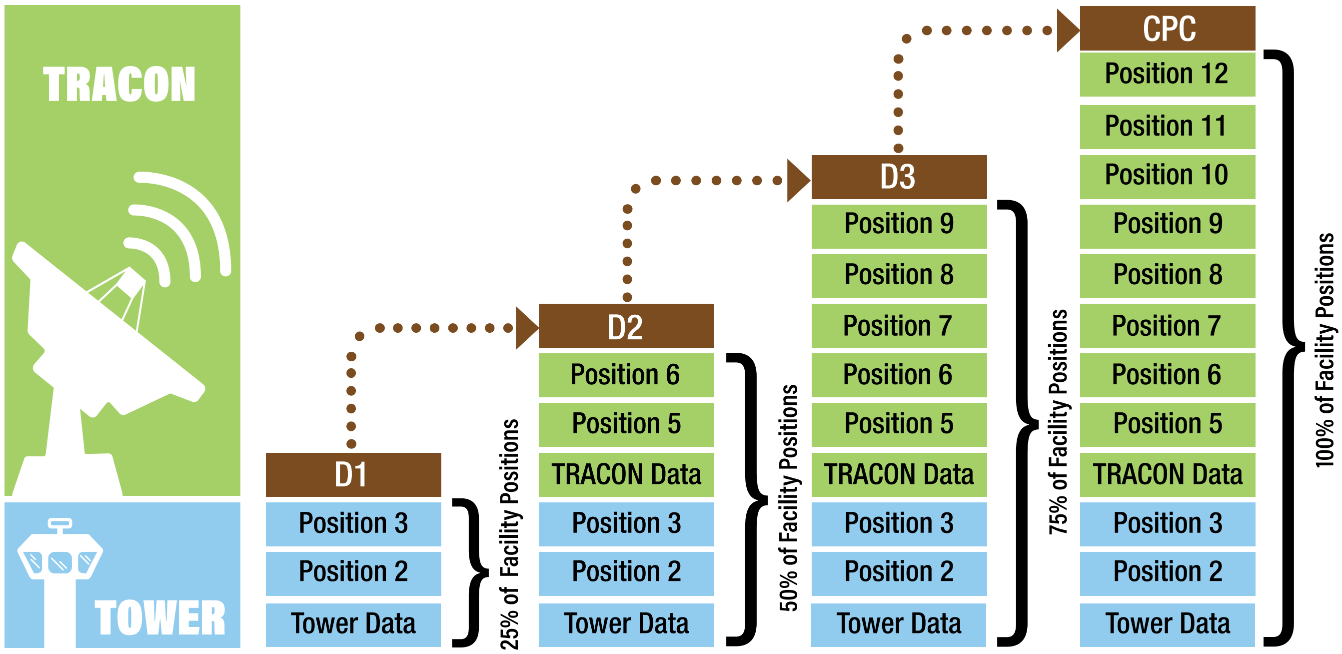


Figure 3.3 depicts an example of a large Tower and Approach Control facility. To be CPCs in these types of facilities, controllers must be checked out on all positions in both the tower and the TRACON.

Trainees achieve “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.

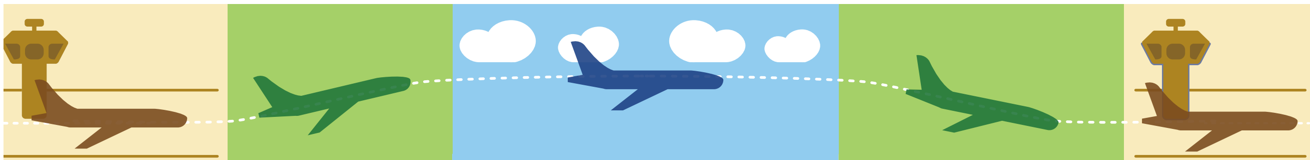
Once developmental controllers are checked out at the D1 level, they can work several positions in the tower independently and without training supervision (Clearance Delivery, Ground Control and Local Control). Once checked out on the final tower position, developmental controllers would be tower-certified and able to work any position in the tower cab independently and without 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.

The levels of responsibility continue to increase as one progresses toward CPC status, but trainees can and do independently 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.

Trainees include both developmental controllers and **CPCs-ITs**. 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 **CPCs** anywhere.

FIGURE 3.4 AIR TRAFFIC CONTROL POSITION AND FACILITY OVERVIEW



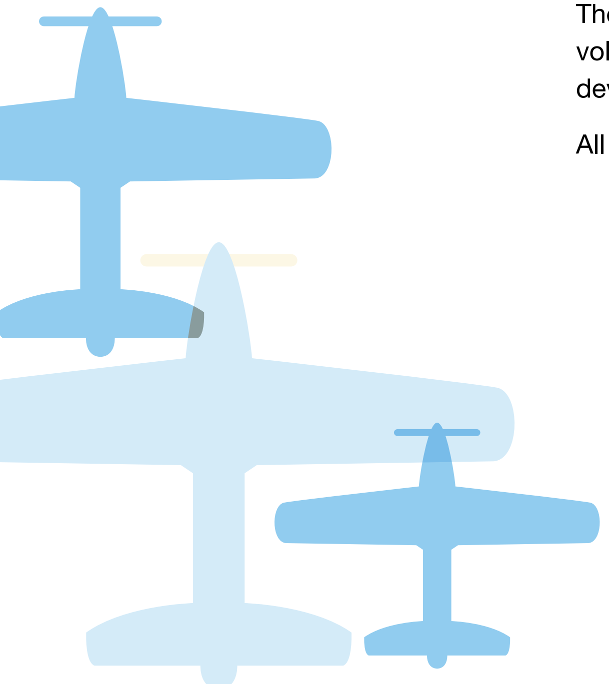
PREFLIGHT + TAKEOFF	DEPARTURE	EN ROUTE	DESCENT APPROACH	LANDING + POST FLIGHT
AIRPORT TRAFFIC CONTROL TOWER	TERMINAL RADAR APPROACH CONTROL	AIR ROUTE TRAFFIC CONTROL CENTER	TERMINAL RADAR APPROACH CONTROL	AIRPORT TRAFFIC CONTROL TOWER
Ground Controller Issues approval for push back from gate and issues taxi instructions and clearances. **Local Controller** Issues takeoff clearances, maintains prescribed separation between departure aircraft, provides departure aircraft with latest weather/field conditions. **Clearance Delivery** Issues IFR and VFR flight plan clearance. **Flight Data** Receives and relays weather information and Notices to Airmen.	**Departure Controller** Assigns headings and altitudes to departure aircraft. Hands off aircraft to the En Route radar controller. **Flight Data-Radar** Issues IFR flight plan clearances to aircraft at satellite airports, coordinates releases of satellite departures.	**Radar Controller** Ensures the safe separation and orderly flow of aircraft through En Route center airspace (includes oceanic airspace). **Radar Associate** Assists the radar controller **Radar Associate (Flight Data)** Supports the En Route radar controller by handling flight data.	**Arrival Controller** Assigns headings and altitudes to arrival aircraft on final approach course.	**Local Controller** Issues landing clearances, maintains prescribed separation between arrivals, provides arrival aircraft with latest weather/field conditions. **Ground Controller** Issues taxi instructions to guide aircraft to the gate.

AIR TRAFFIC STAFFING STANDARDS OVERVIEW

The FAA has used air traffic staffing standards to help determine controller staffing levels since the 1970s, and they are periodically updated to reflect changes in workload, equipment and procedures.

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 co-located 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

Ch. 3 Staffing Requirements



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, 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 standard 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 with 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.

FAA FACTOID

The U.S. has **5.3 Million Square Miles** of Domestic Airspace

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 Tower, TRACON or En Route center 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, and Coordinator. 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 workload portion of the tower cab staffing models were updated in early 2008. 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. Plans to update the workload portion of the tower staffing models in FY 2020 were deferred due to traffic levels and facility visitor restrictions put in place as a result of the COVID-19 pandemic. The FAA will resume it's workload update efforts once the pandemic is over and traffic returns to normal.

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 and Departure Data 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 handle. 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. The FAA intends to update the workload portion of the TRACON staffing models once revisions to the tower standards are completed.

EN ROUTE OVERVIEW

Air traffic controllers assigned to En Route centers guide aircraft 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 decombined 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 (FFRDC) developed a model to generate data needed for the FAA's En Route staffing models. Like the tower and TRACON standards models, this approach incorporated actual traffic and more facility-specific data.

The 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, the FFRDC 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 recalibrated. 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 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 CONTROLLER SCHEDULING

FAA facilities use a variety of methods to address demand of scheduled and non-scheduled air traffic activity. Non-standard scheduling practices are needed to ensure staffing is available to address the changes and peaks in schedules throughout the year. The practice often results in the use of less efficient schedules but provides staffing to cover the changes for seasons, holidays, special events, etc.

Most large, professional, shift-based workforces utilize centralized schedule policies and systems. They generally use software-based scheduling programs to develop more efficient schedules. For example, commercial air carriers such as Southwest and JetBlue use commercially available software to schedule flight and ground crews. Similar systems are also in use by air navigation service providers worldwide, like Nav Canada and Airservices (Australia).

The FAA developed the Operational Planning and Scheduling tool (OPAS) to support local schedule and annual leave negotiations.

Its capabilities incorporated a fully functioning planning tool, including day-to-day scheduling. System-wide implementation was negotiated as part of the 2016 air traffic controller collective bargaining agreement. To date, OPAS has been implemented at the 34 largest facilities, primarily to support local scheduling and leave planning negotiations.

The FAA will use OPAS in the near-term to analyze efficiency of negotiated and actual schedules created by field facilities. Going forward the FAA will continue the pursuit of standardized, software-based scheduling programs to aid in annual schedule and leave planning and to assist schedulers in making day-to-day scheduling decisions.

TECHNOLOGICAL ADVANCES

Most of the foundational technology supporting the Next Generation Air Transportation System (NextGen) had already been deployed prior to the onset of COVID-19. The arrival of the global pandemic, however, created significant hurdles that slowed the agency's efforts to build on that foundation and expand NextGen capabilities.

Traffic has nearly recovered to pre-pandemic rates and the FAA has been able to successfully restart several programs. New tools are coming on line that will help controllers manage the changes in the operating environment of the NAS and progress is accelerating in critical areas that impact the controller workforce. As these changes impact controller workload or capacity in the future, FAA staffing models will be adjusted to account for those impacts.

The scope and precise impact of NextGen enhancements are still being evaluated. While final impacts are also to be determined given the complex nature of the interaction of controllers and their tools, the FAA has achieved a number of significant successes, particularly in the areas of:

- Trajectory Based Operations (TBO)
- Terminal and En Route automation
- The Space Data Integrator
- Space-Based Automatic Dependent Surveillance–Broadcast (ADS-B) analysis
- Low Altitude Authorization and Notification Capability
- Very High Frequency (VHF) Omnidirectional Range Minimum Operating Network

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

Trajectory Based Operations

TBO is a collection of systems, capabilities, processes and people working together to achieve operational objectives. TBO manages air traffic with the knowledge of where an aircraft will be at critical points during its fight. TBO enables more strategic planning and execution of flights. It equips controllers with decision support tools to deconflict flows of traffic using time based management. In concert with Performance Based Navigation (PBN), this will reduce controllers' need for manual deconfliction and vectoring of aircraft by redistributing delays and managing means of delay absorption. TBO will also enhance data-sharing across multiple air traffic systems.

Several TBO milestones have been achieved this year. In the Northeast Corridor, the priority operating area for the NextGen Advisory Committee, departure scheduling from Boston and New York Centers to Atlanta and Charlotte was upgraded to enable scheduling onto arrival timeline. Full implementation began in March 2021. The Las Vegas (LAS) Metroplex was implemented in February 2021 and in April and August of 2021, the FAA went live with phased changes to procedures and air traffic routes that improve the safety and efficiency of the airspace in South-Central Florida. For the Northwest Mountain operating area, Terminal Sequencing and Spacing, or TSAS, testing resumed in April 2021 at the FAA William J. Hughes Technical Center in Atlantic City, New Jersey. Time Based Flow Management, or TBFM, adaptation support also resumed at the Technical Center, along with in-person TSAS shadow testing. In the Southwest operating area, operational use of the Converging Runway Display Aid, or CRDA, to support the use of Established on Required Navigation Performance, or EoR, was initiated in August 2021. EoR went live using CRDA in September 2021, with roughly 50 flights per day using EoR.

Throughout 2021, Air Traffic Services activated Field Implementation Teams in the Northwest Mountain operating area (Denver), Southwest operating area (Los Angeles, Southern California Terminal Radar Approach Control and Los Angeles Center), and at the David J. Hurley Air Traffic Control System Command Center in Warrenton, Virginia, to prepare the workforce and facilities for TBO implementation. The FAA held three TBO Industry Day events to share information and engage in dialogue with various industry partners. The agency also established a TBO Training Workgroup; developed a TBFM Fundamentals course for controllers; published updates to FAA Order 7210.3, which provides instructions, standards and guidance for operating and managing air traffic facilities; and developed a Command Center TBO Transition Plan.

Standard Terminal Automation Replacement System

The FAA achieved a significant milestone in mid-2021 when the final installation of the Standard Terminal Automation Replacement System, or STARS, was completed at the Grand Canyon Tower, a remote facility

feeding into the Las Vegas Terminal Radar Approach Control facility, bringing to a close a seven-year deployment effort. Terminal controllers are now using STARS at hundreds of FAA air traffic control facilities and 200 Department of Defense facilities. STARS consolidates and upgrades the legacy Automated Radar Terminal System computer system into a single, state-of-the-art platform.

The STARS program office is now focusing on sustainment. STARS Sustainment 2, which engineers hardware upgrades (new data recording devices and analog-to-digital video processors) and a new operating system, is on track for completion in May 2022. Those improvements will be deployed under STARS Sustainment 3, which will be ongoing through FY 2026. STARS Sustainment 4, which focuses on tech refreshes at terminal radar approach control facilities, achieved an Investment Analysis Readiness Decision in September 2021, and is on track for a Final Investment Decision in September 2023.

En Route Automation Modernization

While the En Route Automation Modernization, or ERAM, platform has been in operation throughout the nation's network of air route traffic control centers for more than six years now, the FAA was able to overcome a series of COVID-related challenges to successfully continue a comprehensive technical refresh.

Employing COVID-19 safety precautions and protocols, ERAM technology refresh 2 installations restarted at the key sites (Minneapolis, Dallas-Fort Worth and Cleveland Centers) in February 2021 and are now complete. An In-Service Decision was obtained in June 2021, which enabled installations to continue at the remaining 17 ERAM operational locations. As of November 19, 2021, 9 locations are complete, and the project is on track to complete all 20 locations by June 2022.

The critical ERAM technical refresh replaces aging components and those that are no longer supported, primarily the processors and displays used by controllers. Older displays are being replaced with larger, high-definition screens, and ERAM's proprietary operating system is being replaced with an open-source Linux operating system, expanding the market options for acquiring compatible hardware.

Space Data Integrator

SpaceX's June 30, 2021 launch from Cape Canaveral was the first to use the FAA's Space Data Integrator, or SDI, operational prototype. The SDI prototype serves as the foundation by which commercial space operations integrate into the NAS. It enables the FAA to track a space launch or reentry vehicle in near-real time as it travels through the NAS. It automates vehicle position data and Aircraft Hazard Areas — NAS volumes affected by a launch and reentry — as Flow Evaluation Areas in the Traffic Flow Management System and on Space Operations SDI displays the Command Center's Challenger Room. This new capability increases safety for all airspace users and assists the FAA in efficiently managing air traffic during space operations, minimizing the time that launch/reentry airspace will have to be closed to other traffic.

Space-Based Automatic Dependent Surveillance – Broadcast
To gain a better understanding of the total potential value and benefits of space-based Automatic Dependent Surveillance–Broadcast, or ADS-B, technology, the Advanced Surveillance Enhanced Procedural Separation, or ASEPS, team is currently conducting a series of evaluations of space-based ADS-B, known as SBA, performance and benefits in oceanic and offshore airspace, as well as developing agency-wide use cases.

SBA, a privately held service, relays a full slate of flight information to controllers via satellite using existing ADS-B infrastructure. SBA has a near-real-time update rate (every 8 seconds), enabling controllers to track an aircraft's position continuously.

The agency is currently analyzing global, non-operational, air traffic quality SBA data. The analysis will help the FAA better understand the potential benefits of SBA to the agency and NAS users. The ASEPS team is exploring how this non-operational SBA data could be used for applications such as accident investigation, search and rescue, environmental impact analysis, separation analysis, commercial space launch tracking and more.

This analysis comes on the tail of a one-year SBA operational evaluation in the surveillance-challenged Caribbean. The ASEPS team will continue to examine SBA performance in conjunction with the Advanced Technologies and Oceanic Procedures (ATOP) automation system. This will evaluate SBA in airspace at all three of the U.S. oceanic air traffic control facilities in New York, Oakland and Anchorage centers.

Low Altitude Authorization and Notification Capability
A bit closer to the ground, the Low Altitude Authorization and Notification Capability (LAANC) continues to streamline airspace access for Unmanned Aircraft System, or UAS, operators. LAANC enables drone operators to request approval to fly in controlled airspace using a mobile application. Using LAANC, authorizations are usually granted in near real-time.

Since its launch in 2017, LAANC has been enabled at hundreds of air traffic control facilities and has issued more than 900,000 automated airspace access approvals.

In 2021, FAA-Approved UAS Service Suppliers began processing approvals for night-time operations, to support the Operations Over People rule that went into effect earlier in the year. The LAANC program has also implemented an update to UAS facility maps, called Quad Grids, to enable more geographic flexibility for airspace users. Quad

Grids refine grid spacing to 30 seconds of latitude by 30 seconds of longitude, down from one minute of latitude/longitude, creating four rectangles where one was initially defined. The Air Traffic Organization has fully implemented the quad grid configuration, and a review of altitudes by our air traffic facilities is ongoing. Drone operators began experiencing the benefits in late fall 2021.

Another key effort making headway is the VHF Omnidirectional Range (VOR) Minimum Operating Network (MON) program. As part of the transition to Performance Based Navigation, the VOR MON program is optimizing the VOR network in the Contiguous United States (CONUS) by publishing new expanded service volumes for 491 VORs. The new service volumes improve VOR signal coverage starting at 5,000 feet above ground level. This enables VOR-to-VOR navigation through GPS outage areas and landing at MON airports within 100 nautical miles of the aircraft's current position, where the capability currently exists. MON airports enable pilots to fly a Localizer, Instrument Landing System or VOR instrument approach without Distance Measuring Equipment, Automatic Direction Finder, surveillance or GPS. Publication of new VOR service volumes began in December 2021.

Because of this optimized VOR network, the legacy VOR infrastructure can be reduced in CONUS by about one-third, with the remaining VORs providing needed resiliency. Starting with 896 VORs in CONUS, the VOR MON program plans on discontinuing approximately 306 VORs by September 2030. As of October 2021, 113 VORs have been discontinued. As part of the discontinuance process, PBN routes are established when required to mitigate cancellation of conventional airways. The new PBN procedures improve the efficiency of air traffic flow and help to reduce overall VOR-related workload for controllers.

Even as the FAA is making progress with these deployments and upgrades, already deployed systems are continuing to provide significant benefits.

Data Communications

In May 2021, the Data Communications, or Data Comm, program team, which includes many stakeholders from across the FAA and Industry, successfully delivered the 10 millionth controller pilot data link departure clearance to an aircraft. Data Comm Tower Services provide support for departure clearance instructions and are available at 62 air traffic control towers nationwide.

Data Comm is a capability that uses digital text messages sent between controllers and flight crews to supplement voice communications in equipped aircraft. Data Comm services reduce communication time between controllers and fight crews, increase productivity, reduce gate and taxi-out times during adverse weather events, reduce fuel consumption and engine emissions, and enhance safety.

En Route Data Comm Initial Services are available at Kansas City, Indianapolis, and Washington Centers. Initial En Route Services include messages such as rerouting and the transfer of communications from one en route sector to the next. The follow-on baseline will deliver full En Route Services which will add additional capabilities, including the ability to issue speeds.

More than 8,799 U.S. aircraft have been equipped with Data Comm avionics. As of March 2021, there were over 60,000 weekly Data Comm equipped tower operations occurring at the 62 towers, and over 20,000 weekly Data Comm equipped En Route operations at the three centers.

The Initial Services deployment schedule for the remaining 17 En Route facilities has been impacted by COVID-19 and is being replanned.

Looking Ahead
Looking forward, two programs, Voice over Internet Protocol Communications Enterprise, or VoICE, and Flow Management Data and Services, will eventually supplant the aging Traffic Flow Management System, or TFMS.

The VoICE Communications Systems acquisition will replace aging voice switching core infrastructure at air traffic control towers, terminal radar approach control facilities and air route traffic control centers with a modern, supportable Voice over Internet Protocol, or VOIP-enabled, networked voice communication system.

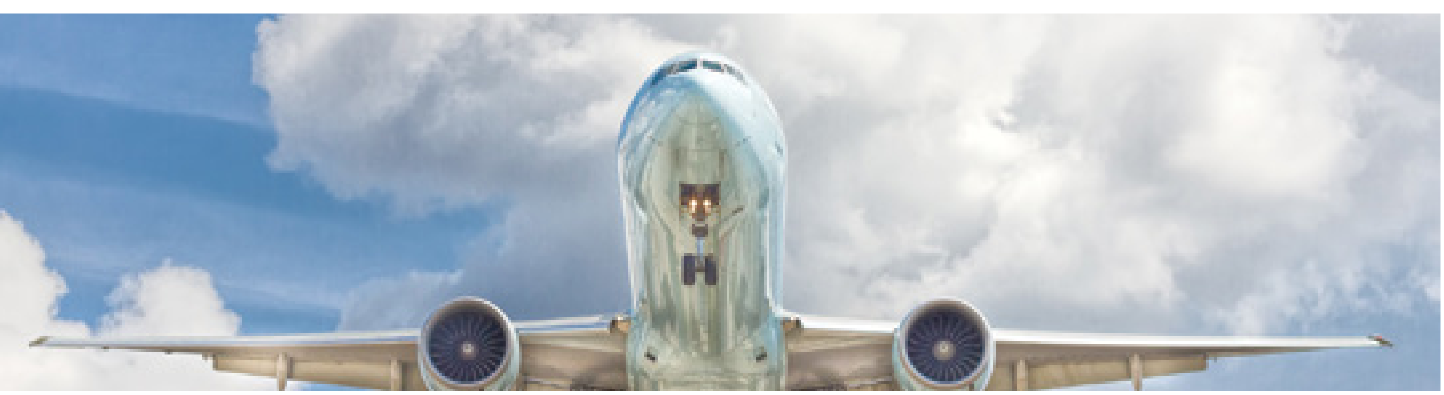
The VoICE acquisition will comprise multiple procurements with multiple contracts executed in a phased approach with staggered investment decisions. This prioritizes near-term needs, such as hardware nearing end-of-life, and provides the FAA with the flexibility to adapt to evolving mission needs.

VoICE Phase 1 involves the procurement of hardware that will convert analog voice into a digital signal that can operate in VoIP or legacy analog mode. Phase 2 will involve the procurement of IP voice communication systems that will use the Phase 1 protocol converters to communicate with legacy analog systems during the lengthy transition to a fully-VoIP-based communication architecture. The VCS procurements may be scoped to replace some, but not all, of FAA legacy voice switches. Legacy switches that are not replaced can be supported using Phase 1 protocol converters, but these systems will not be able to take full advantage of the flexibility offered by a VoIP-based communications network architecture.

Phase 1 procurements are currently planned for contract award in FY 2023-24. Phase 2 procurements are currently planned for contract award in FY 2025 and FY 2026.

TFMS provides tools to the specialists at the Air Traffic System Command Center in Warrenton, Virginia, to manage capacity and demand throughout the day and creates the Traffic Situation Display — the map and playbook for monitoring NAS operations.

As the NAS becomes more complex, limitations with TFMS capabilities and architecture prompted the FAA to explore other, more agile technology. The agency is planning to replace the system with Flow Management Data and Services in the FY 2026-27 timeframe. The system may leverage cloud-based opportunities, enabling software to more easily adapt and evolve to modern standards. Other anticipated benefits include the capability for continuous development and improved security.



Ch. 4 Losses

In total, the FAA expects to lose over 900 controllers due to retirements, promotions and other losses during FY 2022. Other losses include transfers, resignations, removals, deaths, developmental attrition and academy attrition.

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

CONTROLLER LOSS SUMMARY

Figure 4.1 shows the total estimated number of controllers that will be lost, by category, over the 10-year period FY 2022 through FY 2031.

FIGURE 4.1 CONTROLLER LOSS SUMMARY

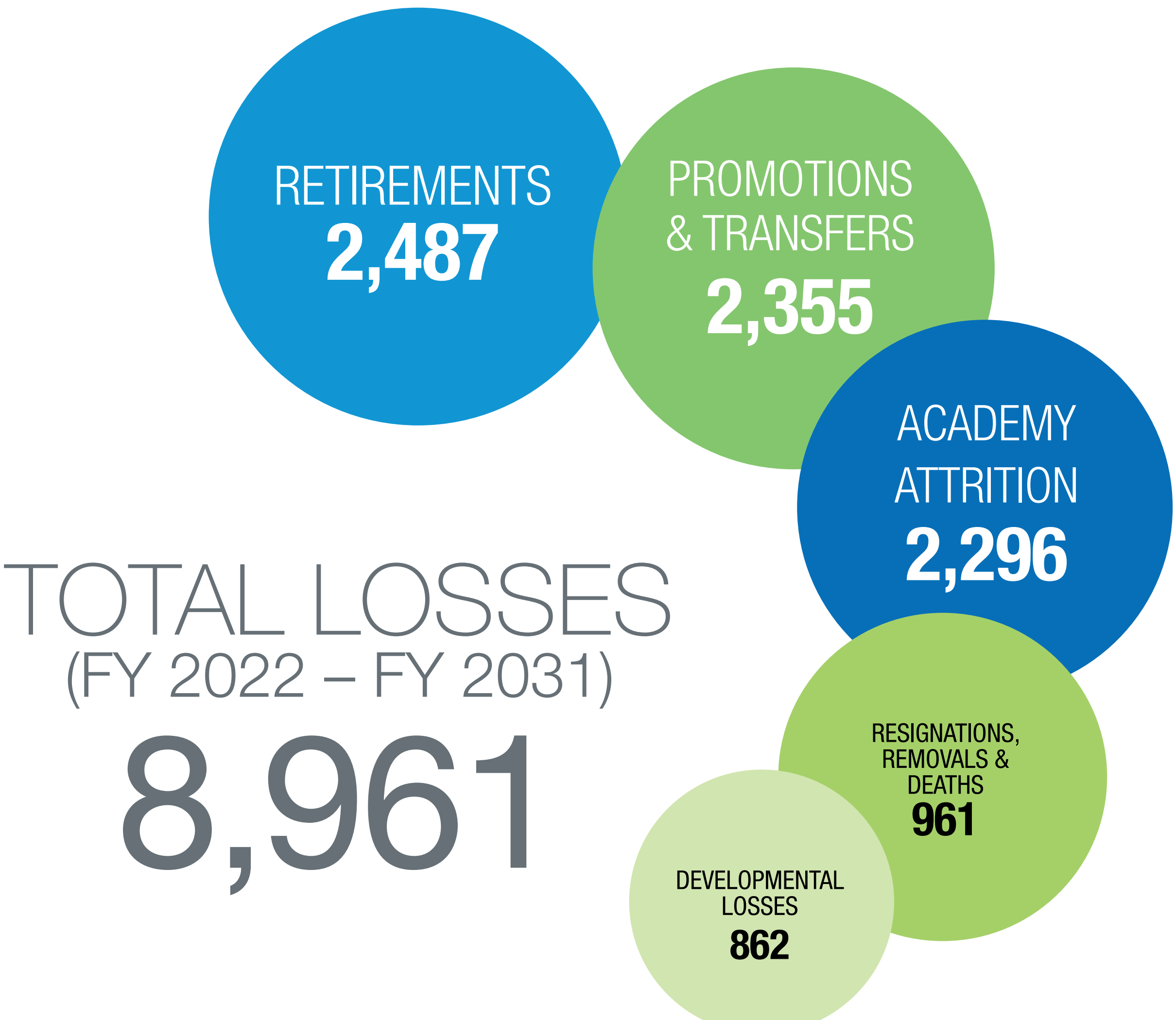
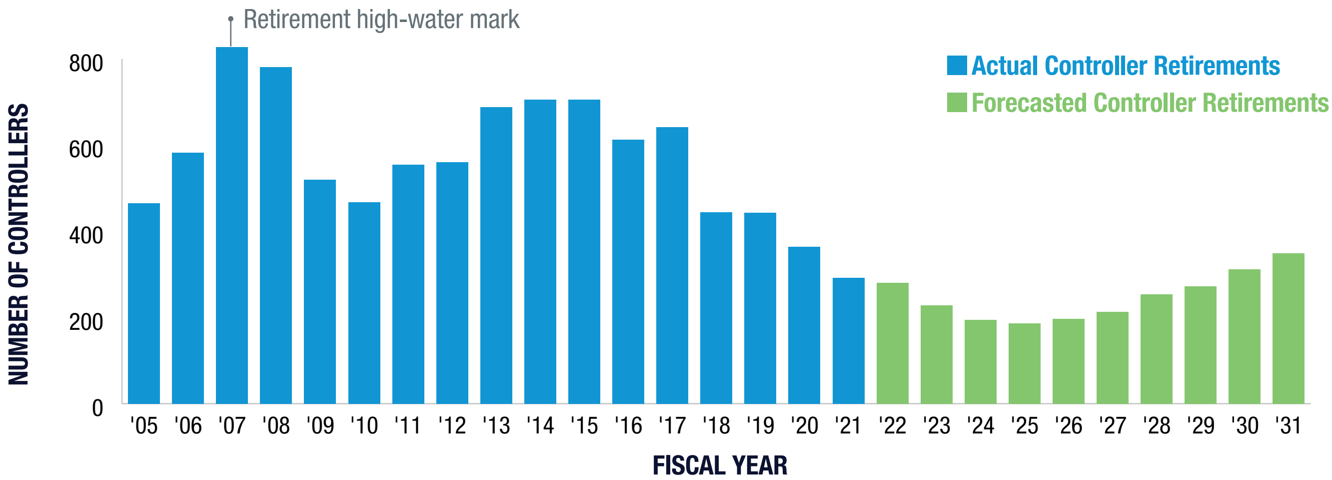


FIGURE 4.1A ACTUAL CONTROLLER RETIREMENTS



ACTUAL CONTROLLER RETIREMENTS

FY 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 FY 2010 to FY 2015, but still below the 2007 peak, and are declining through FY 2025. In the last five years, 2,185 controllers have retired, and we expect an additional 1,087 controllers will retire in the next five years. FY 2021 retirements were lower than projected and future retirements are expected to fall and remain at relatively low levels over the next decade.

CUMULATIVE RETIREMENT ELIGIBILITY

The figure below shows historical and forecasted controller retirement eligibility from FY 2005 to FY 2031. Each bar shows the net number of controllers in the entire controller workforce eligible to retire for each year shown. Because controllers can spend more than one year as eligible before they retire, the same individual controllers may be counted in multiple years. The forecast shows a significant decline in the net number of controllers eligible to retire from the peak in FY 2012 to FY 2025. At the end of FY 2021, only seven controllers remain from those who were hired before 1984. At the end of FY 2021, fewer than 610 controllers were eligible to retire, which is the lowest number since the first Controller Workforce Plan in 2005.
This clearly demonstrates that the controller retirement wave is over.

FIGURE 4.1B CUMULATIVE RETIREMENT ELIGIBILITY

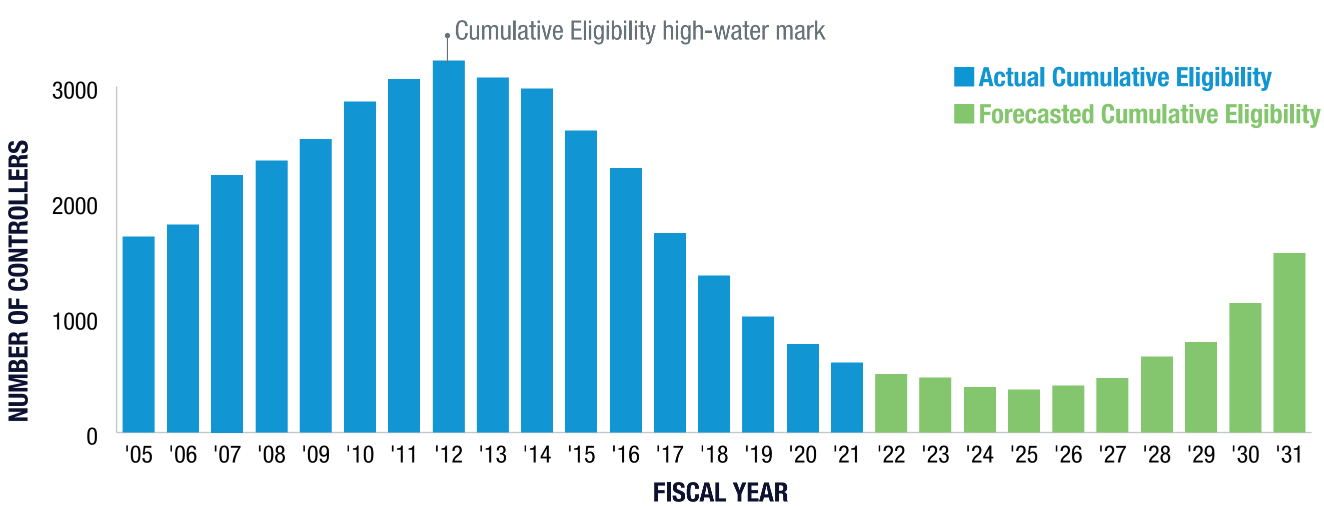
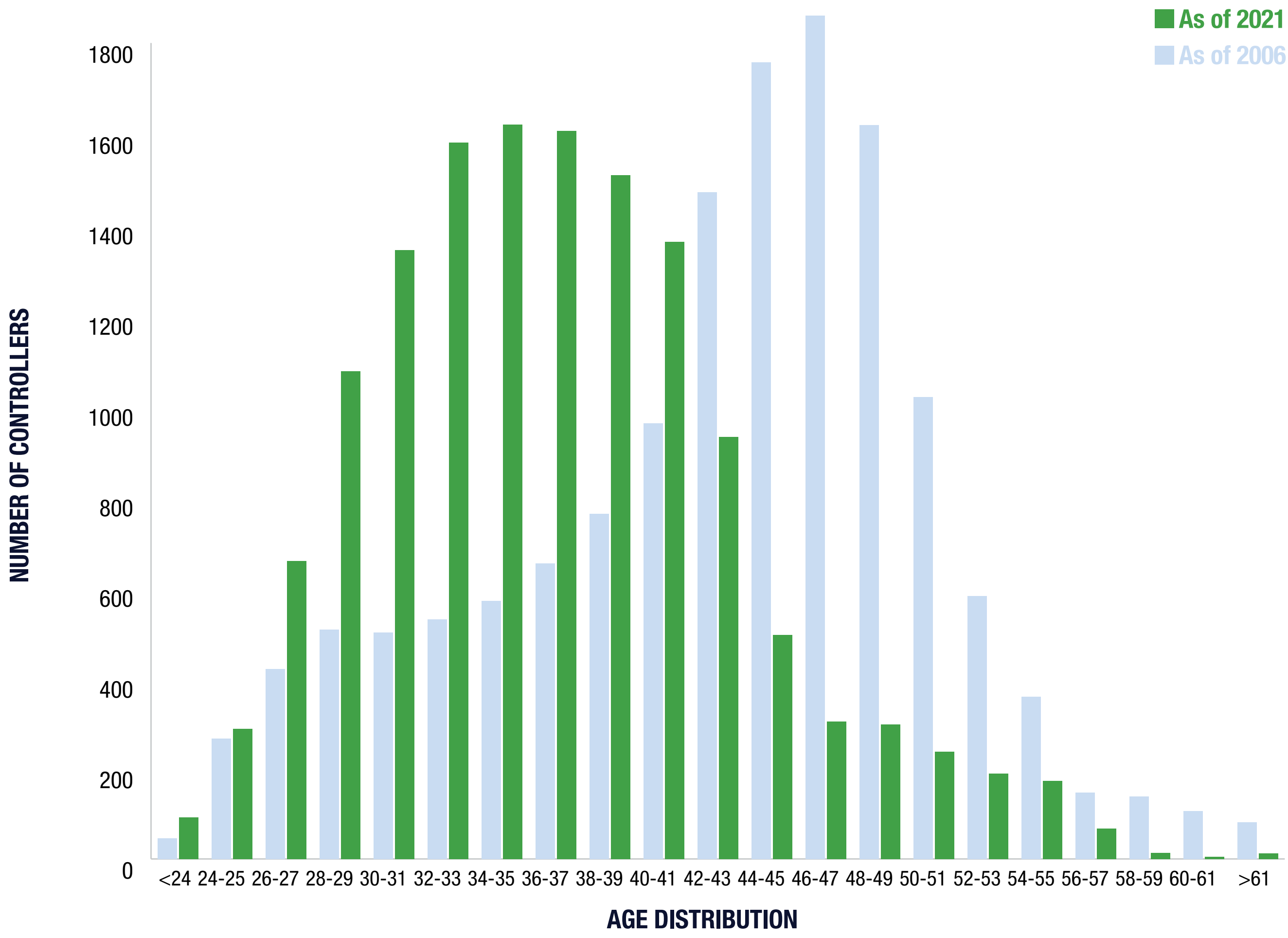


FIGURE 4.2 CONTROLLER WORKFORCE AGE DISTRIBUTION AS OF SEPTEMBER 25, 2021



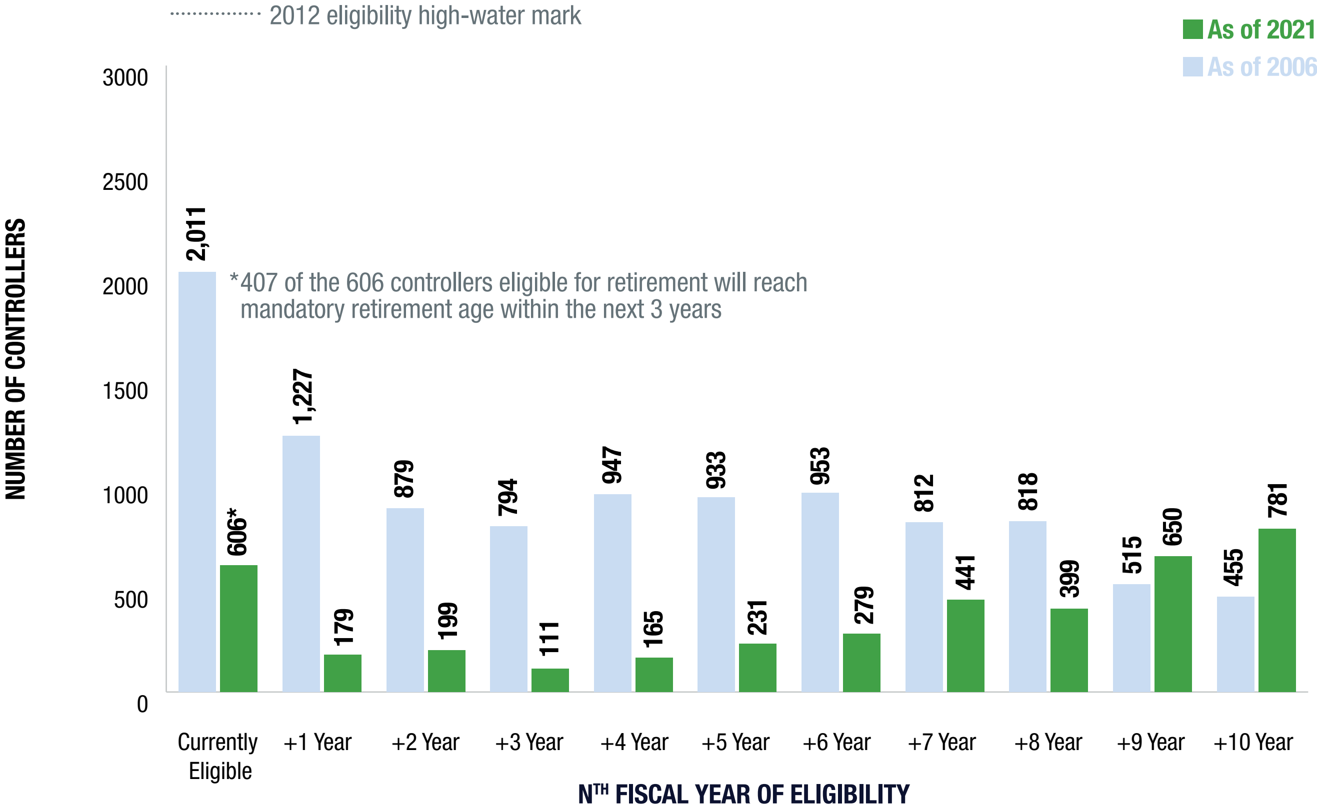
CONTROLLER WORKFORCE AGE DISTRIBUTION

The FAA 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 2006, the blue shaded age distribution peak on the right side of Figure 4.2 was almost 1,900 controllers. Today, the magnitude of that remaining peak is down to 317 controllers because the majority of the controllers hired shortly after the 1981 strike have already retired and been replaced. As Figure 4.2 shows, the current FAA controller workforce is substantially younger on average than it was in 2006. This was driven by relatively high levels of hiring within the last several years.

The FAA's hiring plan is designed to phase in new hires as needed. Figure 4.2 shows that the majority of the FAA controller workforce has been hired in the last 10-15 years and are ages 26-43. There is a relatively small number of controllers approaching mandatory retirement at age 56 over the next few years.

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

FIGURE 4.3 RETIREMENT ELIGIBILITY



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 of "good time" service). "Good time" is defined as service in a covered position 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 25, 2021 and those projected to become retirement-eligible each fiscal year for the next 10 fiscal years. FAA projections show that an additional 179 controllers will become eligible to retire in FY 2022. The number of retirement-eligible controllers has been in decline in recent years from the peak and should continue to decline for the next few years. Figure 4.3 also clearly shows that the current number of retirement-eligible controllers is substantially below the level in 2006 and below 2012 high-water mark. It further shows, based on the profile of the current controller workforce, that the number of additional controllers becoming retirement-eligible in each of the next few years is substantially below those incremental values from 2006.

Due to advance hiring, we have sufficient new hires in place to replace controllers currently eligible to retire when they do retire. The FAA strives to minimize retirement, hiring and training spikes through the process of examining trends and proactively planning years in advance of expected activity.

CONTROLLER RETIREMENT PATTERN

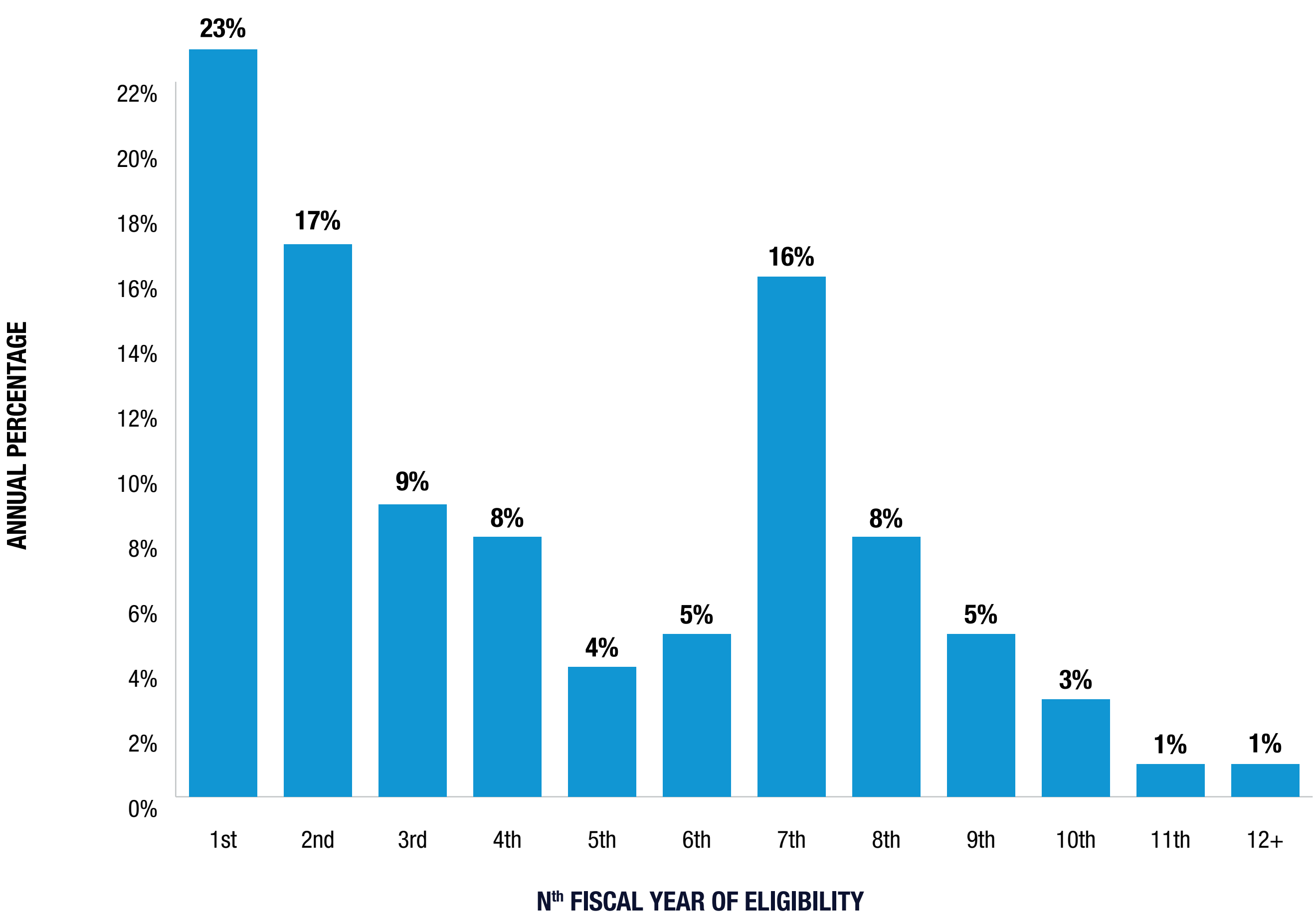
History shows that not all controllers retire when they first become eligible. Recent data shows that 23 percent of controllers who first became eligible actually retired that year.

The FAA has observed that many controllers delay 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



FY 2007 was the high-water mark for controller retirements. Annual retirements are expected to continue to decline for the next several years.

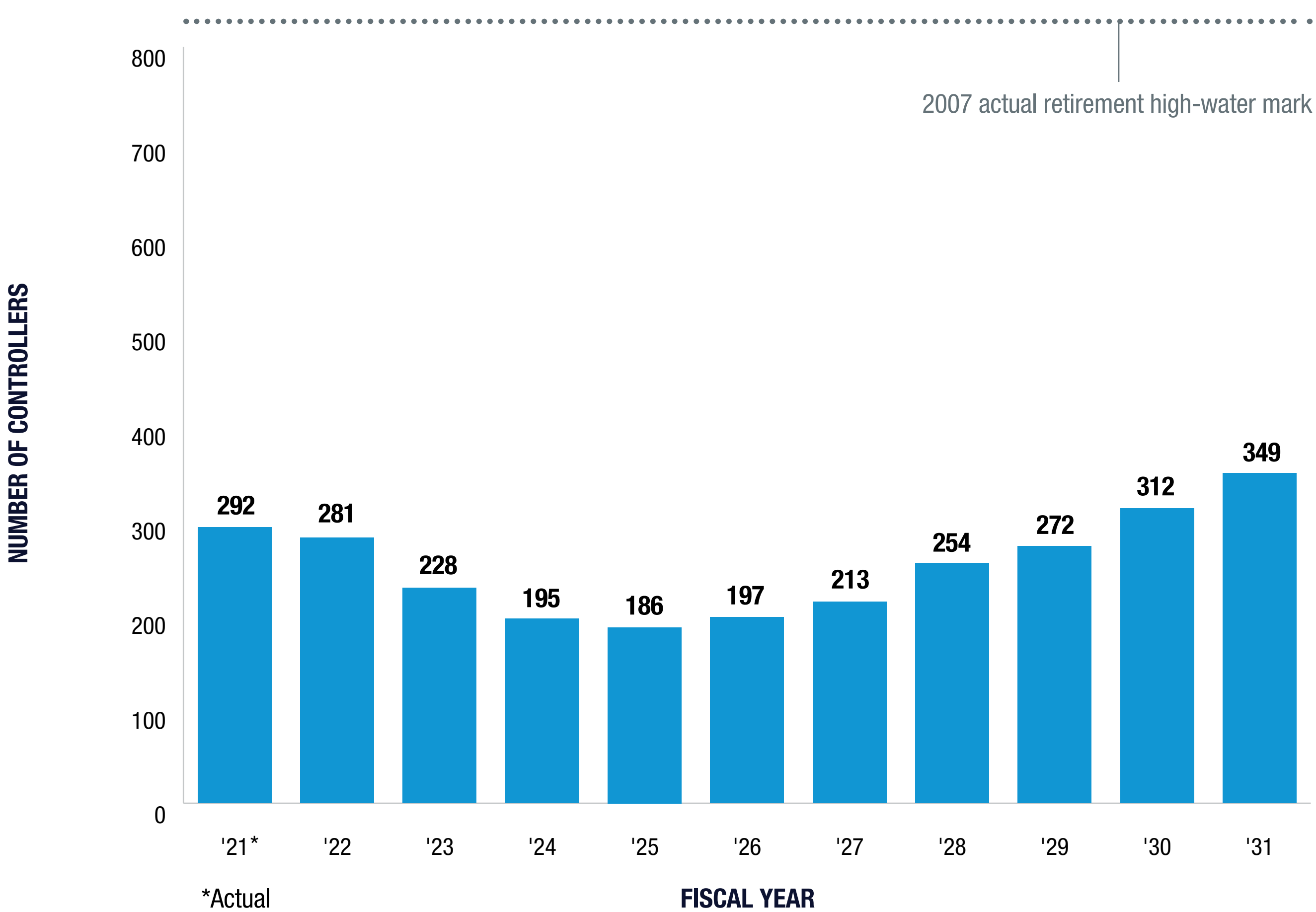
CONTROLLER LOSSES DUE TO RETIREMENTS

For the current plan, the FAA incorporated FY 2018 through FY 2020 retirement data into the retirement histogram used for future retirements.

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 FAA applied the histogram percentage in Figure 4.3 to the retirement pattern in Figure 4.4 to estimate in Figure 4.5 the retirements for each class by year.

FIGURE 4.5 RETIREMENT PROJECTION



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	2021 (actual)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Number of Controllers	106	94	95	95	95	96	96	97	97	98	98

DEVELOPMENTAL ATTRITION

Estimated losses of trainees who terminate from the FAA while still in developmental status are shown in Table 4.3. Hiring from FY 2013 to FY 2015 was lower than projected, which caused the need for increased hiring from FY 2016 through FY 2018. Correspondingly, this plan incorporates an increased number of developmental failures through 2021 as hires from those years progress through their training program.

TABLE 4.3 DEVELOPMENTAL ATTRITION

Fiscal Year	2021 (actual)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Number of Controllers	85	103	91	92	88	82	74	76	81	86	89

ACADEMY ATTRITION

Estimates of losses from new hires that are not successful in the FAA Academy training program are based on both historical rates and projections, and are shown in Table 4.4. The FAA will continue to monitor academy failure rates moving forward for the impact of these changes and adjust future projections accordingly.

TABLE 4.4 ACADEMY ATTRITION

Fiscal Year	2021 (actual)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Number of Controllers	200	201	229	236	235	219	214	234	238	241	249

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 operations supervisor (OS) or other air traffic management/supervisory positions.

Over the past five years, we've observed an average of 186 net promotions each year from CPC to supervisory positions. The majority of these promotions replace retiring supervisors. As a category, Other/Transfers/Promotions was abnormally high in 2021. Our future projection is more in line with historical norms. We expect total net transfers and promotions to decrease for several years and then level off in future years as seen in Figure 4.6.

FIGURE 4.6 CONTROLLER LOSSES DUE TO PROMOTIONS AND OTHER TRANSFERS

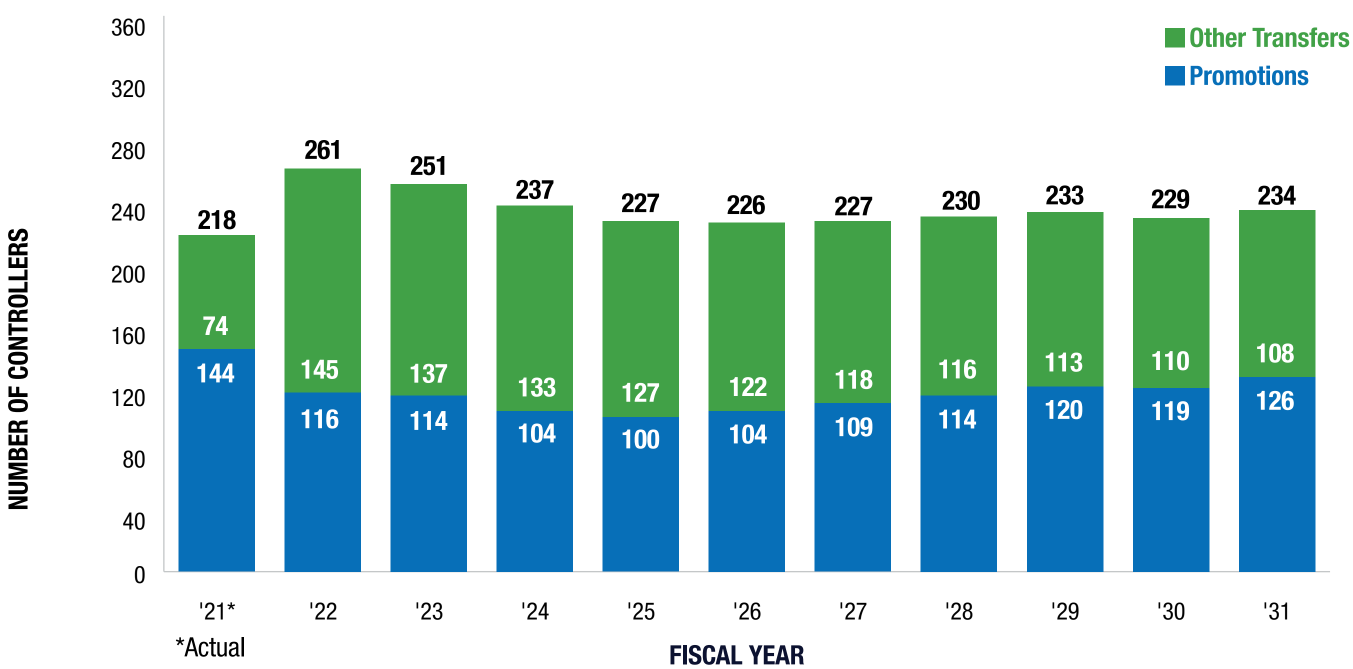
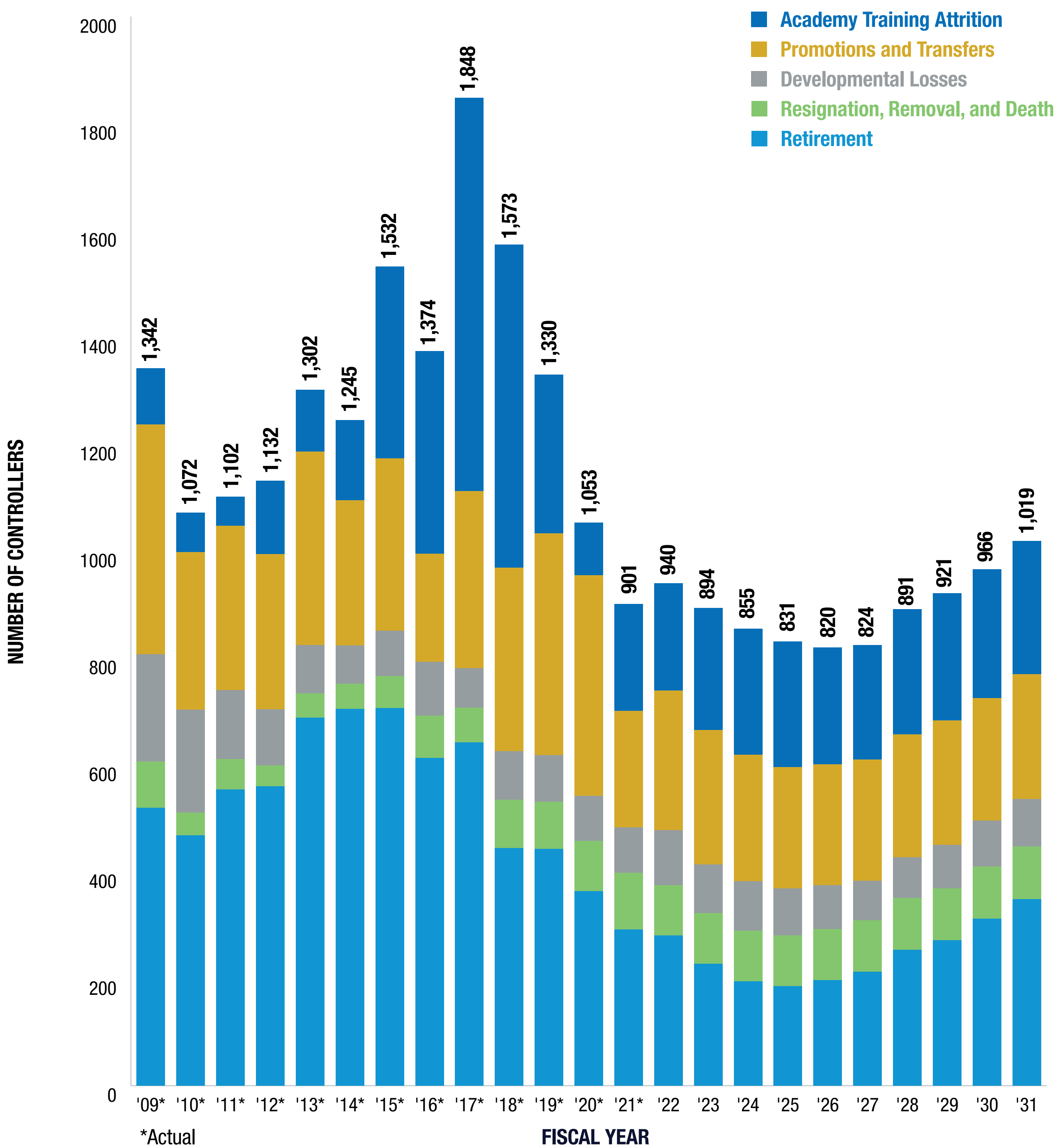


FIGURE 4.7 TOTAL CONTROLLER LOSSES



TOTAL CONTROLLER LOSSES

The FAA projects a total loss of 8,961 controllers over the next 10 years. Should losses outpace projections for FY 2022, the FAA will hire additional controllers as needed to ensure sufficient controllers are available in the future to handle the anticipated workload.

Ch. 5 Hiring Plan

The FAA safely operates and maintains the NAS through 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 its staffing needs to ensure ample training time and 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 FAA 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.

The FAA continues to be able to attract large numbers of qualified controller candidates. Through a revised two-track controller hiring process, and management of staffing distribution, 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 509 controllers compared to the 500 planned controller hires for FY 2021.

Although we met our hiring goal in FY 2020 and FY 2021, we are experiencing the continued impact of the COVID-19 pandemic. Hiring and planning continues with an average hiring goal of over 900 controllers for several years beginning in FY 2022. The number of controllers projected to be hired through FY 2031 is 9,850.

FIGURE 5.1 CONTROLLER HIRING PROFILE

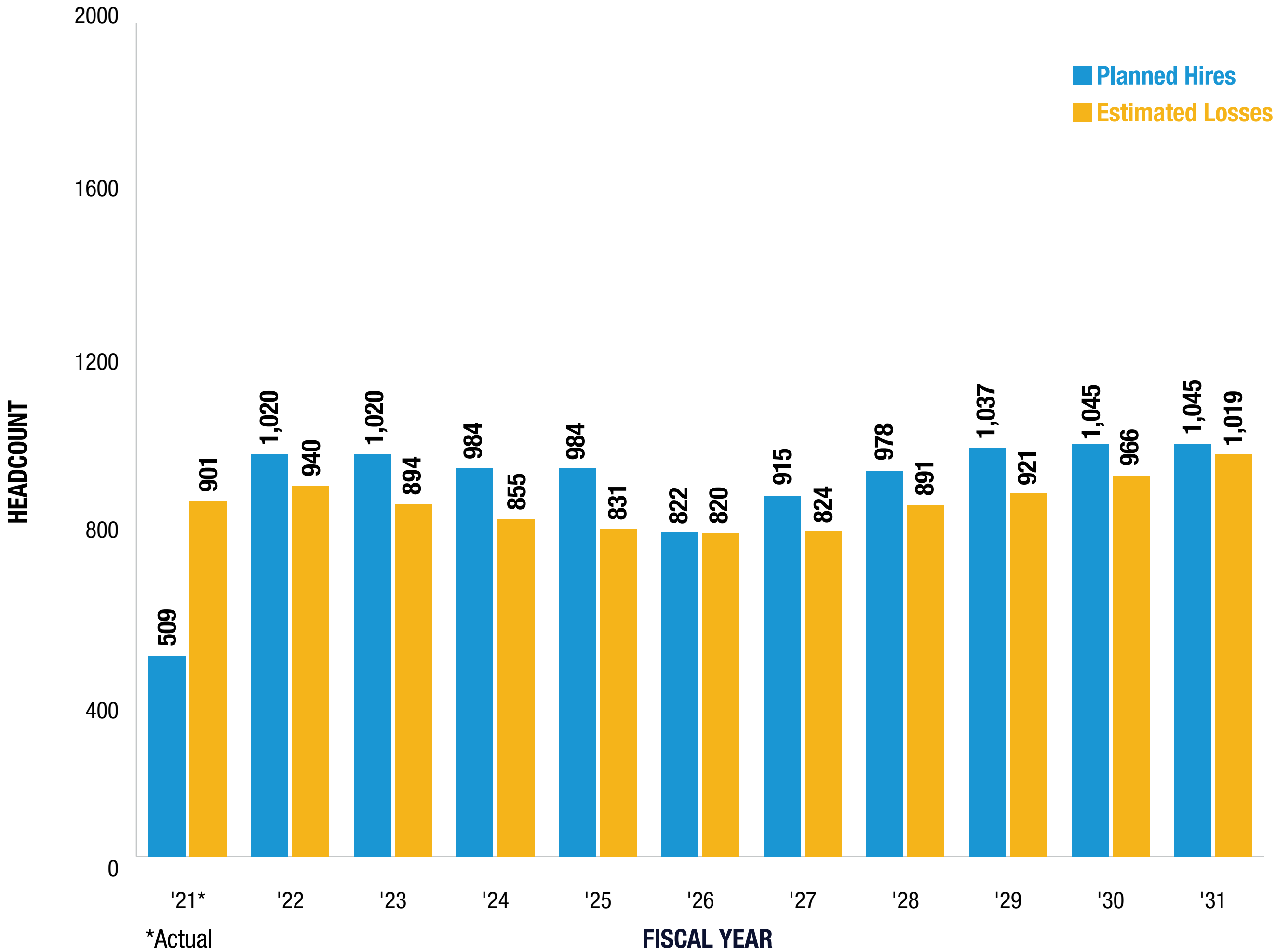
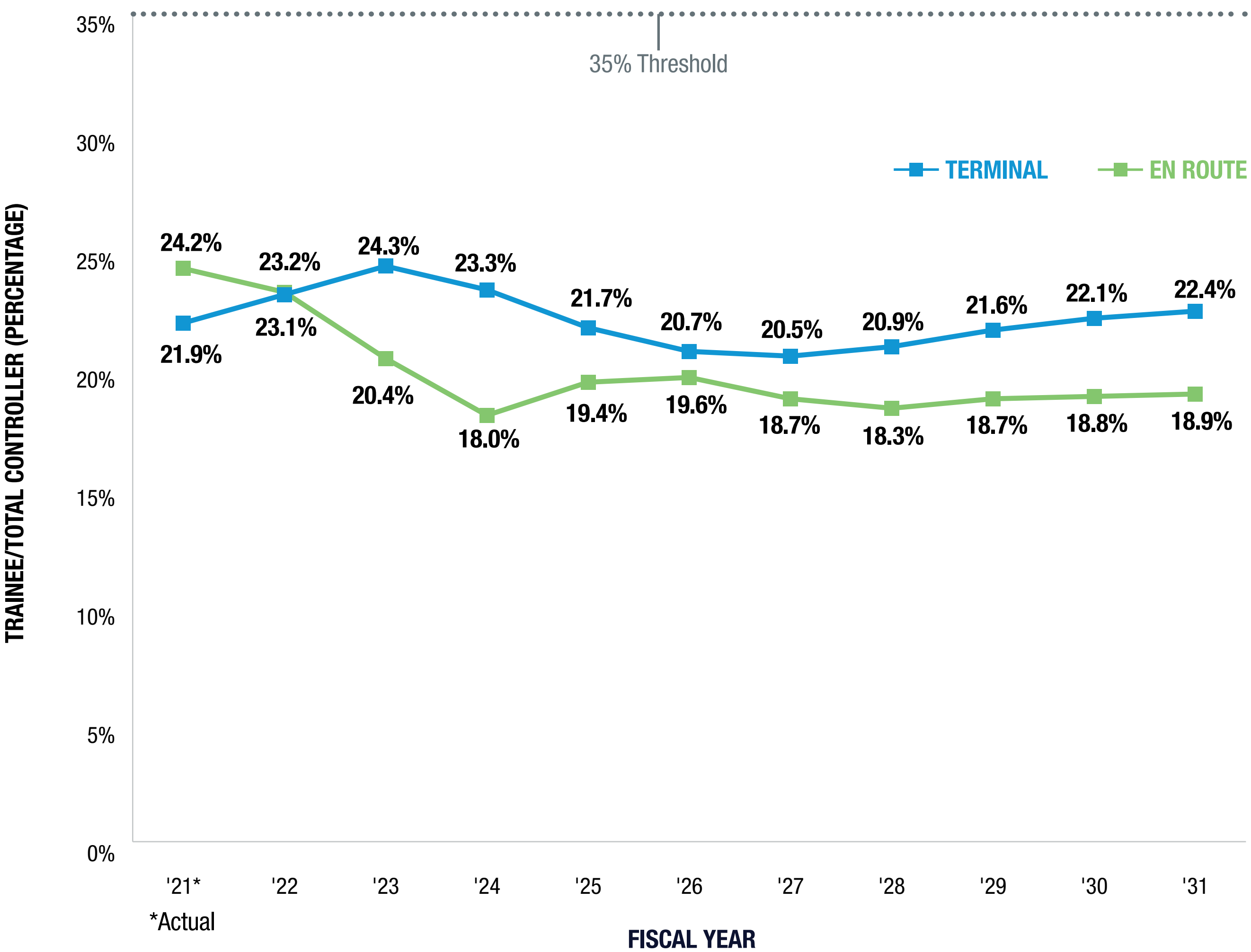


FIGURE 5.2 TRAINEE-TO-TOTAL-CONTROLLER PERCENTAGE



NOTE: The forecast assumes future CPC-IT levels are consistent with FY 2021 levels.

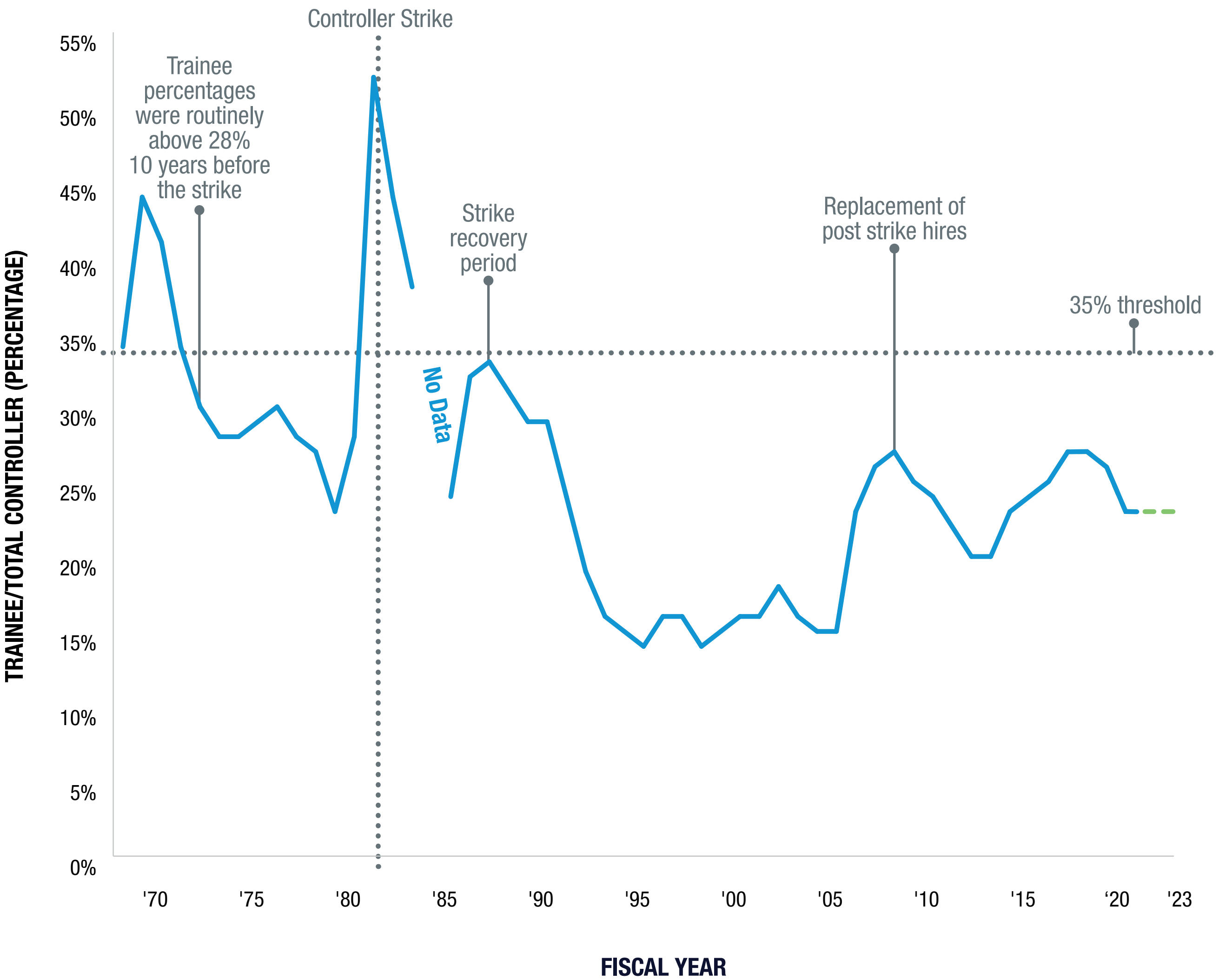
TRAINEE-TO-TOTAL-CONTROLLER PERCENTAGE

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 FAA to measure trainee progress.

Figure 5.2 shows the projected trainee-to-total-controller percentages for En Route and Terminal by year through 2031. The trainee ratio for En Route is generally below Terminal because there tends to be more transfer activity from lower level to higher level Terminal facilities, increasing the number of CPC-ITs. The En Route trainee ratio falls through 2024 due to reduced hiring focus in En Route in 2019-2021.

Note the trainee percentage for both En Route and Terminal is still well below 35 percent.

FIGURE 5.3 HISTORICAL TRAINEE PERCENTAGE



Before the 1981 strike, the FAA experienced trainee percentages ranging from 23 percent to 44 percent. Following the strike, through the end of the hiring wave in 1992, the trainee percentage ranged from 24 percent 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. Figure 5.3 shows historical trainee percentages from 1969 to the present.

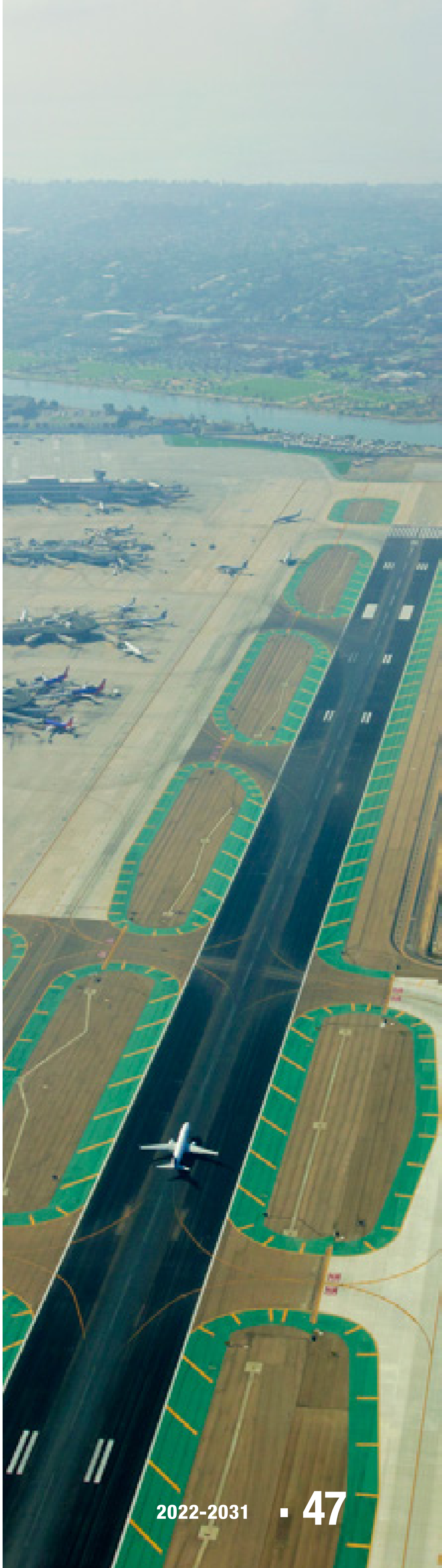
The FAA uses metrics (e.g., 35 percent trainee to total controllers) to manage the flow of trainees while accomplishing daily operations.

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-a-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.



Ch. 6 Hiring Process

CONTROLLER HIRING SOURCES

The FAA has two primary categories of controller hiring sources.

- 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.
- 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.

Examples of other FAA controller hiring sources are the Aviation Development Program (ADP) and Retired Military Controller (RMC) Program. The ADP was developed to increase the hiring and retention of people with targeted disabilities (PWTD) for the ATC Occupation. The RMC program is targeted for certified military controllers who are either on terminal (unused) leave pending retirement or who have retired from active duty within the last 5 years.

RECRUITMENT

The FAA 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) single vacancy announcement for Collegiate Training Initiative (CTI) and certain veterans and general public applicants; (2) a single set of minimum qualifications/eligibility requirements; (3) a multi-hurdle selection process with increased efficiency; and (4) elimination of 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, Public Law 114-190 – FAA Extension, Safety and Security Act (FESSA) of 2016 – was enacted. The law established two hiring tracks totaling three distinct hiring pools. It also included requirements to balance the pools and a requirement that allowed no more than a 10 percent variance between pools. The tracks are: Track 1, Pool 1 - CTI and Veterans, Track 1, Pool 2 - General Public, and Track 2 - Previous Experience.

Public Law 116-92, the National Defense Authorization Act of 2020 (NDAA) replaced the Track 1 pool balancing requirements (Pool 1 - CTI graduates/preference eligible veterans & Pool 2 - general public applicants) with a prerequisite to prioritize Pool 1 applicants, giving preferential consideration by qualification category (Best Qualified, Well Qualified, and Qualified), which is determined by their Air Traffic Skills Assessment result. The NDAA also eliminated the existing 10 percent variance requirement between pools from FESSA. These actions give the FAA better access to the most qualified applicants.

After eligible applicants have completed the required pre-employment Air Traffic Skills Assessment (AT-SA), all candidates who received passing AT-SA results are then referred to the Air Traffic Organization (ATO) for further employment consideration. Once the ATO has completed their review and subsequently made their tentative selections, these are returned to Aviation Careers, Human Resource Management for processing. Aviation Careers notifies selectees and upon acceptance of the tentative offer, 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 FAA needs are identified.

The FAA is fully committed in both controller hiring and training to the tenets of Diversity, Equity, Inclusion and Accessibility (DEIA) as outlined in the agency's Diversity and Inclusion Strategic Plan. The FAA is committed to creating and maintaining a diverse and inclusive workforce and is focused on increasing its outreach and recruitment to underrepresented communities. These efforts include Persons with Disabilities (PWD) and Persons with Targeted Disabilities (PWTD), the Aviation Development Program (ADP), and outreach to Minority Serving Institutions (MSIs), Hispanic Serving Institutions (HSI) and Historically Black Colleges and Universities (HBCUs). These outreach and recruitment actions will ensure the principles of diversity, equity, inclusion and accessibility apply to its workforce and give the FAA access to more applicants.

In 2021, the FAA's Office of Communication introduced a media campaign called "Level Up." The campaign's goal was to encourage women, minorities, and individuals from underrepresented communities to apply for air traffic control positions. The campaign featured current air traffic controllers and FAA leaders sharing their stories in media interviews and on various social media platforms. The FAA also managed internal outreach to Agency stakeholders including the Employee Associations, Colleges, Universities and CTI Schools, Disability and Veteran audiences, and Congressional offices.

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

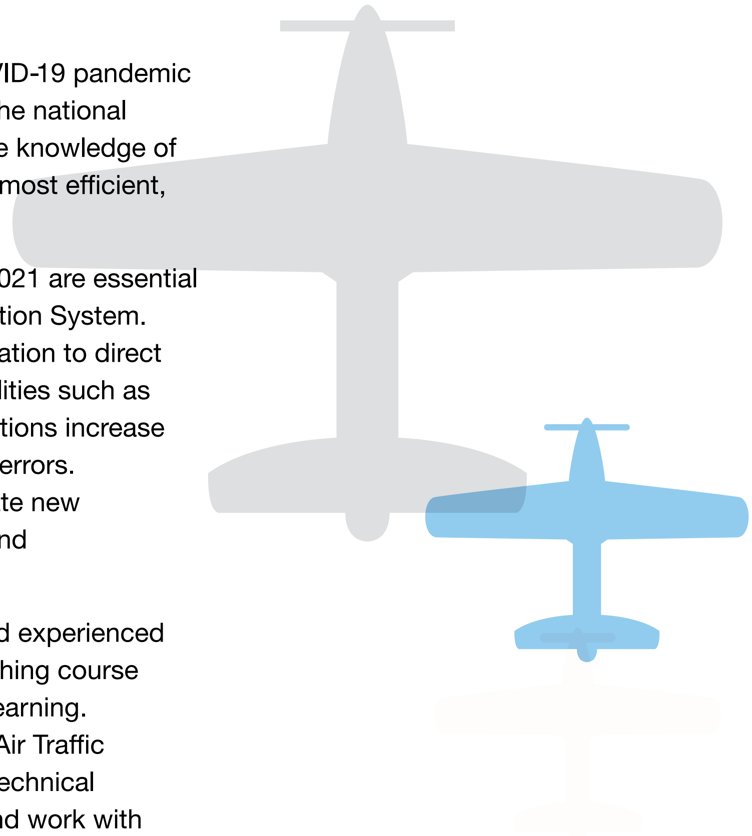
Additionally, the FAA is committed to an air traffic controller training environment that supports DEIA principles. The agency's Office of Civil Rights will ensure continued development and delivery of training that supports and reinforces DEIA principles to employees and managers.

More than 12,000 applicants responded to FAA's July 2021 vacancy announcement.

In FY 2022, 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.

Ch. 7 Training

The FAA is still dealing with the impacts from the COVID-19 pandemic on its controller training program. 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 NAS – today and for the future.



The cohort of air traffic professionals we hired in FY 2021 are essential in our transition to the Next Generation Air Transportation System. Our controllers are increasingly using 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 launches 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 to the training program.

Since the start of FY 2021, 564 newly hired air traffic controllers used FAA provided iPads to take their Air Traffic Basics course from home.

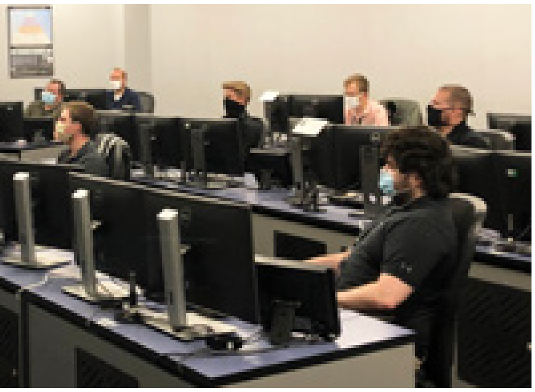
IMPACTS FROM THE COVID-19 PANDEMIC

To address the impact of the pandemic on the throughput of classes, the FAA has evaluated and converted several high demand courses. The initial FAA Academy course, Air Traffic Basics, was converted to a 100% virtual format using a combination of web-based lessons and instructor-facilitated individual and class activities. Initial qualification courses for new hires restarted at the FAA Academy in July of 2020 at a reduced capacity. The FY 2022 schedule incorporates a phased approach designed to reach normal capacity later this fiscal year.

A contingency plan for controllers in the field in certification training, both initial and CPC, was implemented to mitigate skill decay; trainees are using the mobile learning platform tools to engage in online training activities.

Several instructor-led, specialized courses were converted to a virtual delivery format and several more are in the process of being converted. A traveling instructor crew was deployed to several remote locations to conduct Terminal Basic Radar Training. This response has reduced risks of exposure to COVID-19 to FAA Academy students and controllers in the field.

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 FAA Academy assists in delivering 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 certified professional controller, 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 flight deck in most of the nation's air carriers. Their observations enhance their awareness of effects of air traffic control instructions. An integrated, automated process for requesting, executing and reporting the controller's flight deck experience make this supplemental training informative and beneficial.

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. Collaboratively developed and delivered to the controller and supervisory workforce, recurrent training ensures that the operational workforce is aware and prepared to mitigate the day-to-day risks associated with controlling traffic in the NAS.

DESIGNING AND DELIVERING EFFECTIVE TRAINING

Experienced instructors, certified professional controllers 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 utilizes a process for the design, development, delivery and maintenance of its certification and specialized air traffic training courses. The Air Traffic Basics, En Route and Terminal certification training courses are designed to train a younger, diverse and technologically savvy workforce. Advanced technology, modern learning theory, human factors concepts, and professionalism skills are incorporated into our courses. Managers and supervisors receive training on new training approaches. Throughout each phase of the controllers' career, training is available to ensure they have the right skills at the right time.

VIRTUAL TRAINING TECHNOLOGIES

The FAA operates the high-fidelity Tower Simulator System (TSS). The TSS is a complete training solution that provides an interactive, realistic environment for controller training. There are 59 fixed simulators installed at major airports and 48 mobile systems that are deployed to smaller airports with training needs.

The TSS is a valuable tool because it allows a controller to practice their decision-making skills in a controlled environment. It also allows the controller to practice emergency procedures and receive immediate feedback of performance. Because controllers practice their safety skills in a simulator, they will be fully prepared for real life emergencies.

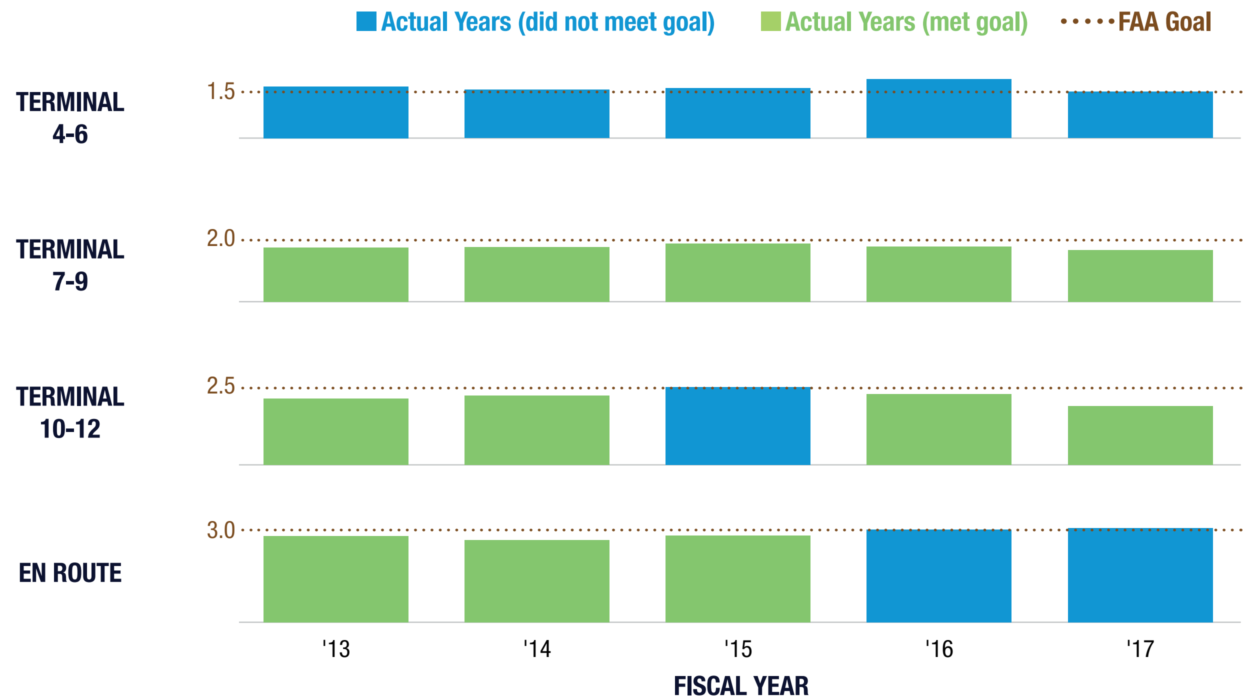
The TSS has proven a wise investment. It has reduced the time-to-certification by 27% and increased safety NAS wide. Simulator technology continues to improve, and we plan to integrate it into our training.

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-a-half to three years.

Over 60 percent of those who began training in FY 2013 through FY 2017 successfully completed training at their first facility or a subsequent facility.

TABLE 7.1 YEARS TO CERTIFY (FIRST ASSIGNED FACILITY ONLY)



Completion means that employees achieved CPC status. The remaining members of the hiring classes (40 percent) have been removed from the FAA, 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 FAA 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 FY 2013 through FY 2017. 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. Training data for hiring classes after FY 2017 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. Because of the pandemic, fewer controllers were certified in FY 2021. The 2018 hiring class has not yet met the threshold to be shown in Table 7.1 because of COVID-19. Approximately 29 percent of the FY 2018 hiring class is still actively in training and may not meet the training target times shown above.

INVESTING FOR THE FUTURE

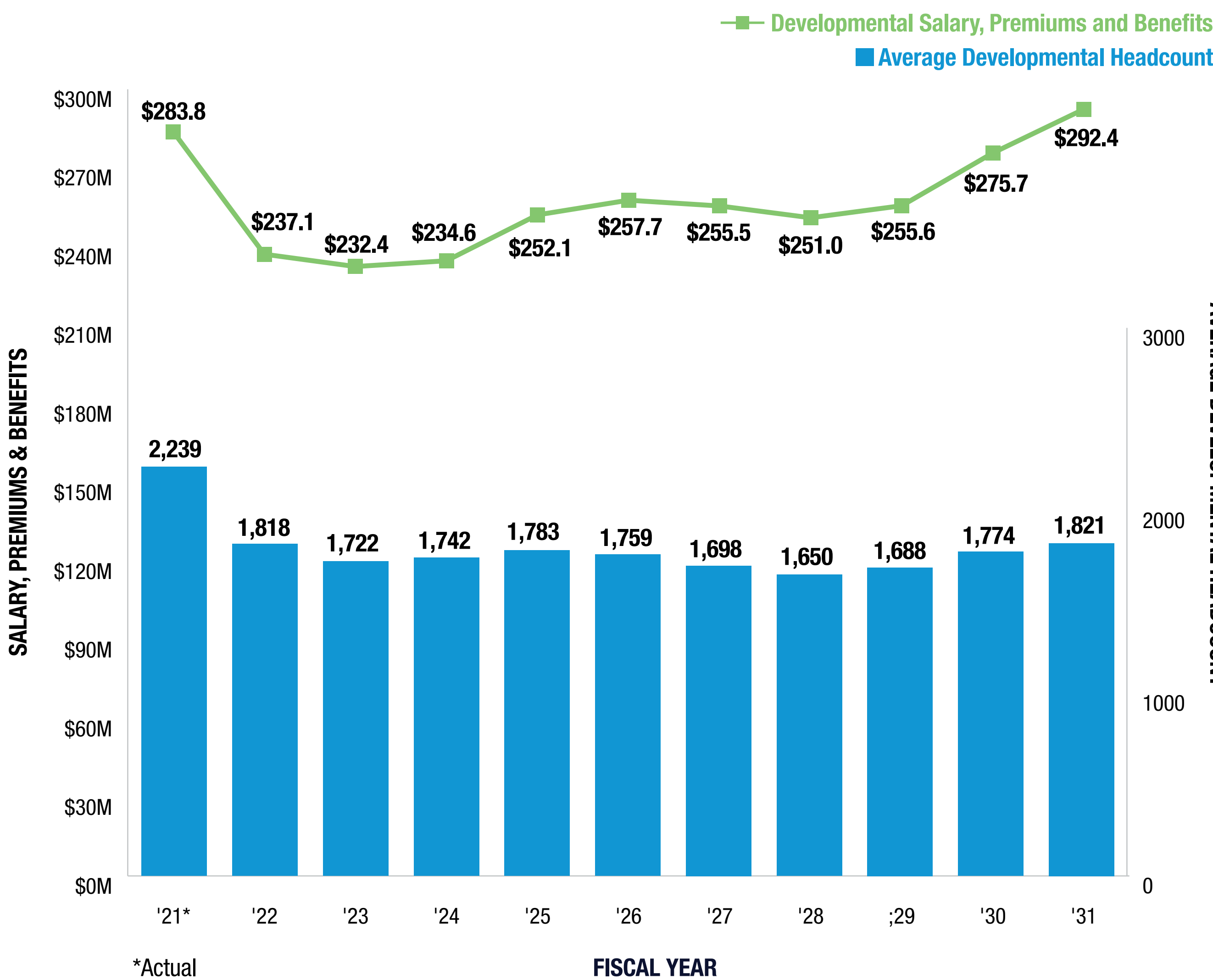
As the FAA transitions to NextGen, the key to providing safe, reliable and efficient air traffic services remains the same: highly skilled, trained and certified professionals. The FAA must maintain curricula to keep pace with the evolving NAS, modernize how it trains employees, incorporate new techniques 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 so the FAA can make predictions on how training programs will need to change as NextGen evolves.

Ch. 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 controller in FY 2022 is projected to be $130,418 including salary and benefits.

Figure 8.1 depicts expected annual compensation costs of developmentals, as well as the expected number of developmentals by year through 2031. As training takes one-and-a-half to three years, the chart depicts a rolling total of hires and costs from the current and previous years.

FIGURE 8.1 ESTIMATED COST OF DEVELOPMENTALS BEFORE CERTIFICATION



Appendix

FACILITY STAFFING RANGES

The Appendix below presents controller staffing ranges, by facility, for En Route and Terminal air traffic control facilities. Additional detail on how the staffing ranges are calculated is provided in Chapter 3. Given the drop in current traffic levels due to the COVID-19 pandemic, we kept the staffing ranges at 2020 levels and will review again in future plans when traffic stabilizes.

In general, the FAA strives to keep the number of CPCs + 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 09/25/21				Staffing range	
ID	FACILITY NAME	CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
ZAB	Albuquerque ARTCC	155	2	49	206	180	220
ZAN	Anchorage ARTCC	77	5	29	111	83	102
ZAU	Chicago ARTCC	277	11	57	345	277	338
ZBW	Boston ARTCC	174	9	33	216	178	218
ZDC	Washington ARTCC	254	19	69	342	258	315
ZDV	Denver ARTCC	211	10	32	253	231	282
ZFW	Fort Worth ARTCC	240	10	57	307	245	300
ZHU	Houston ARTCC	243	4	42	289	233	285
ZID	Indianapolis ARTCC	222	20	77	319	266	326
ZJX	Jacksonville ARTCC	208	4	29	241	235	287
ZKC	Kansas City ARTCC	208	7	37	252	208	255
ZLA	Los Angeles ARTCC	195	17	46	258	231	282
ZLC	Salt Lake City ARTCC	132	8	14	154	154	189
ZMA	Miami ARTCC	220	12	50	282	214	262
ZME	Memphis ARTCC	197	7	74	278	235	288
ZMP	Minneapolis ARTCC	220	10	54	284	216	264
ZNY	New York ARTCC	207	9	89	305	235	287

En Route

		Actual on board as of 09/25/21				Staffing range	
ID	FACILITY NAME	CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
ZOA	Oakland ARTCC	156	9	95	260	193	236
ZOB	Cleveland ARTCC	252	19	62	333	277	338
ZSE	Seattle ARTCC	133	9	33	175	142	173
ZSU	San Juan ARTCC	34	1	38	73	47	57
ZTL	Atlanta ARTCC	277	43	55	375	308	376
ZUA	Guam ARTCC	13	2	5	20	14	17
	En Route Total	4,305	247	1,126	5,678	4,660	5,697

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

Terminal

		Actual on board as of 09/25/21				Staffing range	
ID	FACILITY NAME	CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
A11	Anchorage TRACON	19	2	3	24	21	25
A80	Atlanta TRACON	80	14	0	94	92	113
A90	Boston TRACON	60	11	0	71	70	86
ABE	Allentown Tower	26	0	6	32	23	28
ABI	Abilene Tower	15	0	8	23	14	18
ABQ	Albuquerque Tower	17	9	9	35	26	31
ACK	Nantucket Tower	7	0	1	8	9	10
ACT	Waco Tower	19	2	1	22	16	20
ACY	Atlantic City Tower	19	1	10	30	18	23
ADS	Addison Tower	9	1	1	11	11	14
ADW	Andrews Tower	13	0	2	15	10	12
AFW	Alliance Tower	13	1	2	16	15	18
AGC	Allegheny Tower	12	2	1	15	12	15
AGS	Augusta Tower	12	0	6	18	13	16
ALB	Albany Tower	23	1	12	36	19	23
ALO	Waterloo Tower	10	0	5	15	10	12
AMA	Amarillo Tower	19	0	4	23	14	17
ANC	Anchorage Tower	20	1	2	23	22	26
APA	Centennial Tower	17	3	2	22	20	25
APC	Napa Tower	7	0	6	13	7	8
ARB	Ann Arbor Tower	9	1	0	10	8	10
ARR	Aurora Tower	10	1	2	13	9	11
ASE	Aspen Tower	8	1	8	17	11	13
ATL	Atlanta Tower	42	3	0	45	47	58
AUS	Austin Tower	35	7	0	42	38	46
AVL	Asheville Tower	14	3	2	19	15	18

Terminal

		Actual on board as of 09/25/21				Staffing range	
	FACILITY NAME	CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
AVP	Wilkes-Barre Tower	16	0	7	23	16	20
AZO	Kalamazoo Tower	50	2	9	61	49	59
BDL	Bradley Tower	16	0	4	20	12	15
BED	Hanscom Tower	13	0	5	18	12	14
BFI	Boeing Tower	15	1	5	21	17	21
BFL	Bakersfield Tower	16	0	7	23	17	21
BGM	Binghamton Tower	13	0	3	16	11	14
BGR	Bangor Tower	17	0	8	25	18	22
BHM	Birmingham Tower	22	2	9	33	24	29
BIL	Billings Tower	17	0	6	23	17	21
BIS	Bismarck Tower	10	0	3	13	10	12
BJC	Broomfield Tower	11	2	0	13	12	15
BNA	Nashville Tower	34	4	2	40	39	48
BOI	Boise Tower	23	3	1	27	29	35
BOS	Boston Tower	26	5	0	31	31	38
BPT	Beaumont Tower	9	0	3	12	9	11
BTR	Baton Rouge Tower	16	1	7	24	15	18
BTV	Burlington Tower	21	0	5	26	16	19
BUF	Buffalo Tower	34	1	4	39	25	31
BUR	Burbank Tower	16	0	8	24	16	20
BWI	Baltimore Tower	19	3	0	22	21	26
C90	Chicago TRACON	70	16	2	88	90	110
CAE	Columbia Tower	20	1	5	26	19	24
CAK	Akron-Canton Tower	16	0	2	18	14	17
CCR	Concord Tower	9	0	3	12	9	11
CDW	Caldwell Tower	10	0	2	12	10	12
CHA	Chatanooga Tower	16	3	2	21	16	20
CHS	Charleston Tower	21	1	1	23	22	27
CID	Cedar Rapids Tower	12	0	5	17	14	17
CKB	Clarksburg Tower	15	0	4	19	13	16
CLE	Cleveland Tower	46	14	2	62	37	46
CLT	Charlotte Tower	83	5	2	90	80	98
CMA	Camarillo Tower	10	0	3	13	9	11
CMH	Columbus Tower	34	4	1	39	39	48
CMI	Champaign Tower	13	1	4	18	14	17
CNO	Chino Tower	10	3	1	14	11	13
COS	Colorado Springs Tower	20	6	0	26	23	29
CPR	Casper Tower	13	0	1	14	11	13

Terminal

ID	FACILITY NAME	Actual on board as of 09/25/21				Staffing range	
		CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
CPS	Downtown Tower	10	0	3	13	9	11
CRP	Corpus Christi Tower	29	3	4	36	29	35
CRQ	Palomar Tower	12	0	1	13	10	12
CRW	Charleston Tower	16	2	4	22	16	20
CSG	Columbus Tower	7	0	0	7	7	8
CVG	Cincinnati Tower	32	13	1	46	40	48
D01	Denver TRACON	64	15	1	80	76	92
D10	Dallas - Ft Worth TRACON	70	33	1	104	87	106
D21	Detroit TRACON	43	13	0	56	49	59
DAB	Daytona Beach Tower	46	7	2	55	50	61
DAL	Dallas Love Tower	20	2	1	23	21	26
DAY	Dayton Tower	13	0	2	15	11	14
DCA	Washington National Tower	24	4	1	29	25	31
DEN	Denver Tower	24	7	1	32	38	47
DFW	DFW Tower	46	9	0	55	53	65
DLH	Duluth Tower	14	0	9	23	17	21
DPA	Dupage Tower	14	1	3	18	14	17
DSM	Des Moines Tower	21	0	4	25	18	21
DTW	Detroit Tower	30	3	0	33	29	35
DVT	Deer Valley Tower	15	3	1	19	18	22
DWH	Hooks Tower	14	0	0	14	10	12
ELM	Elmira Tower	13	0	4	17	9	11
ELP	El Paso Tower	18	2	9	29	19	24
EMT	El Monte Tower	7	0	2	9	9	11
ERI	Erie Tower	10	0	1	11	9	11
EUG	Eugene Tower	20	1	1	22	18	22
EVV	Evansville Tower	15	0	7	22	13	15
EWR	Newark Tower	26	12	1	39	33	40
F11	Central Florida TRACON	35	17	3	45	52	64
FAI	Fairbanks Tower	17	0	6	23	17	21
FAR	Fargo Tower	18	0	0	18	17	21
FAT	Fresno Tower	22	1	7	30	21	26
FAY	Fayetteville Tower	13	0	13	26	18	22
FCM	Flying Cloud Tower	10	0	4	14	10	12
FFZ	Falcon Tower	11	1	0	12	13	16
FLL	Fort Lauderdale Tower	22	0	1	23	25	31
FLO	Florence Tower	12	0	3	15	10	12
FNT	Flint Tower	10	0	1	11	8	10

Terminal

ID	FACILITY NAME	Actual on board as of 09/25/21				Staffing range	
		CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
FPR	St Lucie Tower	11	1	0	12	11	13
FRG	Farmingdale Tower	11	2	1	14	12	14
FSD	Sioux Falls Tower	17	1	1	19	15	18
FSM	Fort Smith Tower	24	0	10	34	23	28
FTW	Meacham Tower	15	1	2	18	16	19
FWA	Fort Wayne Tower	22	0	3	25	18	22
FXE	Fort Lauderdale Executive Tower	14	2	4	20	14	17
GCN	Grand Canyon Tower	6	0	3	9	7	9
GEG	Spokane Tower	25	1	6	32	23	29
GFK	Grand Forks Tower	20	0	0	20	18	21
GGG	Longview Tower	17	0	8	25	15	18
GPT	Gulfport Tower	16	0	3	19	13	16
GRB	Green Bay Tower	19	0	3	22	17	20
GRR	Grand Rapids Tower	13	0	1	14	10	12
GSO	Greensboro Tower	24	1	6	31	22	27
GSP	Greer Tower	17	2	8	27	18	23
GTF	Great Falls Tower	15	0	6	21	12	15
HCF	Honolulu Control Facility	76	10	5	91	77	94
HEF	Manassas Tower	8	2	2	12	9	11
HIO	Hillsboro Tower	15	0	4	19	12	15
HLN	Helena Tower	8	0	2	10	9	11
HOU	Hobby Tower	16	3	1	20	18	22
HPN	Westchester Tower	10	0	9	19	11	14
HSV	Huntsville Tower	13	1	5	19	15	18
HTS	Huntington Tower	18	0	3	21	15	19
HUF	Terre Haute /Hulman Tower	16	1	3	20	15	19
HWD	Hayward Tower	7	2	4	13	9	11
I90	Houston TRACON	73	16	0	89	85	103
IAD	Dulles Tower	28	5	1	34	26	32
IAH	Houston Intercontinental Tower	28	5	0	33	32	39
ICT	Wichita Tower	24	3	3	30	26	31
ILG	Wilmington Tower	10	0	1	11	9	11
ILM	Wilmington Tower	14	1	7	22	16	20
IND	Indianapolis Tower	34	9	3	46	38	47
ISP	Islip Tower	18	2	3	23	13	16
ITO	Hilo Tower	14	0	1	15	11	13
JAN	Jackson Tower	15	0	5	20	13	16
JAX	Jacksonville Tower	33	6	9	48	40	49

Terminal

ID	FACILITY NAME	Actual on board as of 09/25/21 CPC	CPC-IT	DEVELOPMENTAL	TOTAL	Staffing range LOW	HIGH
JCF	Joshua Control Facility	14	1	5	20	21	25
JFK	Kennedy Tower	28	9	0	37	31	37
JNU	Juneau Tower	12	0	3	15	11	14
L30	Las Vegas TRACON	31	5	3	39	41	50
LAF	Lafayette Tower	9	0	3	12	8	10
LAN	Lansing Tower	13	1	0	14	11	13
LAS	Las Vegas Tower	29	3	0	32	37	45
LAX	Los Angeles Tower	49	5	0	54	43	53
LBB	Lubbock Tower	14	1	3	18	16	20
LCH	Lake Charles Tower	13	0	6	19	12	15
LEX	Lexington Tower	23	0	4	27	21	25
LFT	Lafayette Tower	18	0	3	21	15	18
LGA	La Guardia Tower	29	10	0	39	30	37
LGB	Long Beach Tower	20	0	0	20	19	23
LIT	Little Rock Tower	21	1	8	30	22	26
LNK	Lincoln Tower	14	0	2	16	9	11
LOU	Bowman Tower	10	0	1	11	9	12
LVK	Livermore Tower	10	0	2	12	10	12
M03	Memphis TRACON	17	2	6	25	27	33
M98	Minneapolis TRACON	46	10	2	58	49	60
MAF	Midland Tower	16	0	9	25	16	20
MBS	Saginaw Tower	7	0	4	11	8	10
MCI	Kansas City Tower	35	3	1	39	30	37
MCO	Orlando Tower	20	2	0	22	26	32
MDT	Harrisburg Tower	21	0	9	30	22	26
MDW	Midway Tower	20	1	1	22	20	24
MEM	Memphis Tower	21	4	1	26	22	26
MFD	Mansfield Tower	9	0	2	11	9	11
MGM	Montgomery Tower	11	3	11	25	17	21
MHT	Manchester Tower	15	0	1	16	12	14
MIA	Miami Tower	66	32	0	98	85	104
MIC	Crystal Tower	10	0	2	12	9	11
MKC	Downtown Tower	15	0	1	16	12	14
MKE	Milwaukee Tower	33	7	1	41	34	41
MKG	Muskegon Tower	8	0	2	10	8	10
MLI	Quad City Tower	17	0	3	20	13	16
MLU	Monroe Tower	10	1	5	16	11	13
MMU	Morristown Tower	11	0	1	12	9	11

Terminal

ID	FACILITY NAME	Actual on board as of 09/25/21 CPC	CPC-IT	DEVELOPMENTAL	TOTAL	Staffing range LOW	HIGH
MOB	Mobile Tower	17	2	1	21	18	21
MRI	Merrill Tower	13	0	0	13	11	13
MRY	Monterey Tower	9	0	0	9	7	9
MSN	Madison Tower	19	0	4	23	18	21
MSP	Minneapolis Tower	33	2	0	35	30	37
MSY	New Orleans Tower	27	6	2	35	32	40
MWH	Grant County Tower	11	1	7	19	12	15
MYF	Montgomery Tower	13	1	1	15	12	15
MYR	Myrtle Beach Tower	20	2	1	23	20	25
N90	New York TRACON	120	18	72	210	173	211
NCT	Northern California TRACON	118	33	2	153	156	191
NEW	Lakefront Tower	12	0	1	13	8	10
OAK	Oakland Tower	17	6	0	23	21	26
OGG	Maui Tower	11	0	4	15	11	14
OKC	Oklahoma City Tower	21	7	8	36	26	32
OMA	Eppley Tower	14	0	1	15	12	15
ONT	Ontario Tower	14	0	9	23	14	17
ORD	Chicago O'Hare Tower	52	14	0	66	63	76
ORF	Norfolk Tower	21	1	5	27	26	31
ORL	Orlando Executive Tower	13	0	0	13	10	12
P31	Pensacola TRACON	32	5	0	37	29	36
P50	Phoenix TRACON	48	9	5	62	56	68
P80	Portland TRACON	23	3	3	29	26	32
PAE	Paine Tower	11	0	0	11	10	12
PAO	Palo Alto Tower	8	0	3	11	8	10
PBI	Palm Beach Tower	41	15	6	62	44	54
PCT	Potomac TRACON	146	20	0	166	144	176
PDK	DeKalb - Peachtree Tower	15	2	3	20	13	16
PDX	Portland Tower	26	1	0	27	23	28
PHF	Patrick Henry Tower	10	1	1	12	8	9
PHL	Philadelphia Tower	58	19	1	78	71	86
PHX	Phoenix Tower	23	5	0	28	29	36
PIA	Peoria Tower	16	1	8	25	16	20
PIE	St Petersburg Tower	9	1	4	14	10	12
PIT	Pittsburgh Tower	31	10	2	43	35	42
PNE	Northeast Philadelphia Tower	10	1	2	13	9	11
PNS	Pensacola Tower	10	0	2	12	10	12
POC	Brackett Tower	10	2	1	13	9	10

Terminal

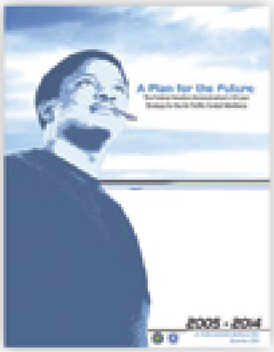
ID	FACILITY NAME	Actual on board as of 09/25/21				Staffing range	
		CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
POU	Poughkeepsie Tower	10	1	1	12	8	9
PRC	Prescott Tower	12	3	0	15	11	14
PSC	Pasco Tower	20	1	0	21	16	19
PSP	Palm Springs Tower	10	0	2	12	9	11
PTK	Pontiac Tower	10	2	1	13	10	13
PUB	Pueblo Tower	10	1	1	12	13	16
PVD	Providence Tower	22	2	9	33	24	29
PWK	Chicago Executive Tower	11	0	1	12	9	11
PWM	Portland Tower	21	0	3	24	18	22
R90	Omaha TRACON	19	2	1	22	19	23
RDG	Reading Tower	11	1	8	20	12	15
RDU	Raleigh-Durham Tower	38	4	2	44	41	50
RFD	Rockford Tower	20	0	3	23	19	23
RHV	Reid-Hillview Tower	11	0	1	12	11	13
RIC	Richmond Tower	14	1	2	17	13	15
RNO	Reno Tower	12	0	3	15	13	15
ROA	Roanoke Tower	21	0	4	25	18	23
ROC	Rochester Tower	20	2	6	28	20	25
ROW	Roswell Tower	11	0	5	16	11	14
RST	Rochester Tower	13	0	2	15	12	15
RSW	Fort Myers Tower	27	5	1	33	26	32
RVS	Riverside Tower	12	0	7	19	12	15
S46	Seattle TRACON	35	3	4	42	49	60
S56	Salt Lake City TRACON	34	4	9	47	40	48
SAN	San Diego Tower	21	3	0	24	22	27
SAT	San Antonio Tower	37	6	4	47	37	45
SAV	Savannah Tower	15	5	3	23	20	25
SBA	Santa Barbara Tower	21	0	10	31	23	28
SBN	South Bend Tower	20	0	9	29	18	23
SCK	Stockton Tower	11	1	0	12	8	10
SCT	Southern California TRACON	186	28	0	214	203	249
SDF	Standiford Tower	39	4	3	46	38	47
SDL	Scottsdale Tower	9	2	1	12	11	14
SEA	Seattle Tower	25	0	1	26	29	36
SEE	Gillespie Tower	12	1	4	17	13	16
SFB	Sanford Tower	15	2	1	18	17	20
SFO	San Francisco Tower	20	10	0	30	30	37
SGF	Springfield Tower	23	0	8	31	25	30

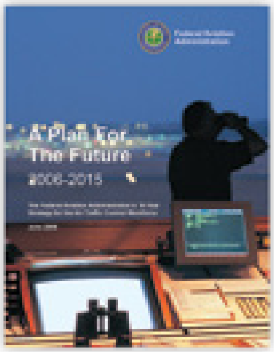
Terminal

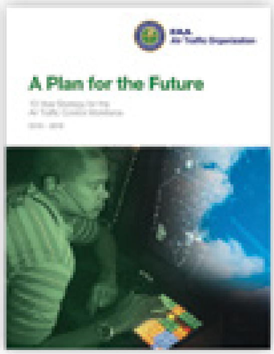
ID	FACILITY NAME	Actual on board as of 09/25/21 CPC	CPC-IT	DEVELOPMENTAL	TOTAL	Staffing range LOW	HIGH
SHV	Shreveport Tower	17	0	10	27	18	22
SJC	San Jose Tower	13	0	6	19	14	17
SJU	San Juan Tower	15	0	1	16	15	18
SLC	Salt Lake City Tower	27	4	0	31	27	33
SMF	Sacramento Tower	14	1	3	18	14	17
SMO	Santa Monica Tower	10	1	7	18	10	12
SNA	John Wayne Tower	18	3	1	22	20	25
SPI	Springfield Tower	12	0	3	15	9	12
SRQ	Sarasota Tower	12	0	3	15	12	14
STL	St Louis Tower	17	2	1	20	18	21
STP	St Paul Tower	13	0	0	13	8	10
STS	Sonoma Tower	7	0	3	10	8	9
STT	St Thomas Tower	11	0	1	12	8	10
SUS	Spirit Tower	11	0	2	13	10	12
SUX	Sioux Gateway Tower	13	0	2	15	11	13
SYR	Syracuse Tower	17	0	7	24	17	21
T75	St Louis TRACON	24	1	5	30	26	31
TEB	Teterboro Tower	16	4	0	20	21	26
TLH	Tallahassee Tower	14	2	3	19	15	19
TMB	Tamiami Tower	14	0	4	18	15	18
TOA	Torrance Tower	9	1	1	11	8	10
TOL	Toledo Tower	22	1	2	25	17	21
TPA	Tampa Tower	41	7	5	53	54	65
TRI	Tri-Cities Tower	11	1	12	24	14	17
TUL	Tulsa Tower	25	5	3	33	25	30
TUS	Tucson Tower	9	2	8	19	12	15
TVC	Traverse City Tower	8	0	2	10	8	10
TWF	Twin Falls Tower	8	0	1	9	7	9
TYS	Knoxville Tower	25	1	10	36	24	29
U90	Tucson TRACON	15	2	3	20	16	20
VGT	North Las Vegas Tower	10	0	1	11	11	13
VNY	Van Nuys Tower	19	4	4	27	17	21
VRB	Vero Beach Tower	12	0	0	12	11	14
Y90	Yankee TRACON	17	1	5	23	19	23
YIP	Willow Run Tower	14	0	1	15	10	12
YNG	Youngstown Tower	16	0	6	22	16	19
	Terminal Total	6,275	784	978	8,037	6,636	8,104

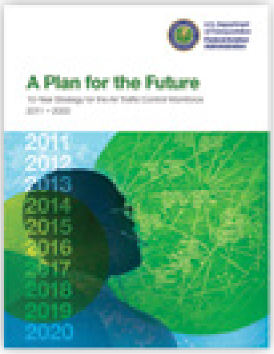
Note: Facility numbers do not include new hires at the FAA Academy

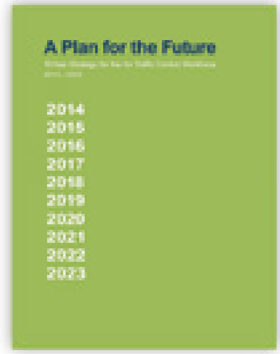
FAA Totals	Actual on board as of 09/25/21				Staffing range	
	CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
En Route total	4,305	247	1,126	5,678	4,660	5,697
Terminal total	6,275	784	978	8,037	6,636	8,104
Facility total	10,580	1,031	2,104	13,715	11,296	13,801
FAA Academy Students				135		
Total Controller Headcount				13,850		

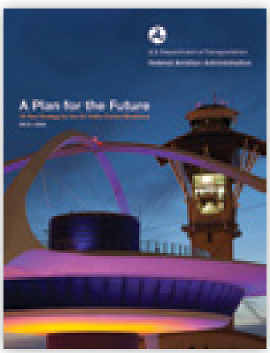


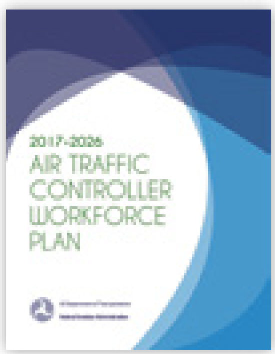


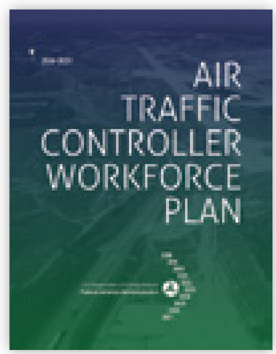



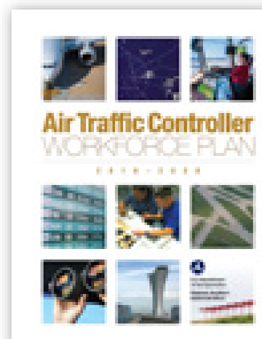


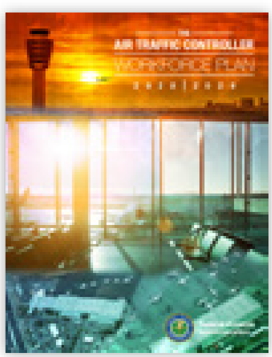












U.S. Department
of Transportation

**Federal Aviation
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