U.S. Department of Transportation
Federal Aviation Administration

A Plan for the Future

10-Year Strategy for the Air Traffic Control Workforce

2015 – 2024

This 2015 report is the FAA's tenth 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 20, 2014.

SECTION (221) OF PUBLIC LAW (108-176) (UPDATED BY PUBLIC LAW 111-117) REQUIRES THE FAA ADMINISTRATOR TO TRANSMIT A REPORT TO THE SENATE COMMITTEE ON COMMERCE, SCIENCE AND TRANSPORTATION AND THE HOUSE OF REPRESENTATIVES COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE THAT DESCRIBES THE OVERALL AIR TRAFFIC CONTROLLER WORKFORCE PLAN. IT IS DUE BY MARCH 31 OF EACH FISCAL YEAR, OTHERWISE THE FAA'S APPROPRIATION IS REDUCED BY $100,000 FOR EACH DAY IT IS LATE.

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Executive Summary

Safety is the top priority of the Federal Aviation Administration (FAA) as it manages America's National Airspace System (NAS). Thanks to the expertise of people and the support of technology, tens of thousands of aircraft are guided safely and expeditiously every day through the NAS to their destinations.

WORKLOAD

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

TRAFFIC

Air traffic demand has declined significantly since 2000, the peak year for traffic. For the purposes of this plan, air traffic includes aircraft that are controlled, separated and managed by air traffic controllers. This includes commercial passenger and cargo aircraft as well as general aviation and military aircraft. Since 2000 traffic volume has declined by 24 percent and is not expected to return to those levels in the near term.

HEADCOUNT

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

RETIREMENTS

Fiscal year 2014 retirements were close to projections, and also slightly higher than 2013 actuals, while 2015 retirements are currently tracking in line with the 2015 projected figure from last year's controller workforce plan. Annual retirements continue to fall since the long-anticipated wave of retirements crested eight years ago, in 2007. Retirements are expected to continue to fall in the next decade. In the last five years, 2,975 controllers have retired. The FAA carefully tracks actual retirements and projects future losses to ensure its recruitment and training keep pace.

HIRING

In the last five years, the FAA has hired approximately 4,400 new air traffic controllers. We plan to hire more than 6,300 new controllers over the next five years to keep pace with expected attrition and traffic growth. Due to the continuing effects of the hiring freeze from March 2013 through December 2013, the FAA hired 1,112 controllers compared to the previously reported plan of 1,286.

TRAINING

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

The FAA continues its efforts in response to an Independent Review Panel in 2011 that focused on air traffic controller selection, assignment and training. The panel, part of a nationwide Call to Action on air traffic control safety and professionalism, delivered its comprehensive set of recommendations to the agency for review and implementation.

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

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

Chapter 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, 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." This practice gives us the flexibility throughout each day to match the number of controllers at each facility with traffic volume and workload.

System-wide, air traffic has declined by 24 percent since peak year 2000. The chart in Figure 1.1 shows that air traffic volume is not expected to return to peak levels in the near term.

Figure 1.1: Traffic Forecast
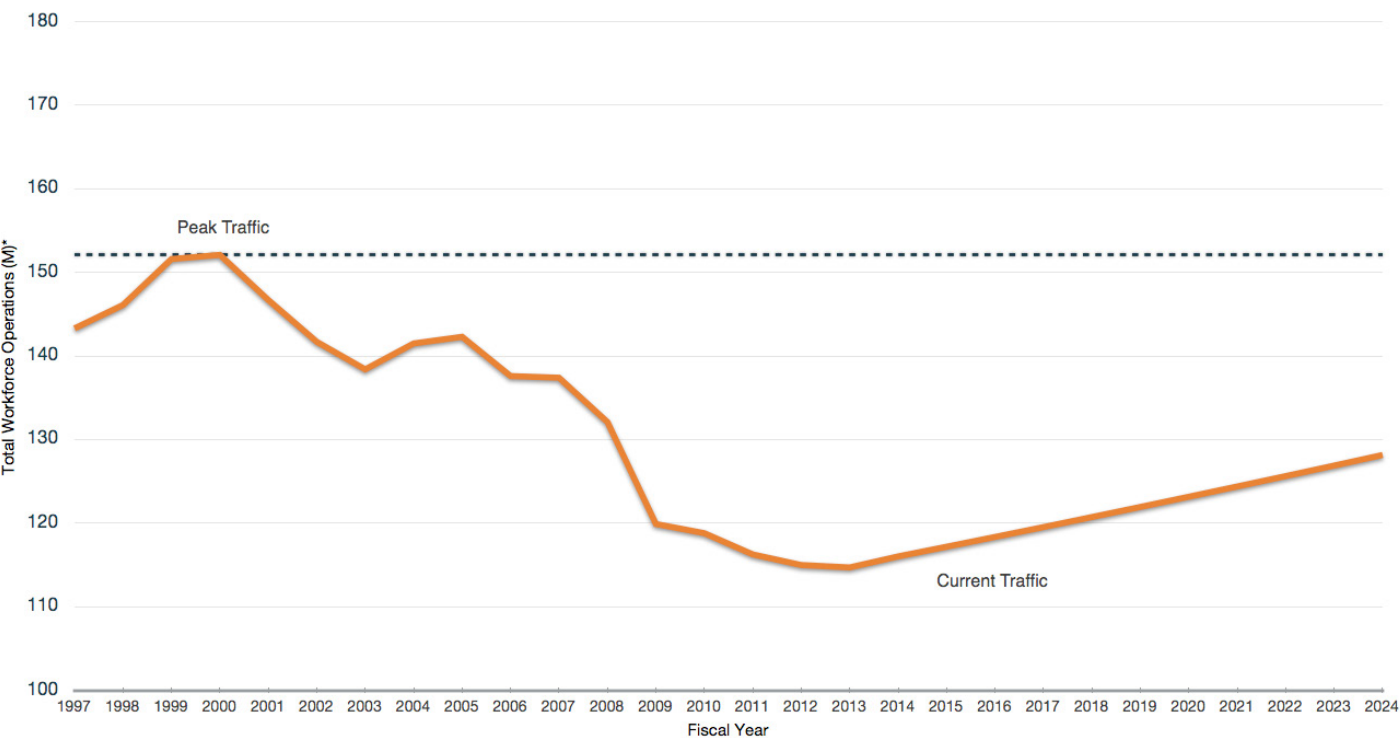
*Total Workforce Operations = Tower + TRACON + Aircraft Handled by En Route Centers

Figure 1.2 shows system-wide controller staffing and traffic, indexed from 2000 and projected through 2024. Indexing is a widely used technique which compares the change over time of two or more data series (in this case, total controller headcount, certified profession controllers (CPC) and certified professional controllers in training (CPC-IT) and traffic). The data series are set equal to each other (or indexed) at a particular point in time (in this case, the year 2000, a high mark for traffic) and measured relative to that index point in each successive year. This way we know how much growth or decline has occurred compared to the base value.

Staffing to traffic not only applies on a daily basis, but also means that we staff to satisfy expected needs two to three years in advance. We do this to ensure sufficient training time for new hires. Despite the decline in air traffic shown in the figure below, "staffing to traffic" requires us to anticipate controller attrition, so that we plan and hire new controllers in advance of need. This is one reason that staffing remains well ahead of traffic. The gap between the green line (Headcount) and the orange line (CPC and CPC-IT staffing) is the advance hire trainee pipeline and is projected to close significantly by 2020. The headcount and CPC+CPC-IT lines converge due to reduced retirements and other losses.

Figure 1.2: System-wide Traffic and Total Controller Trends
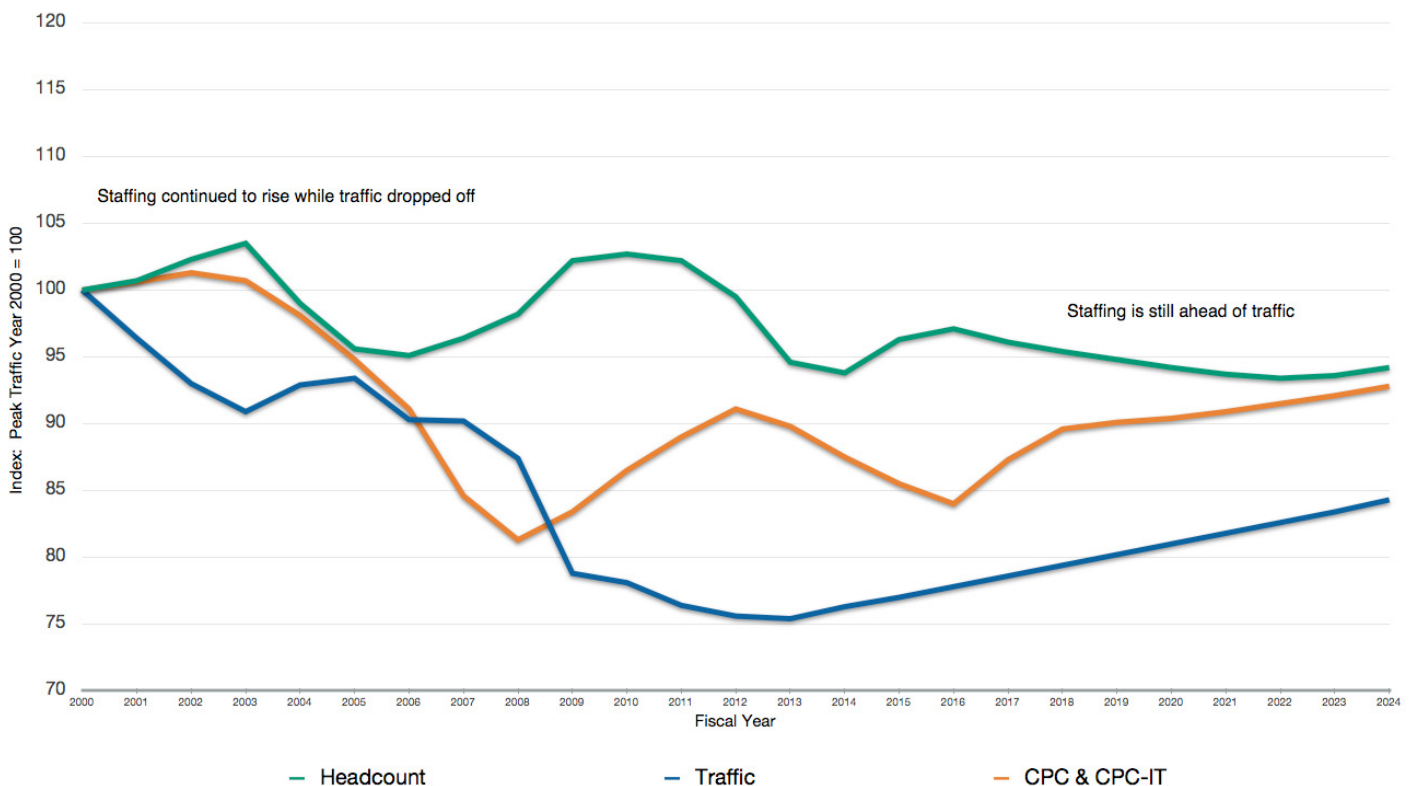
MEETING THE CHALLENGE

The FAA hires in advance to reflect all attrition, not just retirements. While the long-predicted wave of retirements has passed, we revised our plan to increase FY 2015 and FY 2016 hires so that we can catch up from the effects of sequestration and a hiring freeze experienced in the first three months of FY 2014.

The FAA's current hiring plan has been designed to phase in new hires as needed over time. This will avoid creating another major spike in retirement eligibility in future years like the one resulting from the 1981 controller strike. Annual retirements continue to fall as the long-anticipated wave of retirements crested eight years ago, in 2007. Retirements are expected to continue to fall for the next decade. Starting in FY 2017 we will enter a steady-state period in which we expect new hires to approximately mirror the number of losses for the next several years.

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

To address these challenges, the FAA has:

• Convened an Independent Review Panel that focused on air traffic controller selection, assignment and training.

• Implemented changes to its air traffic control hiring process.

• Procured a commercially available off-the-shelf scheduling product that provides a common toolset for FAA facilities to effectively develop and maintain optimal schedules based on traffic, staffing, work rules and qualifications.

Effective and efficient training, properly placing new and transferring controllers, and efficient scheduling of controllers are all important factors in the agency's success.

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

Chapter 2: Facilities and Services

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

More than 14,000 federal air traffic controllers in airport traffic control towers, terminal radar approach control facilities and air route traffic control centers guide pilots through the system. An additional 1,280 civilian contract controllers and more than 10,000 military controllers also provide air traffic services for the NAS.

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

TERMINAL AND EN ROUTE AIR TRAFFIC SERVICES

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

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

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

FAA AIR TRAFFIC CONTROL FACILITIES

As of October 1, 2014, the FAA operated 316 air traffic control facilities, including the Air Traffic Control System Command Center, in the United States. Table 2.1 lists the type and number of these FAA facilities. More than one type of facility may be collocated in the same building.

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

Table 2.1: Types and Number of FAA Air Traffic Control Facilities

Type	Name	Number of Facilities	Description
1	Tower without Radar	1	An airport traffic control terminal that provides service using direct observation primarily to aircraft operating under visual flight rules (VFR). This terminal is located at airports where the principal user category is low-performance aircraft.
2	Terminal Radar Approach Control (TRACON)	24	An air traffic control terminal that provides radar-control service to aircraft arriving or departing the primary airport and adjacent airports, and to aircraft transiting the terminal's airspace.
3	Combination Radar Approach Control and Tower with Radar	130	An air traffic control terminal that provides radar-control service to aircraft arriving or departing the primary airport and adjacent airports, and to aircraft transiting the terminal's airspace. This terminal is divided into two functional areas: radar approach control positions and tower positions. These two areas are located within the same facility, or in close proximity to one another, and controllers rotate between both areas.
4	Combination Non-Radar Approach Control and Tower without Radar	2	An air traffic control terminal that provides air traffic control services for the airport at which the tower is located and without the use of radar, approach and departure control services to aircraft operating under instrument flight rules (IFR) to and from one or more adjacent airports.
6	Combined Control Facility	4	An air traffic control facility that provides approach control services for one or more airports as well as en route air traffic control (center control) for a large area of airspace. Some may provide tower services along with approach control and en route services. Also includes Combined Center Radar Approach (CERAP) facilities.
7	Tower with Radar	130	An airport traffic control terminal that provides traffic advisories, spacing, sequencing and separation services to VFR and IFR aircraft operating in the vicinity of the airport, using a combination of radar and direct observations.
8	Air Route Traffic Control Center (ARTCC)	21	An air traffic control facility that provides air traffic control service to aircraft operating on IFR flight plans within controlled airspace and principally during the en route phase of flight. When equipment capabilities and controller workload permit, certain advisory/assistance services may be provided to VFR aircraft.
9	Combined TRACON Facility	3	An air traffic control terminal that provides radar approach control services for two or more large hub airports, as well as other satellite airports, where no single airport accounts for more than 60 percent of the total Combined TRACON facility's air traffic count. This terminal requires such a large number of radar control positions that it precludes the rotation of controllers through all positions.
—	Air Traffic Control System Command Center	1	The Air Traffic Control System Command Center is responsible for the strategic aspects of the NAS. The Command Center modifies traffic flow and rates when congestion, weather, equipment outages, runway closures or other operational conditions affect the NAS.
	Total	**316**	

Chapter 3: Staffing Requirements

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

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

Proper staffing levels also depend on the efficient scheduling of employees, so the FAA tracks a number of indicators as part of its continuous staffing review. Some of these indicators are overtime, time on position, leave usage and the number of trainees. For example, in FY 2014, the system average for overtime was 2.1 percent, a slight increase from the FY 2013 level. Meanwhile, average time on position was 4 hours and 10 minutes, a two-minute increase over FY 2013.

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

Figure 3.1 shows the expected end-of-year total headcount (dark brown line), CPC & CPC-IT headcount (orange line), losses (blue bar) and new hires (green bar) by year through FY 2024.

Figures for FY 2014 represent actual end-of-year headcount, losses and hires. Losses include retirements, promotions and transfers, resignations, removals, deaths, developmental attrition and academy attrition. Due to the impacts of sequestration, the FAA ended FY 2014 approximately 150 controllers below the FY 2014 plan.

In general, the FAA strives to keep the number of CPCs and CPC-ITs near the middle of the calculated staffing range. Figure 3.1 shows that FY 2015 staffing values are within the calculated staffing range shown by the "min" and "max" bars. However, a facility's total staffing levels are often above the defined staffing range because new controllers are typically hired two to three years in advance of expected attrition to allow for sufficient training time. The total expected end-of-year staffing number shown in Figure 3.1 reflects this projected advanced hiring.

Figure 3.1: Projected Controller Workforce Trends

TIME ON POSITION

OVERTIME

TRAFFIC

RETIREMENTS

STAFFING RANGES

TRAINEES

FIELD INPUT

SIMULATORS AND INSTRUCTORS

PRODUCTIVE TIME
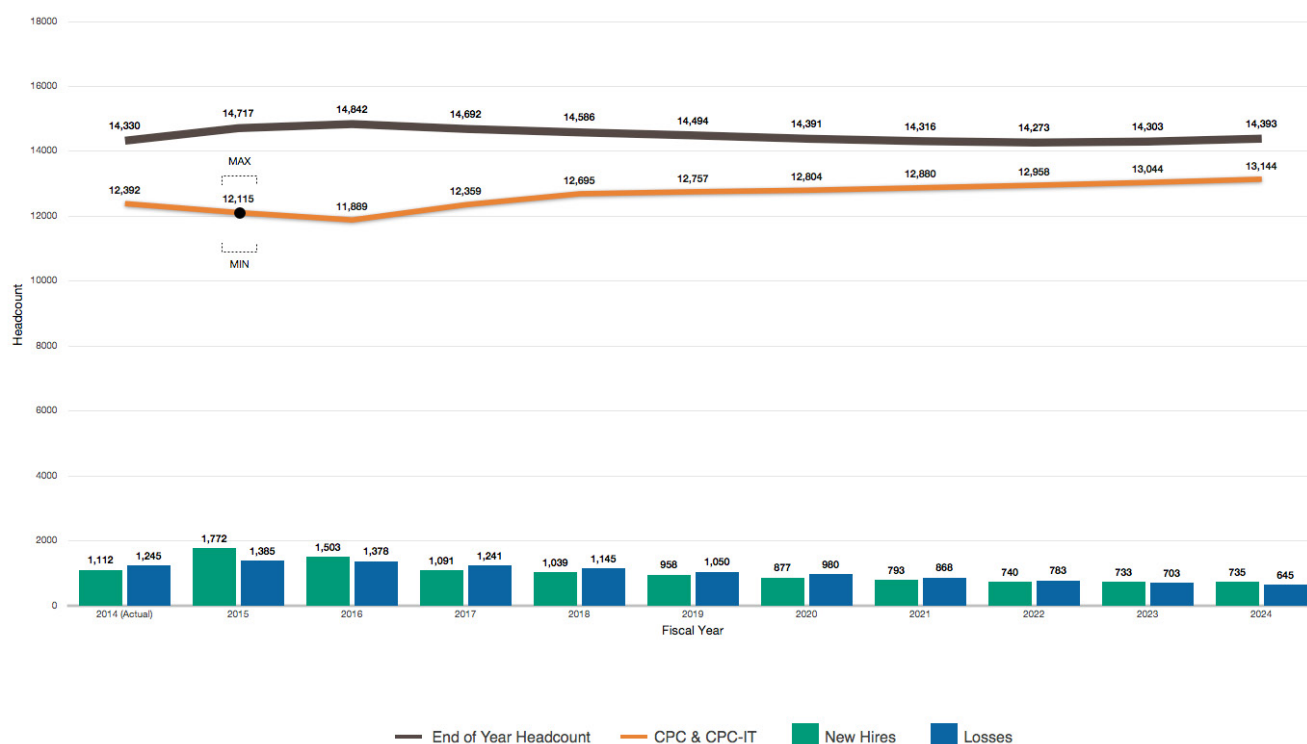
→ The FAA uses many metrics to manage its facilities.

How do I compare to my peers?
- Range
- Overtime
- Trainee Ratio

How have I done in the last 10 years?

What if...

FAA
Air Traffic Organization
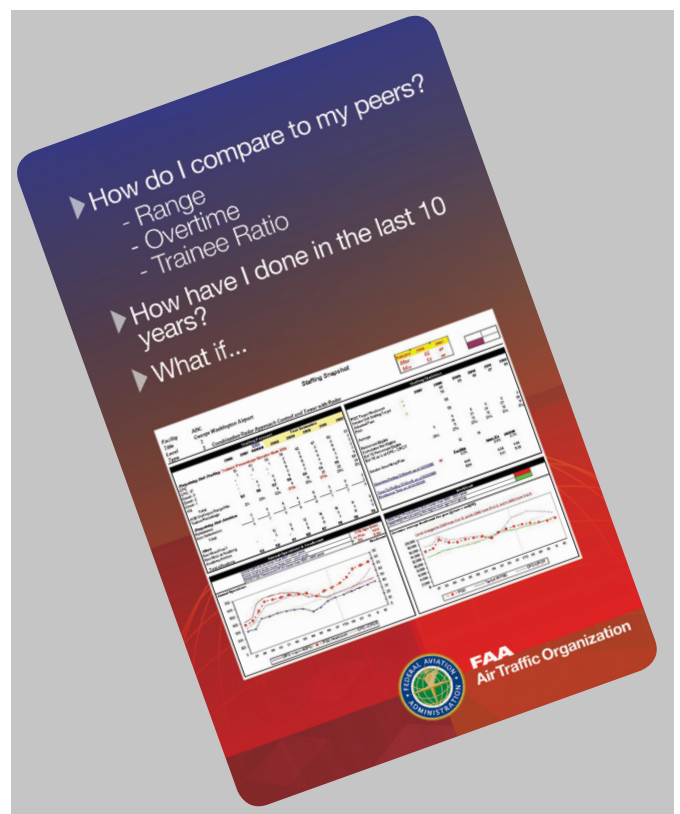
STAFFING RANGES

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

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

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

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

2. Service unit input — the number of controllers required to staff the facility, typically based on past position utilization and other unique facility operational requirements. The service unit input is validated 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 years 2000 to 2014. If any annual point falls outside +/- 5 percent of the 2000 to 2014 average, it is eliminated from the analysis. From the remaining data points, the highest productivity year is then used.

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

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

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

The 2015 staffing ranges for certified controllers are published by facility in the Appendixes of this report. In general, the FAA strives to keep the number of CPCs and CPC-ITs near the middle of the range. In many facilities, the current Actual on Board (AOB) number may appropriately exceed the range. This is because many facilities' current AOB (all controllers at the facility) numbers include larger numbers of developmental controllers in training to offset expected future attrition. Individual facilities can be above the range due to advance hiring. Facilities may also be above the range based upon facility-specific training and attrition forecasts.

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

Figure 3.2: Controller Staffing

Facility X Staffing

Controller Staffing

High

Low

Characteristics/Drivers of High Staffing Levels
- Inefficient scheduling
- Fewer losses than projected
- Less overtime
- Reduction in traffic volumes
- Decrease in hours of operation
- Temporary airport construction
- Higher number of position-qualified controllers
- Higher number of advance hire trainees

Characteristics/Drivers of Low Staffing Levels
- Reduced controller lost time
- Greater use of overtime
- Increase in traffic volumes
- Increase in hours of operation
- Lower number of position-qualified controllers
- Lower number of advance hire trainees

Figure 3.3 depicts an example of a large, Type 3 FAA facility. This Combination Radar Approach Control and Tower with Radar facility is one in which controllers work in the tower cab portion and in the radar room (also known as a TRACON). To be a CPC in these types of facilities, controllers must be checked out on all positions in both the tower and the TRACON.

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

Figure 3.3: Controller Training Progression

Training Progression to Certified Professional Controller

	D1	D2	D3	CPC	
				Radar Position 5	TRACON
				Radar Position 4	TRACON
			Radar Position 3	Radar Position 3	TRACON
			Radar Position 2	Radar Position 2	TRACON
			Radar Position 1	Radar Position 1	TRACON
		Final Vector 2	Final Vector 2	Final Vector 2	TRACON
		Final Vector 1	Final Vector 1	Final Vector 1	TRACON
		Departure Data	Departure Data	Departure Data	TRACON
		Arrival Data	Arrival Data	Arrival Data	TRACON
		Runway Crossing Coordinator	Runway Crossing Coordinator	Runway Crossing Coordinator	TOWER
	Local Control	Local Control	Local Control	Local Control	TOWER
	Ground Control	Ground Control	Ground Control	Ground Control	TOWER
	Clearance Delivery	Clearance Delivery	Clearance Delivery	Clearance Delivery	TOWER

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

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

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

AIR TRAFFIC STAFFING STANDARDS OVERVIEW

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

Figure 3.4: Air Traffic Control Position and Facility Overview

Cruise

Ascent

Push back, taxi and takeoff
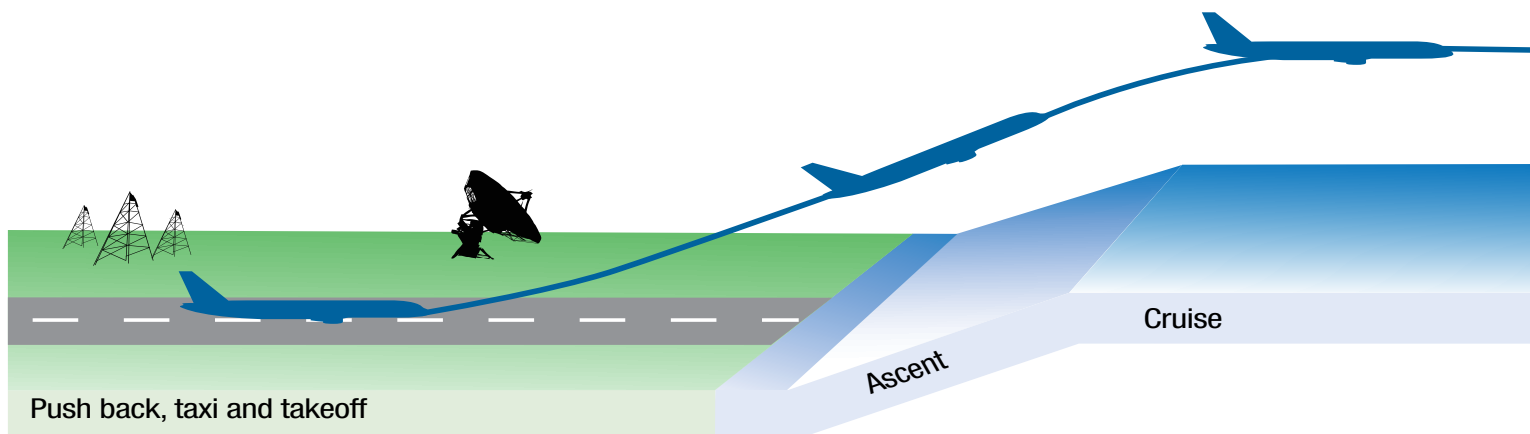
AIRPORT TRAFFIC CONTROL TOWER (ATCT)

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 clearances.

Flight Data

Receives and relays weather information and Notice to Airmen.

TERMINAL RADAR APPROACH CONTROL (TRACON)

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.

AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC)

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.

Cruise

Descent and approach

Landing and taxi to gate
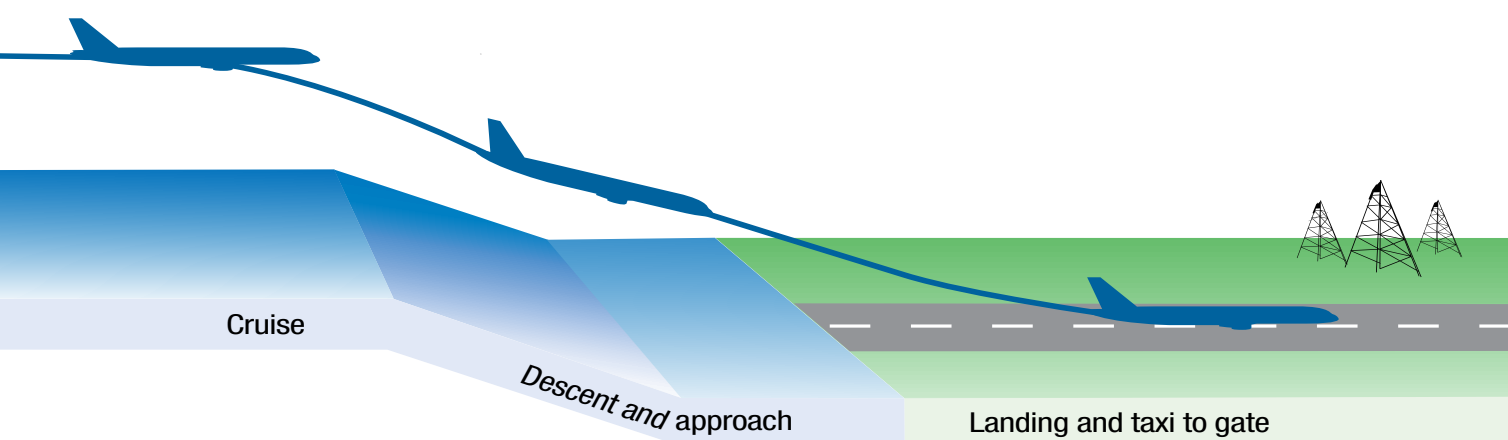
AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC)

Radar Associate (Flight Data)

Supports the Center Radar Controller by handling flight data.

TERMINAL RADAR APPROACH CONTROL (TRACON)

Arrival Controller

Assigns headings and altitudes to arrival aircraft to establish aircraft on final approach course.

AIRPORT TRAFFIC CONTROL TOWER (ATCT)

Local Controller

Issues landing clearances, maintains prescribed separation between arrivals, provides arrival aircraft with latest weather/field conditions.

Ground Controller

Issues taxi instructions and clearances to guide aircraft to the gate.

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 model and standards.

All FAA staffing models incorporate similar elements:

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

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

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

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

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

TOWER CAB OVERVIEW

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

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

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

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

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

TRACON OVERVIEW

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

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

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

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

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

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

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

EN ROUTE OVERVIEW

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

• En Route center airspace is divided into smaller, more manageable blocks of airspace called areas and sectors.

• Areas are distinct, and rarely change based on changes in traffic. Within those areas, sectors may be combined or de-combined based on changes in air traffic operations.

• Controllers are assigned to positions within the sectors (e.g., Radar, Radar Associate, Tracker). As traffic increases, sectors can be de-combined and additional positions opened, or the sector sizes can be maintained but additional controllers added to assistant positions within the sectors.

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

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

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

SUMMARY

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

AIR TRAFFIC STAFFING STANDARDS REVIEW

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

In the committee's judgment, the efficacy of the entire staffing process needs to be judged by the extent to which efforts result in the right staffing at all of the FAA's air traffic facilities. Thus, the extent to which subsequent staffing plans governing the hiring, training and transfer of controllers are properly executed must be considered in addition to the specific model used in generating the staffing standards or the correctness of the staffing ranges.

In September 2010, the National Academy of Sciences completed a review at the FAA's request of MITRE's workload modeling capabilities. The review concluded that "the model is superior to past models because it takes into account traffic complexity when estimating task load." It recommended "obtaining more operational and experimental data on task performance, however, to establish and validate many key model assumptions, relationships and parameters."

During 2013, the FAA continued its work with MITRE to address the 2010 National Academy of Sciences recommendations. One recommendation was that MITRE observes controllers in the field. In response to this recommendation, MITRE collaborated with the FAA and the National Air Traffic Controllers Association (NATCA) to develop a plan to evaluate the En Route workload model. The evaluation sought to validate the model by ensuring it covers tasks that are the major drivers of workload, quantifies task performance times, and determines task scheduling distributions. The evaluation consisted of two components: field observations and laboratory human-in-the-loop (HITL) experiments. The goals of the evaluation were to assess model task coverage across facilities, evaluate task performance times and distributions, estimate position-to-traffic thresholds, and calibrate a task time development approach for new tasks. These tasks were not completed and presented in time for the July 2014 review mentioned in the paragraphs below.

In July 2014, the National Academy of Sciences completed its review of FAA staffing standards. The study committee consisted of academicians, consultants and a current NATCA controller as well as retired air traffic controllers. Members have expertise in ATC and management, human factors, aviation safety, fatigue and sleep research, workforce planning, staffing models, aviation demand and management, public policy, economics, and budgeting.

The following is a quote from the National Academy of Sciences report: "Overall, the committee found FAA's staffing standards for terminal ATC facilities to be reasonable for use in developing initial estimates of the number of controllers needed for managing traffic at each facility. However, it had concerns about the validity of the mathematical model used for En Route facilities and the resulting estimates of controller staffing needs. They also felt the steps taken by FAA to create a controller staffing plan from the staffing standards and then execute such plan were obscure. As a result, the committee was unable to determine the extent to which FAA staffing imbalances are being corrected over time to help ensure cost-effective staffing." The FAA is in the process of consulting with the National Academy of Sciences to review and gain further understanding of the academy's specific recommendations.
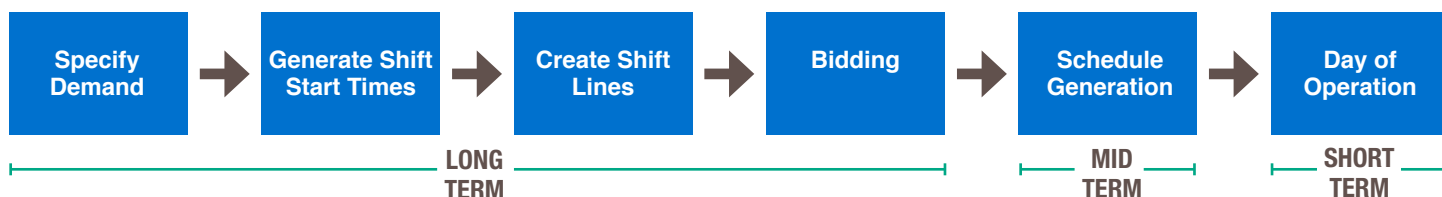
AIR TRAFFIC CONTROLLER SCHEDULING

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

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

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

- Generate optimal schedules for a given period (day, pay period, month and year) based on demand, business rule constraints, employee qualification requirements and available resources.

- Calculate optimal shift start times and associated demand in support of national and local bargaining.

- Propose various shifts in the most efficient way to cover demand while abiding by business and contractual rules.

- Calculate projected time on position (signed on and controlling traffic) to staff an area by shift, schedule segment and/or person.

- Run what-if analyses.

- Aid in the assignment of efficiently scheduled overtime.

- Automate shift requests, bid process and other scheduling-related tasks.

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

Specify Demand → Generate Shift Start Times → Create Shift Lines → Bidding → Schedule Generation → Day of Operation

LONG TERM | MID TERM | SHORT TERM

SPECIFY DEMAND

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

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

The diagram below shows how OPAS uses the 15-minute demand (green blocks) to create the required shifts in the lower part of the diagram. OPAS allows for a different demand curve for different roles (e.g., controller versus supervisor), thus allowing for optimal schedules to be made for all positions in a facility. The blue line above the green blocks shows how the staffing per shift generated by OPAS more than adequately covers the inputted green demand curve.
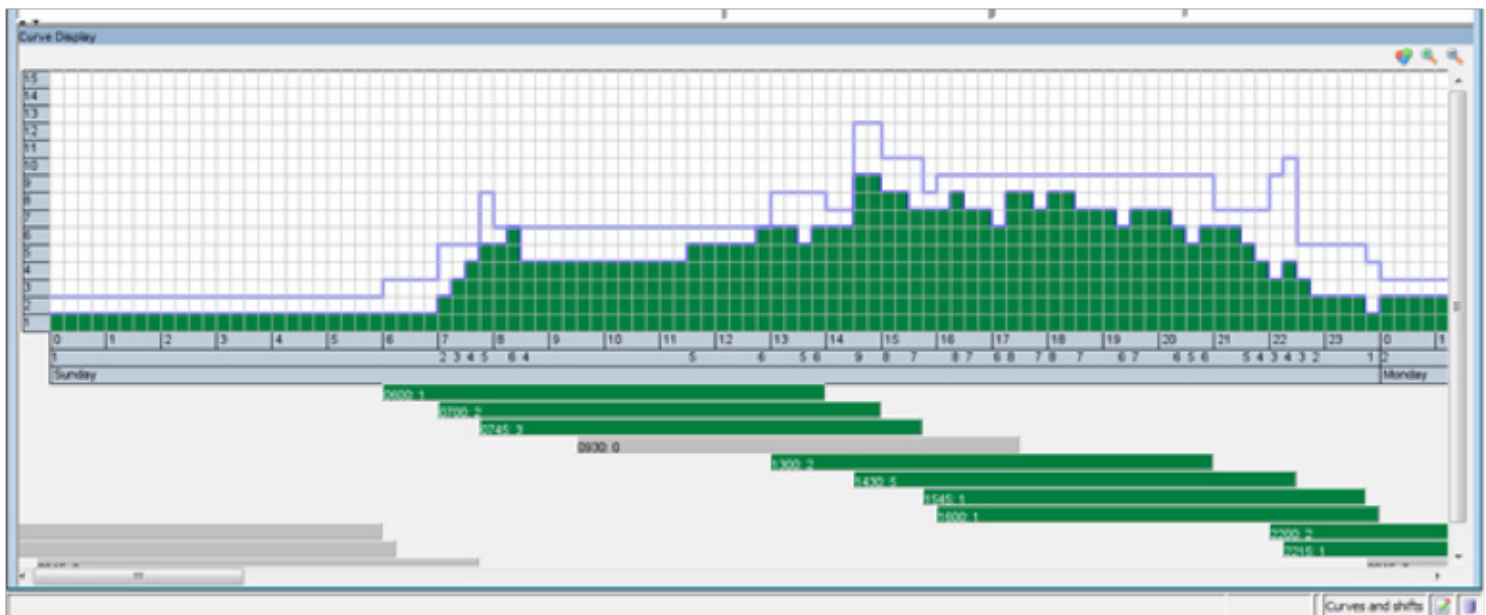
In the diagram below, the left pane gives the category, names, and start and end times for the optimal shifts. There are three core shifts (for the day shift, evening shift and midnight shift) and three ancillary shifts per shift category. The last two panes give the demand per shift per day. In this example, since "Sunday" is selected, the last pane gives the minimum demand per shift on Sunday.

MANAGE A SCHEDULE/DAY OF OPERATION VIEWS

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

The views can also address questions such as:

• "Who is scheduled to work today and when?"

• "Who is scheduled to work overtime?"

• "Who has a leave request for today, pending or approved?"

OPAS LITE

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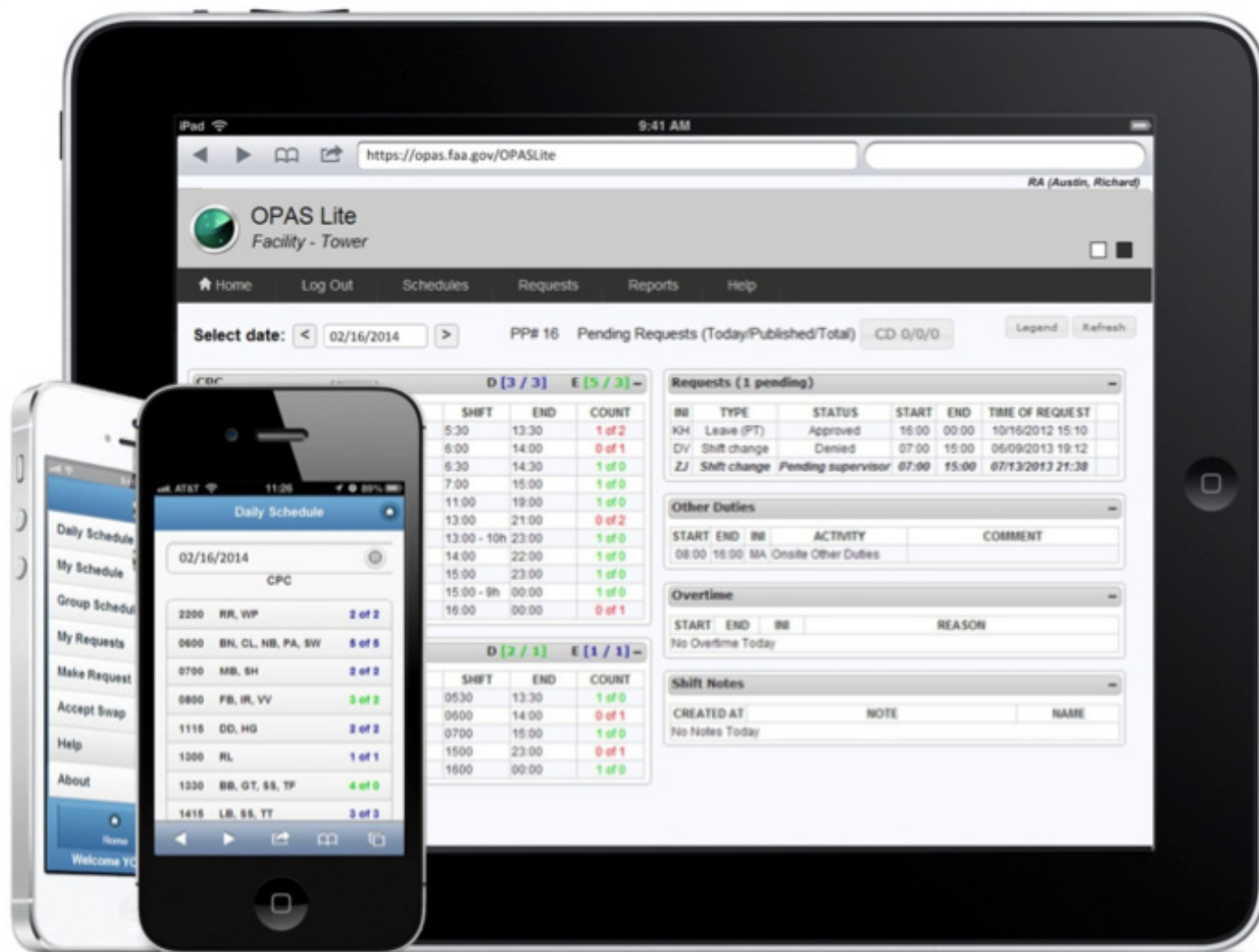
AIR TRAFFIC SCHEDULING SOFTWARE REVIEW

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

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

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

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

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

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

TECHNOLOGICAL ADVANCES

In 2014, the FAA made great progress toward completing the foundational phase of the Next Generation Air Transportation System (NextGen). Through En Route Automation Modernization (ERAM), the FAA upgraded automation capabilities in 20 planned En Route centers. In Terminal facilities, the FAA is upgrading its automation platform through the Terminal Automation Modernization and Replacement (TAMR) program. In March 2014, the FAA completed the installation of 634 radios to serve as ground infrastructure for Automatic Dependent Surveillance-Broadcast (ADS-B).

Meanwhile, the FAA continues to move ahead with several other key NextGen programs including Data Communications (Data Comm), NAS Voice System, and Time Based Flow Management (TBFM).

While there are many NextGen technologies on the horizon, ERAM and Data Comm are believed to have to most impact on air traffic controller productivity in the near term.

ERAM technology is foundational to NextGen. Upgrading the 1970s automation platform will advance the transition from a ground-based system of air traffic control to a satellite-based system of air traffic management. ERAM technology processes flight radar data, provides communications and generates display data for air traffic controllers. Future ERAM enhancements could also improve controller productivity, but the scope and precise impact of those enhancements are still under development.

Data Comm is a key transformational program in the NextGen portfolio that provides a digital data mode of communication between air traffic controllers and pilots. It will enable controllers to send routine instructions, such as revised departure clearances and weather-avoiding reroutes, directly to the flight deck with the push of a button. Data Comm will reduce the talk time between controllers and pilots, decreasing the potential for errors in voice communication while enabling controllers to handle more traffic.

Data Comm departure clearance trials at Memphis and Newark airports are coming along well. Each site is using Data Comm 24 hours a day, seven days a week to conduct as many as 80 operations a day. This year, the FAA starts key site testing at Salt Lake Tower, and two control towers in Houston. The FAA is on schedule for deployment at 56 airports starting in 2016, which is based on "challenge" implementation dates agreed to with the NextGen Advisory Committee (NAC), and at all of its En Route control centers starting in 2019.

As part of the NAC prioritization effort, the FAA agreed to concentrate its efforts on four NextGen priorities: (1) increasing the use of Performance Based (or satellite-based) Navigation, (2) making multiple runway operations more efficient, (3) improving surface operations and (4) implementing Data Communications.

Increased productivity and efficiency, and their ultimate impact on the size and composition of the FAA's workforce, depend on many factors. As with ERAM, the scope and precise impact of NextGen enhancements are still under development.

Over time the relationship between pilots and air traffic controllers will evolve. The relationship between controller and automated systems will similarly evolve. These evolutions will occur gradually and require much testing and analysis to ensure the safety of the system.

Chapter 4: Losses Plan

In total, the FAA expects to lose almost 1,400 controllers due to retirements, promotions and other losses this fiscal year. Other controller losses include transfers, resignations, removals, deaths, developmental attrition and academy attrition.

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

CONTROLLER LOSS SUMMARY
Table 4.1 shows the total estimated number of controllers that will be lost, by category, over the period FY 2015 through FY 2024.

Table 4.1: Controller Loss Summary

Loss Category	Losses: 2015 – 2024
Retirements	4,394
Resignations, Removals and Deaths	423
Developmental Attrition	961
Promotions/Transfers	3,016
Academy Attrition	1,384
Total	**10,178**

ACTUAL CONTROLLER RETIREMENTS

Fiscal year 2007 was correctly projected to be a peak year for retirements of controllers hired in the early 1980s. The long-anticipated retirement wave has passed, and annual retirements are expected to decline for the next ten years.

Figure 4.1: Actual Controller Retirements
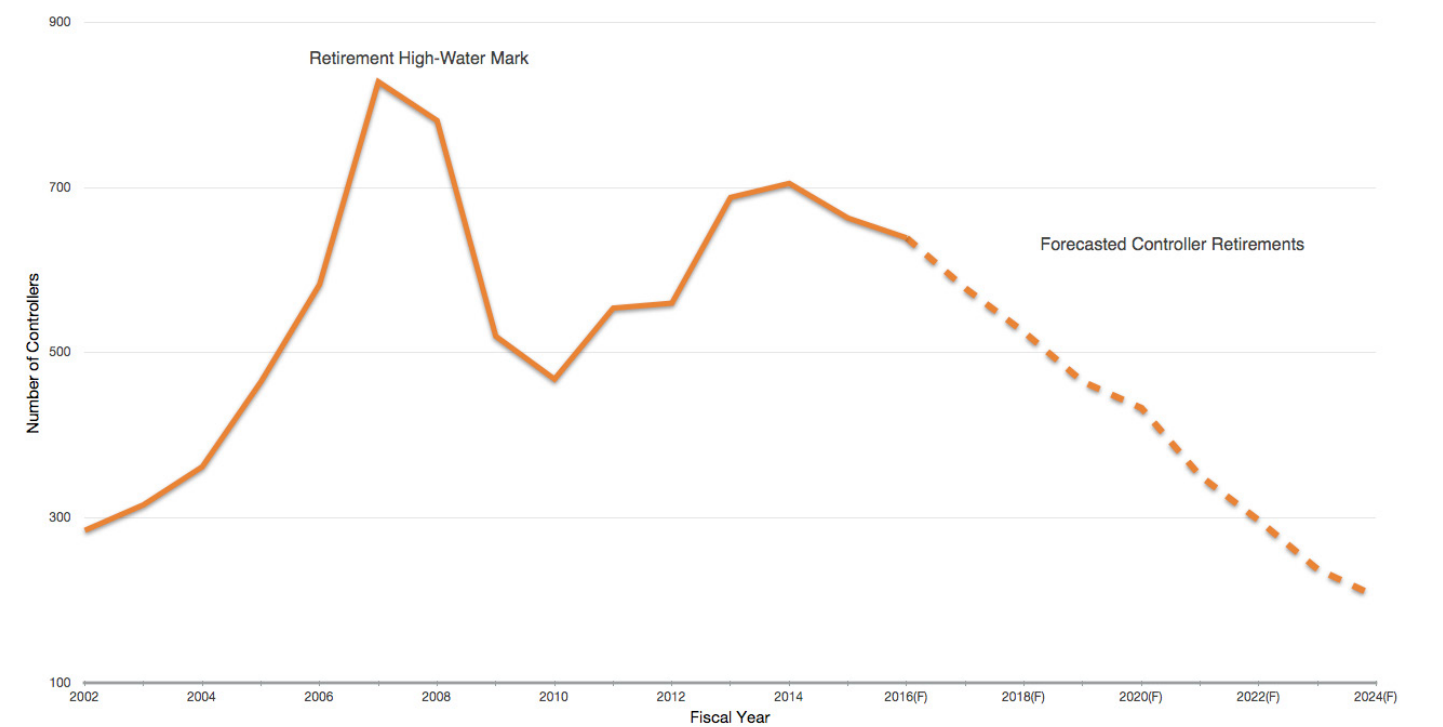
CONTROLLER WORKFORCE AGE DISTRIBUTION

The agency hired a substantial number of controllers in the years immediately following the 1981 strike. This concentrated hiring wave meant a large portion of the controller workforce would reach retirement age in roughly the same time period. In September 2005, the age distribution peak on the right side of Figure 4.2 was greater than 1,900 controllers. Today, the magnitude of that remaining peak is down to less than 1,000 controllers because the majority of the controllers hired shortly after the 1981 strike have already retired and been replaced.

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

Figure 4.2: Controller Workforce Age Distribution as of September 20, 2014
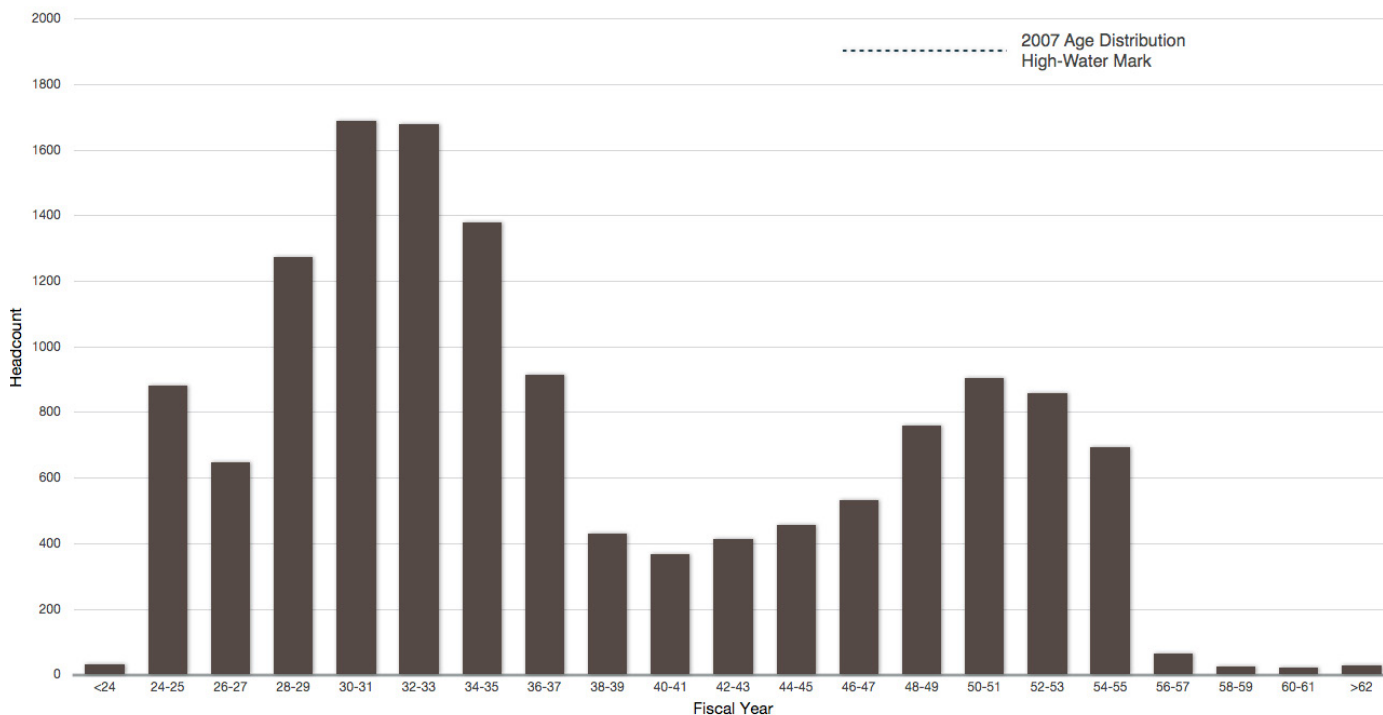
The FAA's hiring plan is designed to phase in new hires as needed.

CONTROLLER RETIREMENT ELIGIBILITY

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

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

Figure 4.3 shows the number of controllers who are currently retirement eligible as of September 2014 and those projected to become retirement eligible each fiscal year through FY 2024. Agency projections show that an additional 373 controllers will become eligible to retire in FY 2015. The number of retirement eligible controllers has been in decline in recent years and should continue to do so for the next few years.

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

Figure 4.3: Retirement Eligibility

Only 1,212 of the controllers currently eligible for retirement will reach mandatory retirement age within the next 3 years
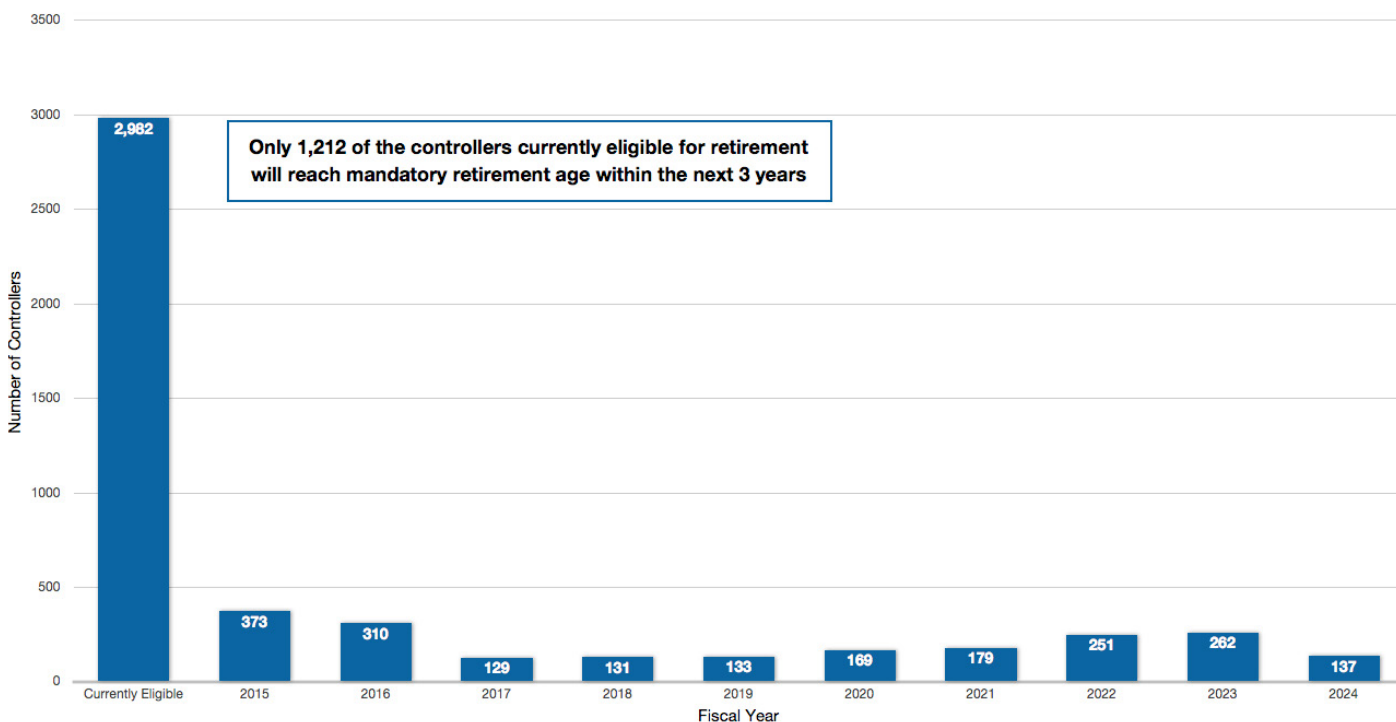
CONTROLLER RETIREMENT PATTERN

History shows that not all controllers retire when they first become eligible. In 2014, 13.3 percent of controllers who first became eligible actually retired. This is comparable to the 13.2 percent in last year's plan.

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

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

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

Figure 4.4: Percent of Controllers Retiring in the Nth Fiscal Year of Their Eligibility
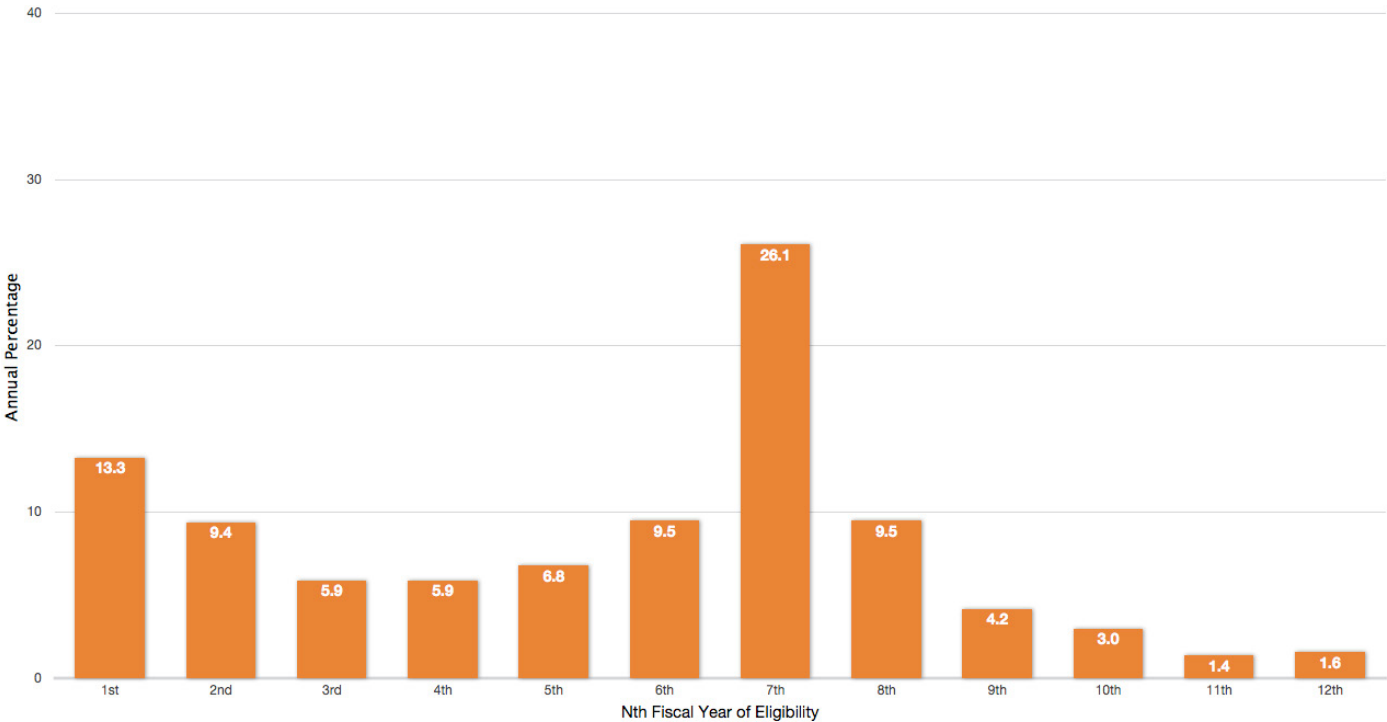
CONTROLLER LOSSES DUE TO RETIREMENTS

For the current plan, the agency incorporated FY 2014 retirement data into the retirement histogram used for future retirement.

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

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

Figure 4.5: Retirement Projection
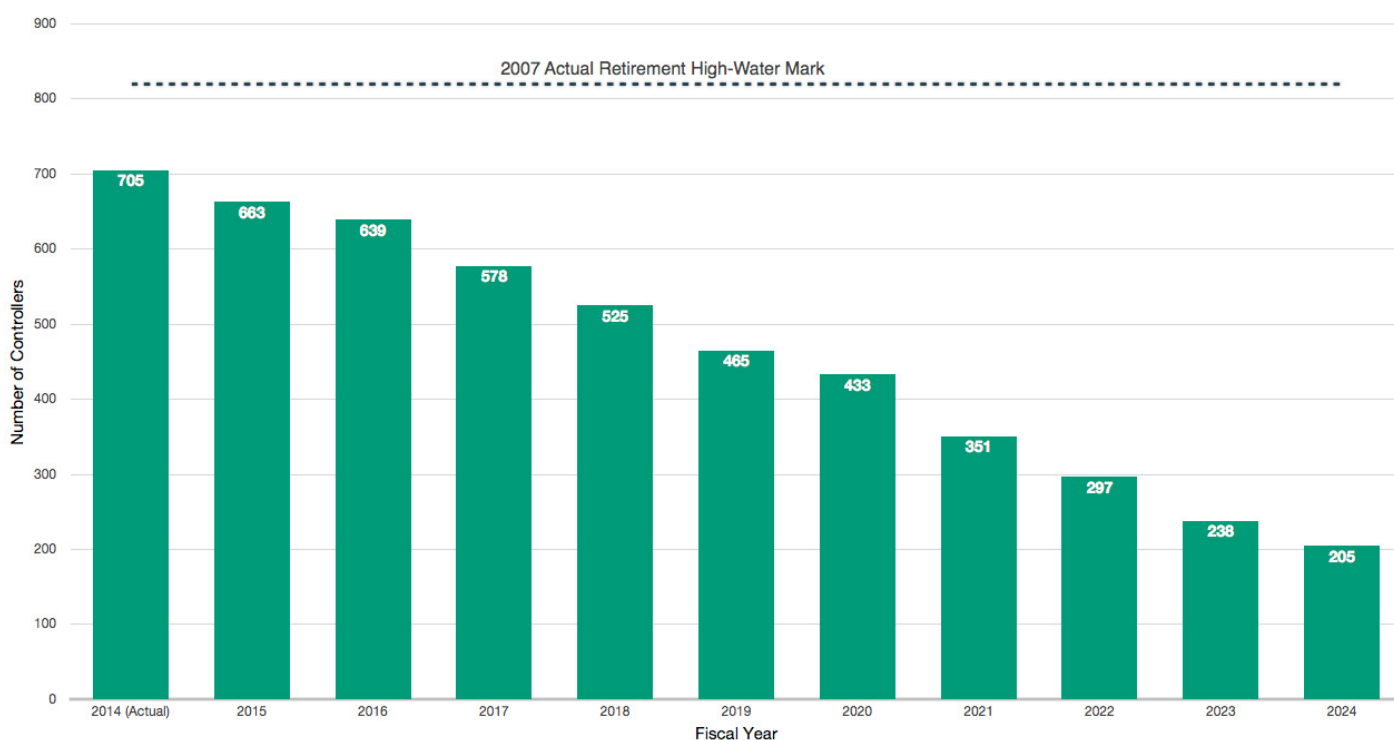
FY 2007 provided the high-water mark for controller retirements. Annual retirements are expected to continue to decline for the next decade.

CONTROLLER LOSSES DUE TO RESIGNATIONS, REMOVALS AND DEATHS

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

Table 4.2: Controller Losses Due to Resignations, Removals and Deaths

2014*	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
47	41	42	42	42	42	42	43	43	43	43

* Actual

DEVELOPMENTAL ATTRITION

Estimated losses of trainees who terminate from the FAA while still in developmental status are shown in Table 4.3. The agency has incorporated historical developmental attrition rates into the latest FAA forecasts. Reduced hiring due to sequestration in previous years has caused the need for a small hiring surge in FY 2015 and FY 2016. Therefore, this plan incorporates a projected increase in developmental attrition for FY 2016 through FY 2018.

Table 4.3: Developmental Attrition

2014*	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
71	84	152	138	115	95	87	80	74	69	67

* Actual

ACADEMY ATTRITION

Estimates of losses from new hires that are not successful in the FAA Academy training program are based on historical rates and are shown in Table 4.4. Reduced hiring due to sequestration in previous years has caused the need for a small hiring surge in FY 2015 and FY 2016. Therefore, this plan incorporates a projected increase in Academy attrition for FY 2015 and FY 2016.

Table 4.4: Academy Attrition

2014*	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
150	253	204	150	141	129	117	106	97	93	94

* Actual

CONTROLLER LOSSES DUE TO PROMOTIONS AND OTHER TRANSFERS

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

Over the past five years, we've observed an average of 162 net promotions each year from CPC to supervisory positions. The majority of these promotions replace retiring supervisors. We expect net transfers to promotions to increase slightly and to peak at 213 in 2017 and slightly fall in future years as seen in Figure 4.6.

Figure 4.6: Controller Losses Due to Promotions and Other Transfers
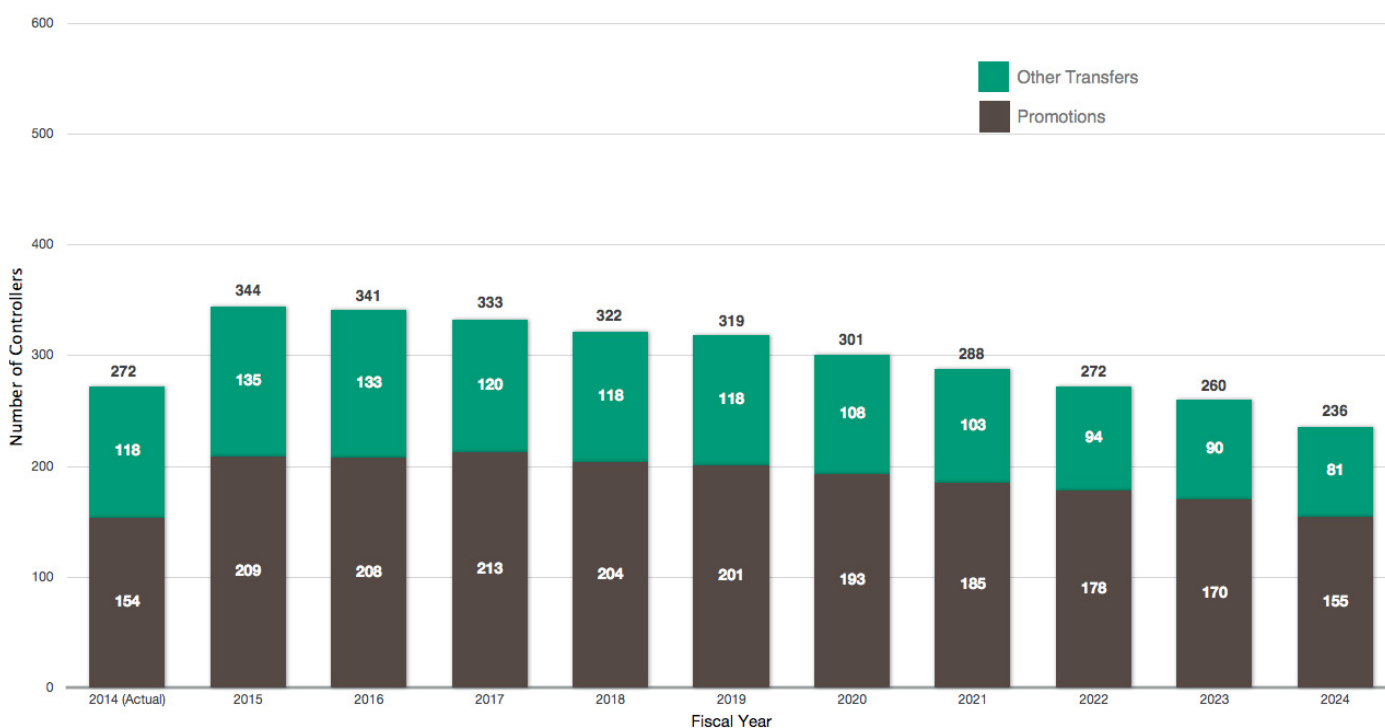
TOTAL CONTROLLER LOSSES

The FAA projects a total loss of 10,178 controllers over the next 10 years. Should losses outpace projections for FY 2015, the FAA will hire additional controllers to reach the end-of-year goal of 14,717 air traffic controllers on board.

Figure 4.7: Projected Total Controller Losses
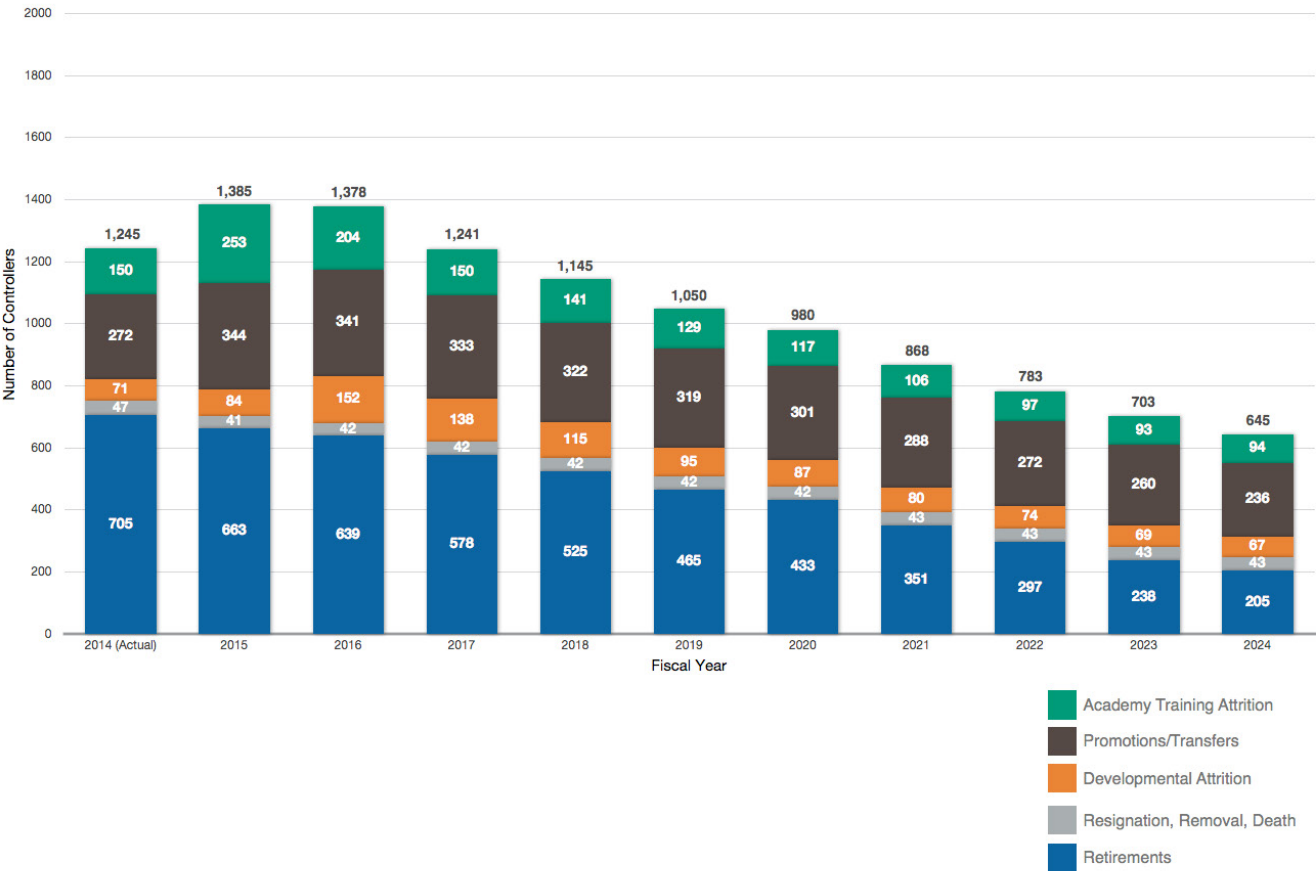
Chapter 5: Hiring Plan

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

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

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

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

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

CONTROLLER HIRING PROFILE

The controller hiring profile is shown in Figure 5.1. Despite the effects of sequestration during the first three months of FY 2014 during which the FAA was under a hiring freeze, the FAA was able to hire 1,112 of the planned 1,286 controllers in FY 2014. The difference between planned and actual hiring in FY 2014, as well as a significant remaining backlog of new hires needed from FY 2013, is expected to be addressed over the next two fiscal years, raising hiring projections in those years relative to last year's plan. The number of controllers projected to be hired through FY 2024 is 10,241.

Figure 5.1: Controller Hiring Profile
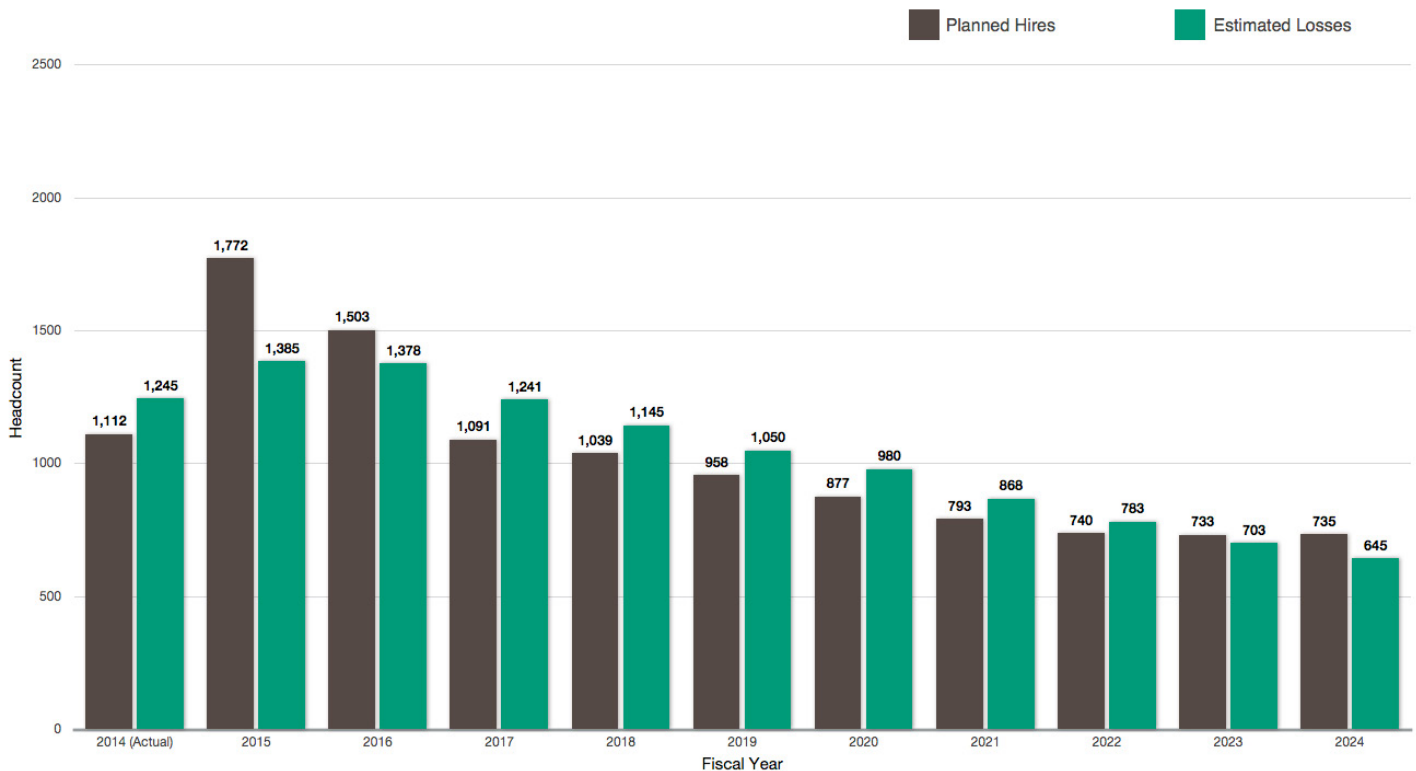
Due to the effects of sequestration, the FAA only hired 554 controllers in FY 2013 and 1,112 in FY 2014.

TRAINEE-TO-TOTAL-CONTROLLER PERCENTAGE

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

Figure 5.2 shows the projected trainee-to-total-controller percentages for En Route and Terminal by year to 2024. The percentage shown is calculated as the sum of CPC-ITs plus developmentals divided by all controllers.

While Terminal facilities are showing a decline through 2024, there is a slight uptick in the En Route percentage for the next several years as controllers in the current developmental pipeline become fully certified. Note the trainee percentage for both En Route and Terminal is still well below 35 percent. In general, the En Route trainee ratio exceeds the Terminal ratio primarily because of the longer times to certify (on average) in En Route facilities.

Figure 5.2: Trainee to Total Controller Percentage
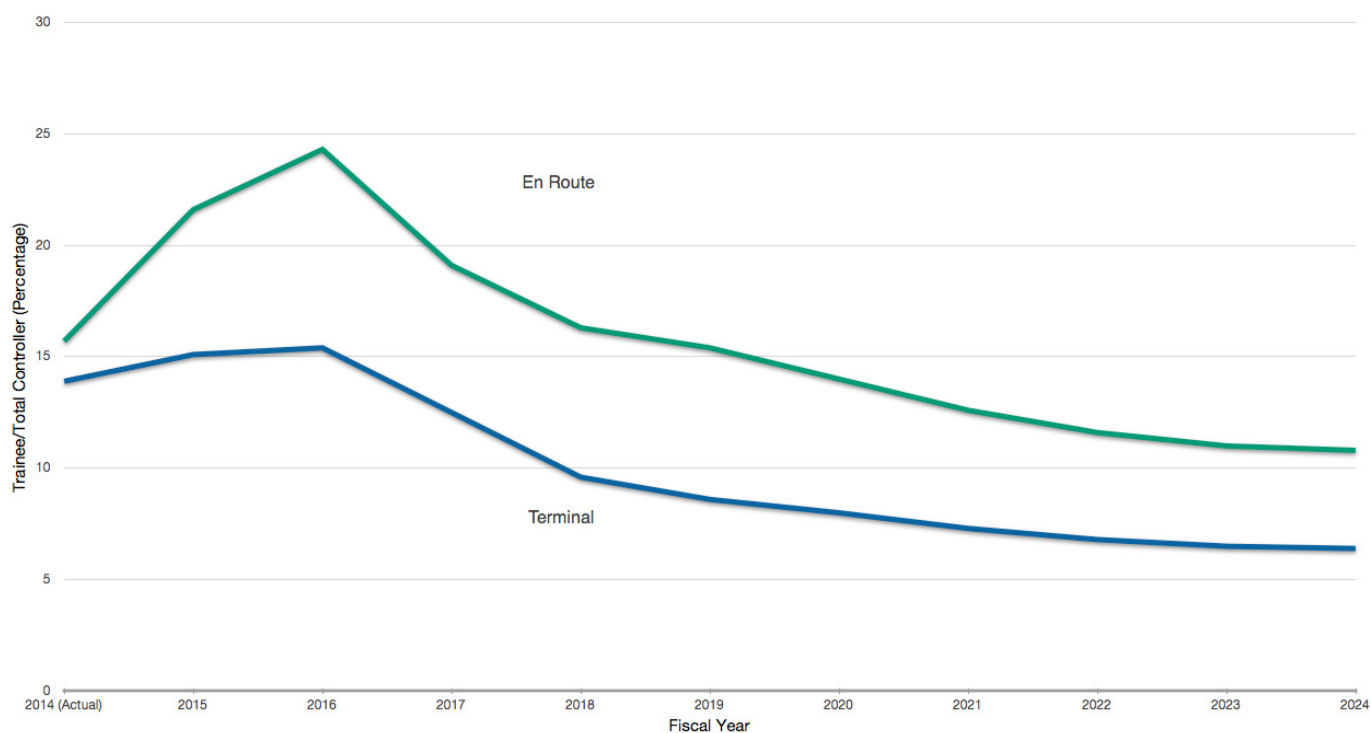
Before the 1981 strike, the FAA experienced trainee percentages ranging from 23 to 44 percent. Following the strike, through the end of the hiring wave in 1992, the trainee percentage ranged from 24 to 52 percent. When the post-strike hires became fully certified by the end of decade, the trainee percentage declined.

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

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

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

Figure 5.3: Historical Trainee Percentage
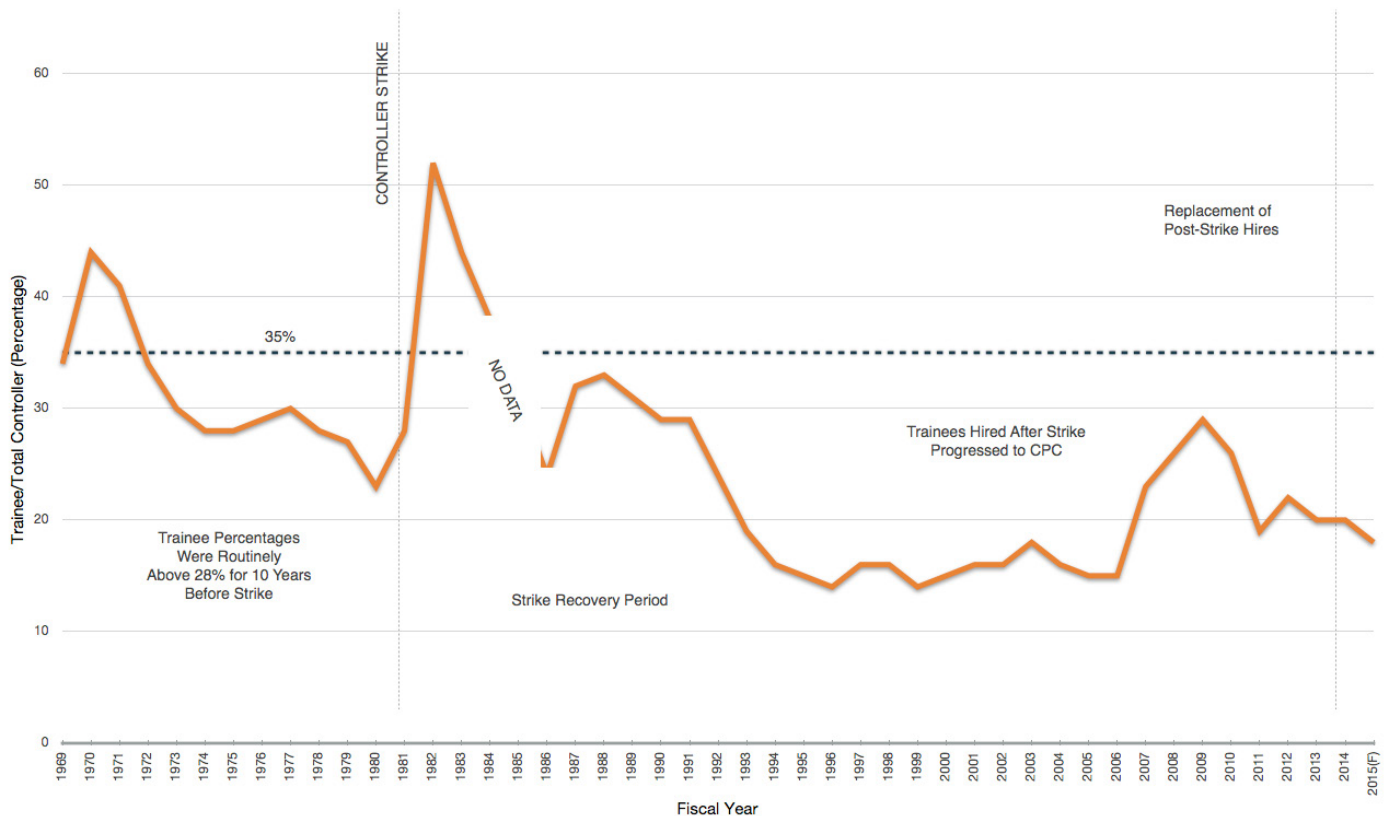
The FAA uses many metrics (e.g., 35 percent trainee to total controllers) to manage the flow of trainees while accomplishing daily operations. Facilities meter training to coincide with a number of dynamic factors, including technology upgrades, new runway construction and recurrent proficiency training for existing CPCs. Facility training is enabled by many factors. Examples include the use of contract instructors, access to simulators, scheduled overtime, and the seasonality and complexity of operations.

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

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

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

Chapter 6: Hiring Process

CONTROLLER HIRING SOURCES

The FAA has two primary categories of controller hiring sources.

• Prior ATCS experience: These individuals have at least 52 weeks of certified air traffic control experience.

• No prior ATCS experience: These individuals are not required to have prior air traffic control experience and may apply for vacancies announced by the FAA.

RECRUITMENT

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

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

In January 2015, the FAA stated that it would conduct a two-track announcement process for hiring air traffic control specialists for the year. The first track includes 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. The second track targets candidates without operational air traffic control experience.

Chapter 7: Training

One of the primary goals of the FAA's technical training and development programs is to ensure that our air traffic controllers have all the necessary skills and abilities to perform their jobs effectively and maintain the safety of the NAS.

The FAA's technical training framework is designed to provide controllers with training to meet the challenges of today and prepare them for the next advancements of air traffic management.

The FAA's Office of Safety and Technical Training is helping the agency to firmly instill its safety mission in controllers from the start of their careers. The powerful combination of safety, training and quality assurance under the same leadership structure enhances the FAA's ability to identify, mitigate and manage risks, and integrate lessons learned into the technical training curriculum. The training program for air traffic controllers is governed by FAA Order 3120.4, Air Traffic Technical Training, and is reviewed annually to ensure its technical accuracy.

FAA'S CALL TO ACTION

The FAA previously reported on its independent review of the selection, assignment and training of air traffic control specialists (see http://1.usa.gov/IRP_Release) as part of a nationwide Call to Action in 2011 on air traffic control safety and professionalism. About a third of the Independent Review Panel's (IRP) 49 recommendations dealt with the selection and placement of air traffic control specialists. The rest covered improvements to professionalism, on-the-job training instruction, learning technologies, record-keeping, and curriculum design. The FAA continues to work on projects that adopt the panel's recommendations.

The agency has updated training courses to support cumulative grading, in which students are assessed at multiple points in training, with new training advancement decision points, so that students underperforming in training are either provided remedial training or are released from the agency. The revamped process increases staffing flexibility for the agency and improves efficiency in both hiring and initial training of air traffic controllers.

THE TRAINING PROCESS

Training begins at the FAA Academy, where students gain foundational air traffic control knowledge through classroom and simulation training. Later, at field facilities, they receive additional classroom and simulation training and then on-the job training to become certified professional controllers (CPC). All controllers are assigned periodic proficiency training, in the form of recurrent training or other supplemental training.

The FAA is adopting an outcome-based approach to the design and development of training, based on one of the recommendations from the IRP. The outcome-based approach refers to the strategy used to design individual courses and is based on the performance requirements found in the competency model. It uses the collection of job tasks, knowledge, skills and abilities to define the operational outcome required for the controller's job so that training can be designed accordingly. The newer approach includes mapping curriculum to job tasks, knowledge, skills and training methods. The techniques apply to new course development, redesigns and updates.

FAA ACADEMY TRAINING

The FAA Academy trains new controllers using lecture, computer-based instruction, and simulation with a range of fidelity. The academy lays the foundation for controller development by teaching common, fundamental air traffic control procedures that are used throughout the country.

FAA FACILITY TRAINING

After graduating from the FAA Academy, developmental controllers begin facility training in the classroom, where they learn facility-specific rules and procedures. Often, these rules and procedures are practiced in simulation. The FAA is increasing the use of simulators – technology that allows instructors to duplicate and play back actual operating events to give students opportunities for improvement in a safe environment. Simulators enable students to not only see the cause and effect, but also to avoid mistakes in the future. Since live traffic is inconsistent and unpredictable due to weather and system delays, a controller may have to wait days or weeks for an opportunity to learn a particular procedure, and even longer to become proficient at it. The FAA uses simulation to help compress the training timeline while also improving the students' learning experience and reducing training costs.

After classroom and simulation training have been completed, developmental controllers begin on-the-job training on operational positions. This training is conducted by CPCs who observe and instruct developmental controllers working the control position. Once they are certified on control positions, developmental controllers often work independently on those positions under the direction of a supervisor to gain experience and to supplement staffing.

The Flight Deck Training (FDT) program is supplemental training designed for current controllers to improve understanding and communications between controllers and pilots. During 2014, the program accomplished over 2,900 FDT flights.

RECURRENT TRAINING

In 2012, the FAA initiated recurrent training to enhance controller proficiency. The recurrent training program is administered annually as a combination of classroom and computer-based instruction for air traffic controllers that deliver evidence-based topics derived from the Air Traffic Safety Action Program (ATSAP), Quality Assurance and Quality Control activities and data. As contrasted with annually-required refresher training on static, predetermined topics, recurrent training delivers timely and directly relevant safety training based on safety trends and lessons learned from safety data and analysis. Recurrent training is developed in collaboration with subject matter experts from the National Air Traffic Controllers Association.

Most recently, the FAA initiated a multi-year, three-step program to revise and update its training courses for on-the-job-training field instructors. It is especially important for field instructors to maintain proficiency on all of the latest skills, new procedures and technologies coming into the system through NextGen improvements.

INFRASTRUCTURE INVESTMENTS

To improve the performance and reliability of the eLearning Management System (eLMS) across the Air Traffic Organization (ATO), the FAA set up a Content Delivery Network (CDN) on Computer Based Instruction (CBI) training platforms. This system delivers replacement CBI hard drives with all qualified eLMS course content to air traffic facilities. The CDN is basically a network that places the eLMS content on a distributor at the site so the content is viewed from a local area network instead of downloading the content every time it's viewed. Approximately 150 air traffic sites have the CDN solution installed, and there are plans to deploy the CDN solution to the remaining Air Traffic sites in 2015. Sites with the CDN configuration have the ability to view more robust training typically associated with multimedia and simulation.

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 En Route Automation Modernization (ERAM) and Terminal Automation Modernization and Replacement (TAMR), and new training requirements are factors that affect overall time to CPC. Depending on the type of facility, facility level (complexity) and the number of candidates to certify, controllers are expected to complete certification in one and one-half to three years.

Table 7.1 shows the FAA's training targets by facility type and actual training times through the end of FY 2014 for certified air traffic controllers from the fiscal year hiring classes of 2007, 2008, 2009 and 2010. More than 82 percent of controllers in hiring classes since 2008 have completed training.

Given the 1.5- to 3-year targeted training times for new Terminal and En Route controllers, Table 7.1 reflects actual training behavior for controllers who started in FY 2007 to FY 2010. In addition, the FAA continues to monitor the pace of new hires from more recent hiring classes (i.e., 2011-2014). The FAA will report actual training times for these classes after completion rates reach 90 percent.

Table 7.1: Years to Certify

Facility Type	FAA Goal	FY 2007	FY 2008	FY 2009	FY 2010
Terminal 4 – 6	1.5	1.87	2.05	2.37	2.05
Terminal 7 – 9	2.0	1.92	2.26	2.48	2.23
Terminal 10 – 12	2.5	2.05	2.30	2.56	2.22
En Route	3.0	2.57	2.73	2.98	2.93

Note: More recent hiring classes (FY 2011 forward) are not reported as there are still greater than 10 percent of the class in progress, resulting in continuously changing metrics as those students certify or fail.

Developmental controllers who fail to certify at a facility may be removed from service or reassigned to a less complex facility in accordance with agency policies and directives. The ultimate goal of the training program is for the controller to achieve certification on all positions at a facility and attain CPC status while maintaining the safety of the NAS.

PREPARING FOR NEXTGEN

The Office of Safety and Technical Training provides critical input to support implementation of NextGen. Training professionals are part of an FAA team that evaluates how NextGen will change the air traffic work environment and what competencies will be required for the future workforce. The FAA is incorporating what it learns from this evolving and ongoing process into training programs as new systems are implemented. Outcomes-based training aligns NextGen functionality with job tasks as well, so that the training organization can make predictions on how programs will need to change with the advent of NextGen.

In 2013, the Technical Training office worked with data from NextGen Human Factors to estimate how much training would be affected by NextGen technologies being introduced to the workforce in the mid-term range. Using the Human Factors' Strategic Training Needs Assessment (STNA), the FAA assessed what training development needs were likely to be.

Examples of NextGen training efforts include Time Based Flow Management (TBFM), ERAM and Automatic Dependent Surveillance-Broadcast (ADS-B).

- The TBFM system enhances efficiency and improves traffic flow by leveraging the capabilities of the Traffic Management Advisor (TMA) decision support tool. Although some form of TBFM has been in the field for many years, a national training program was never developed. The Technical Training office is now filling the training gap with a series of courses for the Web and classroom to be implemented as supplemental or refresher training.

- Multiple courses covering ERAM have been implemented to support transition of En Route facilities to this new technology. Courses include workforce training, refresher training, supplemental training and cadre training for instructors who deliver training in the field. These various courses enable a consistent yet flexible delivery of ERAM training as facilities cycle through the phases of system implementation.

- ADS-B training combines instructor-led training with hands-on performance verification on the actual equipment. This training covers ADS-B, Fused Mode and associated new functionality in the Standard Terminal Automation Replacement System (STARS).

Chapter 8: Funding Status

In addition to direct training costs, the FAA will incur salary and other costs for developmental controllers before they certify. The average cost of a developmental in FY 2015 is projected to be $91,279.

Figure 8.1 depicts expected annual compensation costs of developmentals, as well as the expected number of developmentals by year through 2024. As training takes one and one-half to three years, the chart depicts a rolling total of hires and costs from the current and previous years. It also incorporates the effect of the controller contract.

Figure 8.1: Estimated Cost of Developmentals Before Certification
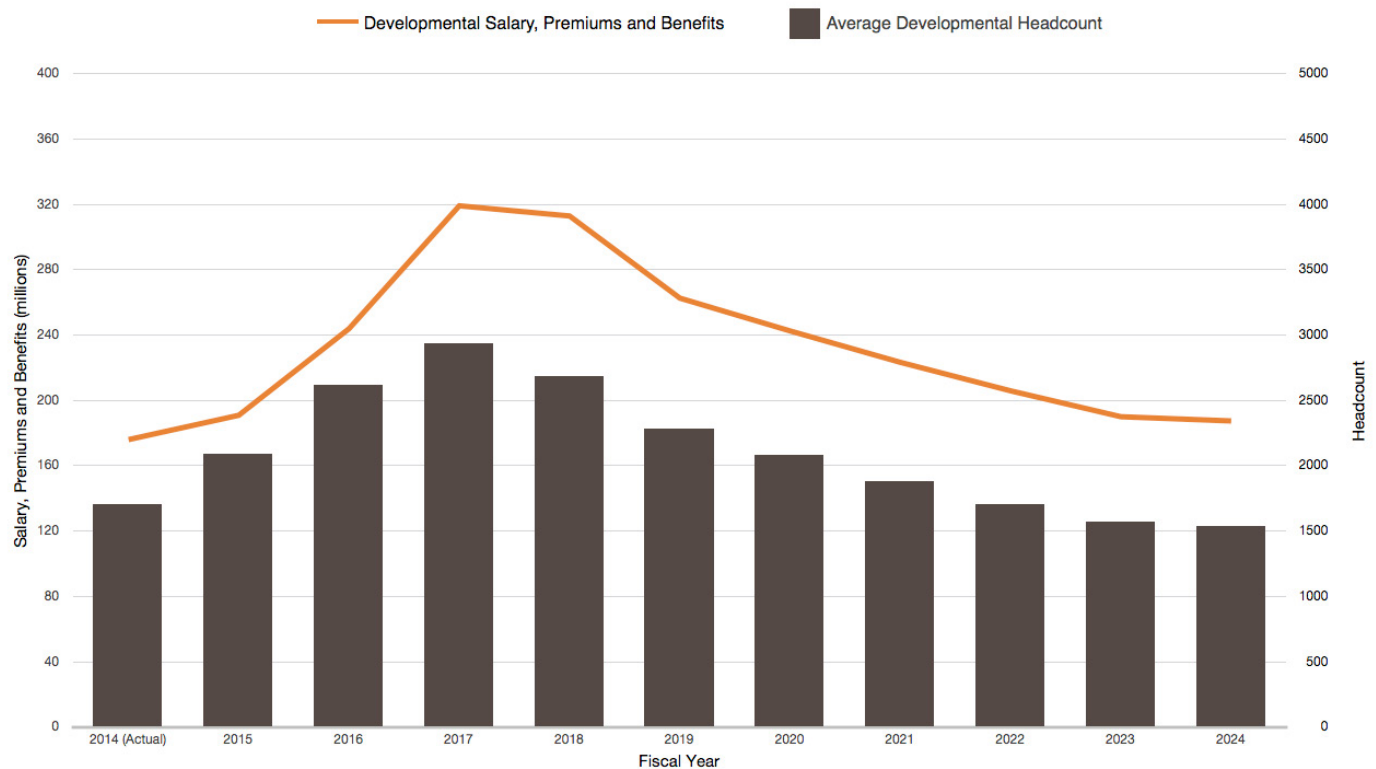
Appendix A: En Route Facility Controller Staffing Ranges

The Appendix below presents controller staffing ranges, by facility, for En Route air traffic control facilities for FY 2015. Additional detail on how the staffing ranges are calculated is provided in Chapter 3.

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

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

ID	FACILITY NAME	ACTUAL ON BOARD AS OF 09/20/14				STAFFING RANGES	
		CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
ZAB	Albuquerque ARTCC	166	1	27	194	161	197
ZAN	Anchorage ARTCC	70	7	19	96	84	103
ZAU	Chicago ARTCC	318	16	38	372	274	335
ZBW	Boston ARTCC	212	7	43	262	186	228
ZDC	Washington ARTCC	270	14	54	338	263	322
ZDV	Denver ARTCC	243	16	43	302	227	277
ZFW	Fort Worth ARTCC	254	19	33	306	251	306
ZHU	Houston ARTCC	224	12	27	263	237	290
ZID	Indianapolis ARTCC	269	12	38	319	245	300
ZJX	Jacksonville ARTCC	276	6	19	301	217	266
ZKC	Kansas City ARTCC	199	15	52	266	204	249
ZLA	Los Angeles ARTCC	219	17	43	279	209	256
ZLC	Salt Lake City ARTCC	156	1	13	170	138	169
ZMA	Miami ARTCC	225	8	22	255	214	262
ZME	Memphis ARTCC	242	8	33	283	223	273
ZMP	Minneapolis ARTCC	226	9	44	279	223	272
ZNY	New York ARTCC	239	10	64	313	244	298
ZOA	Oakland ARTCC	171	17	65	253	171	209
ZOB	Cleveland ARTCC	317	8	41	366	268	327
ZSE	Seattle ARTCC	128	6	40	174	129	157
ZSU	San Juan ARTCC	40	6	5	51	44	54
ZTL	Atlanta ARTCC	343	11	22	376	311	380
ZUA	Guam ARTCC	16	0	0	16	14	17
EN ROUTE TOTAL		**4,823**	**226**	**785**	**5,834**	**4,537**	**5,547**

Appendix B: Terminal Facility Controller Staffing Ranges

The Appendix below presents controller staffing ranges, by facility, for Terminal air traffic control facilities for FY 2015. Additional detail on how the staffing ranges are calculated is provided in Chapter 3.

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

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

| ID | FACILITY NAME | ACTUAL ON BOARD AS OF 09/20/14 | | | | STAFFING RANGES | |
		CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
A11	Anchorage TRACON	14	6	9	29	20	24
A80	Atlanta TRACON	76	13	0	89	82	100
A90	Boston TRACON	57	2	0	59	49	60
ABE	Allentown Tower	19	5	5	29	22	27
ABI	Abilene Tower	15	0	6	21	16	20
ABQ	Albuquerque Tower	27	6	3	36	22	26
ACK	Nantucket Tower	9	0	2	11	9	11
ACT	Waco Tower	14	2	6	22	16	20
ACY	Atlantic City Tower	17	4	6	27	20	24
ADS	Addison Tower	11	1	0	12	9	11
ADW	Andrews Tower	14	0	2	16	11	14
AFW	Alliance Tower	15	0	1	16	13	16
AGC	Allegheny Tower	14	1	3	18	9	11
AGS	Augusta Tower	13	0	6	19	13	15
ALB	Albany Tower	14	3	5	22	20	24
ALO	Waterloo Tower	8	0	7	15	11	13
AMA	Amarillo Tower	16	1	6	23	15	18
ANC	Anchorage Tower	21	3	6	30	21	26
APA	Centennial Tower	16	4	3	23	18	22
APC	Napa Tower	6	0	2	8	6	7
ARB	Ann Arbor Tower	7	0	1	8	8	10

ID	FACILITY NAME	ACTUAL ON BOARD AS OF 09/20/14				STAFFING RANGES	
		CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
ARR	Aurora Tower	9	1	2	12	8	10
ASE	Aspen Tower	10	0	7	17	11	13
ATL	Atlanta Tower	45	11	0	56	43	52
AUS	Austin Tower	28	14	0	42	31	37
AVL	Asheville Tower	11	0	6	17	13	16
AVP	Wilkes-Barre Tower	16	0	3	19	16	20
AZO	Kalamazoo Tower	12	1	4	17	14	17
BDL	Bradley Tower	15	1	3	19	10	13
BED	Hanscom Tower	15	0	1	16	11	13
BFI	Boeing Tower	18	5	3	26	14	17
BFL	Bakersfield Tower	16	1	9	26	17	21
BGM	Binghamton Tower	13	0	2	15	11	13
BGR	Bangor Tower	19	0	1	20	15	19
BHM	Birmingham Tower	21	2	3	26	22	26
BIL	Billings Tower	16	0	3	19	16	19
BIS	Bismarck Tower	7	0	5	12	13	15
BJC	Broomfield Tower	12	1	0	13	8	10
BNA	Nashville Tower	26	10	3	39	32	40
BOI	Boise Tower	25	3	5	33	20	25
BOS	Boston Tower	28	8	0	36	27	33
BPT	Beaumont Tower	9	0	1	10	9	11
BTR	Baton Rouge Tower	12	3	5	20	15	18
BTV	Burlington Tower	14	2	6	22	16	19
BUF	Buffalo Tower	24	1	8	33	24	29
BUR	Burbank Tower	15	4	0	19	14	17
BWI	Baltimore Tower	27	3	3	33	19	24
C90	Chicago TRACON	74	19	0	93	80	98
CAE	Columbia Tower	23	0	1	24	18	21
CAK	Akron-Canton Tower	23	1	3	27	16	20
CCR	Concord Tower	8	0	0	8	8	10
CDW	Caldwell Tower	11	0	0	11	8	9
CHA	Chattanooga Tower	14	3	5	22	16	19

Appendix B: Terminal Facility Controller Staffing Ranges

		ACTUAL ON BOARD AS OF 09/20/14				STAFFING RANGES	
ID	FACILITY NAME	CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
CHS	Charleston Tower	23	0	3	26	18	23
CID	Cedar Rapids Tower	15	0	3	18	13	16
CKB	Clarksburg Tower	17	0	2	19	13	16
CLE	Cleveland Tower	43	5	6	54	35	43
CLT	Charlotte Tower	62	24	2	88	74	90
CMA	Camarillo Tower	11	2	2	15	9	10
CMH	Columbus Tower	38	8	1	47	36	45
CMI	Champaign Tower	11	0	5	16	13	16
CNO	Chino Tower	10	3	2	15	9	11
COS	Colorado Springs Tower	24	6	3	33	22	26
CPR	Casper Tower	11	0	3	14	11	13
CPS	Downtown Tower	12	0	1	13	9	11
CRP	Corpus Christi Tower	26	6	5	37	28	34
CRQ	Palomar Tower	14	0	2	16	9	11
CRW	Charleston Tower	21	2	5	28	17	21
CSG	Columbus Tower	7	0	0	7	4	5
CVG	Cincinnati Tower	48	1	0	49	34	41
D01	Denver TRACON	55	13	0	68	65	80
D10	Dallas-Fort Worth TRACON	55	22	0	77	77	94
D21	Detroit TRACON	41	16	0	57	48	59
DAB	Daytona Beach Tower	37	13	8	58	47	57
DAL	Dallas Love Tower	24	3	1	28	17	21
DAY	Dayton Tower	17	0	0	17	12	14
DCA	Washington National Tower	21	9	4	34	23	28
DEN	Denver Tower	36	5	0	41	34	42
DFW	DFW Tower	48	4	0	52	46	57
DLH	Duluth Tower	15	1	7	23	17	21
DPA	Dupage Tower	11	2	1	14	9	12
DSM	Des Moines Tower	15	5	6	26	17	21
DTW	Detroit Tower	33	0	0	33	29	35
DVT	Deer Valley Tower	17	2	1	20	14	18
DWH	Hooks Tower	17	0	0	17	11	13

ID	FACILITY NAME	ACTUAL ON BOARD AS OF 09/20/14				STAFFING RANGES	
		CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
E10	High Desert TRACON	22	1	4	27	23	29
ELM	Elmira Tower	13	0	2	15	10	12
ELP	El Paso Tower	16	2	6	24	18	22
EMT	El Monte Tower	9	1	1	11	8	10
ERI	Erie Tower	16	1	5	22	11	14
EUG	Eugene Tower	10	9	4	23	16	20
EVV	Evansville Tower	17	0	2	19	14	17
EWR	Newark Tower	27	11	0	38	28	34
F11	Central Florida TRACON	37	12	0	49	41	50
FAI	Fairbanks Tower	17	1	5	23	18	22
FAR	Fargo Tower	17	3	2	22	15	18
FAT	Fresno Tower	17	6	6	29	20	25
FAY	Fayetteville Tower	18	6	2	26	19	23
FCM	Flying Cloud Tower	11	0	0	11	7	9
FFZ	Falcon Tower	13	0	2	15	12	15
FLL	Fort Lauderdale Tower	27	2	3	32	20	24
FLO	Florence Tower	10	1	3	14	10	12
FNT	Flint Tower	15	1	3	19	11	14
FPR	St Lucie Tower	9	2	4	15	10	12
FRG	Farmingdale Tower	13	1	3	17	12	15
FSD	Sioux Falls Tower	16	1	1	18	14	17
FSM	Fort Smith Tower	20	1	2	23	20	24
FTW	Meacham Tower	14	1	3	18	12	14
FWA	Fort Wayne Tower	17	1	4	22	16	19
FXE	Fort Lauderdale	15	1	6	22	13	15
GCN	Grand Canyon Tower	8	1	1	10	8	10
GEG	Spokane Tower	22	2	3	27	20	24
GFK	Grand Forks Tower	20	3	3	26	18	22
GGG	Longview Tower	13	0	4	17	15	18
GPT	Gulfport Tower	12	2	7	21	13	16
GRB	Green Bay Tower	21	0	0	21	16	19
GRR	Grand Rapids Tower	18	0	4	22	17	20

Appendix B: Terminal Facility Controller Staffing Ranges

ID	FACILITY NAME	ACTUAL ON BOARD AS OF 09/20/14				STAFFING RANGES	
		CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
GSO	Greensboro Tower	25	2	6	33	21	26
GSP	Greer Tower	12	2	7	21	17	20
GTF	Great Falls Tower	10	1	5	16	12	15
HCF	Honolulu Control Facility	72	11	13	96	73	89
HEF	Manassas Tower	9	1	4	14	8	10
HIO	Hillsboro Tower	16	1	2	19	12	14
HLN	Helena Tower	8	0	3	11	7	9
HOU	Hobby Tower	24	0	0	24	17	21
HPN	Westchester Tower	14	0	4	18	11	14
HSV	Huntsville Tower	15	0	4	19	14	17
HTS	Huntington Tower	19	0	1	20	12	15
HUF	Terre Haute Tower	15	1	7	23	13	16
HWD	Hayward Tower	9	1	2	12	7	9
I90	Houston TRACON	69	20	0	89	74	90
IAD	Dulles Tower	32	1	4	37	25	31
IAH	Houston Intercontinental Tower	40	2	0	42	29	36
ICT	Wichita Tower	28	8	1	37	26	32
ILG	Wilmington Tower	11	1	3	15	7	9
ILM	Wilmington Tower	16	2	3	21	15	19
IND	Indianapolis Tower	37	6	3	46	32	40
ISP	Islip Tower	12	0	6	18	10	12
ITO	Hilo Tower	13	1	4	18	12	14
JAN	Jackson Tower	12	0	3	15	13	16
JAX	Jacksonville Tower	24	11	7	42	37	46
JFK	Kennedy Tower	26	7	3	36	28	35
JNU	Juneau Tower	9	0	3	12	9	12
K90	Cape TRACON	22	2	1	25	19	24
L30	Las Vegas TRACON	36	15	1	52	40	49
LAF	Lafayette Tower	8	2	1	11	7	9
LAN	Lansing Tower	18	1	5	24	16	19
LAS	Las Vegas Tower	37	10	0	47	31	38
LAX	Los Angeles Tower	38	11	0	49	38	46

ID	FACILITY NAME	ACTUAL ON BOARD AS OF 09/20/14				STAFFING RANGES	
		CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
LBB	Lubbock Tower	15	1	5	21	15	18
LCH	Lake Charles Tower	11	0	5	16	12	15
LEX	Lexington Tower	20	3	4	27	18	22
LFT	Lafayette Tower	14	0	5	19	15	18
LGA	La Guardia Tower	29	5	2	36	26	32
LGB	Long Beach Tower	24	0	0	24	16	20
LIT	Little Rock Tower	23	5	4	32	22	27
LNK	Lincoln Tower	10	0	0	10	8	9
LOU	Bowman Tower	9	0	2	11	8	9
LVK	Livermore Tower	9	4	1	14	8	10
M03	Memphis TRACON	27	7	7	41	30	37
M98	Minneapolis TRACON	47	6	0	53	49	59
MAF	Midland Tower	15	0	6	21	18	21
MBS	Saginaw Tower	14	2	2	18	10	13
MCI	Kansas City Tower	31	3	1	35	30	37
MCO	Orlando Tower	24	4	1	29	21	26
MDT	Harrisburg Tower	23	1	8	32	20	24
MDW	Midway Tower	22	6	0	28	20	24
MEM	Memphis Tower	25	1	4	30	20	24
MFD	Mansfield Tower	12	1	4	17	11	13
MGM	Montgomery Tower	12	7	4	23	16	20
MHT	Manchester Tower	18	0	1	19	10	12
MIA	Miami Tower	68	18	3	89	78	95
MIC	Crystal Tower	11	0	0	11	8	10
MKC	Downtown Tower	12	1	3	16	10	12
MKE	Milwaukee Tower	40	9	3	52	31	38
MKG	Muskegon Tower	14	0	1	15	12	15
MLI	Quad City Tower	6	1	9	16	15	18
MLU	Monroe Tower	9	1	4	14	11	13
MMU	Morristown Tower	11	0	0	11	7	9
MOB	Mobile Tower	19	1	3	23	18	23
MRI	Merrill Tower	10	2	1	13	9	11

Appendix B: Terminal Facility Controller Staffing Ranges

ID	FACILITY NAME	ACTUAL ON BOARD AS OF 09/20/14				STAFFING RANGES	
		CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
MRY	Monterey Tower	8	0	1	9	6	7
MSN	Madison Tower	19	4	0	23	16	20
MSP	Minneapolis Tower	31	3	0	34	30	37
MSY	New Orleans Tower	23	6	0	29	30	37
MWH	Grant County Tower	9	1	5	15	13	16
MYF	Montgomery Tower	10	1	6	17	10	12
MYR	Myrtle Beach Tower	13	3	9	25	22	27
N90	New York TRACON	150	18	35	203	177	217
NCT	Northern California TRACON	146	27	10	183	152	186
NEW	Lakefront Tower	8	0	0	8	7	8
NMM	Meridian TRACON	8	0	3	11	11	14
OAK	Oakland Tower	24	4	0	28	17	21
OGG	Maui Tower	10	1	4	15	8	10
OKC	Oklahoma City Tower	32	2	5	39	26	32
OMA	Eppley Tower	16	0	0	16	10	12
ONT	Ontario Tower	15	0	3	18	10	12
ORD	Chicago O'Hare Tower	48	21	0	69	59	72
ORF	Norfolk Tower	22	6	8	36	25	31
ORL	Orlando Executive Tower	10	0	2	12	9	11
P31	Pensacola TRACON	27	2	2	31	28	35
P50	Phoenix TRACON	51	10	0	61	52	64
P80	Portland TRACON	24	5	4	33	22	27
PAE	Paine Tower	10	2	2	14	9	10
PAO	Palo Alto Tower	7	1	1	9	9	11
PBI	Palm Beach Tower	29	12	9	50	33	41
PCT	Potomac TRACON	143	29	9	181	137	167
PDK	DeKalb-Peachtree Tower	18	4	0	22	12	14
PDX	Portland Tower	23	8	2	33	18	22
PHF	Patrick Henry Tower	11	1	4	16	8	10
PHL	Philadelphia Tower	77	12	0	89	65	79
PHX	Phoenix Tower	30	3	0	33	27	33
PIA	Peoria Tower	11	1	6	18	15	18

ID	FACILITY NAME	ACTUAL ON BOARD AS OF 09/20/14				STAFFING RANGES	
		CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
PIE	St Petersburg Tower	13	0	3	16	9	11
PIT	Pittsburgh Tower	39	7	0	46	32	39
PNE	Northeast Philadelphia Tower	8	1	4	13	7	9
PNS	Pensacola Tower	11	1	1	13	10	12
POC	Brackett Tower	10	1	0	11	8	10
POU	Poughkeepsie Tower	10	0	2	12	7	9
PRC	Prescott Tower	12	1	3	16	12	15
PSC	Pasco Tower	13	1	2	16	13	16
PSP	Palm Springs Tower	7	1	5	13	8	10
PTK	Pontiac Tower	13	0	1	14	9	11
PUB	Pueblo Tower	12	0	3	15	11	14
PVD	Providence Tower	24	1	4	29	23	28
PWK	Chicago Executive Tower	12	1	1	14	8	10
PWM	Portland Tower	19	1	5	25	16	20
R90	Omaha TRACON	19	4	0	23	17	21
RDG	Reading Tower	15	0	2	17	15	18
RDU	Raleigh-Durham Tower	32	7	0	39	34	42
RFD	Rockford Tower	20	2	3	25	16	20
RHV	Reid-Hillview Tower	10	2	0	12	9	11
RIC	Richmond Tower	12	1	8	21	10	13
RNO	Reno Tower	14	1	1	16	11	13
ROA	Roanoke Tower	23	2	8	33	18	22
ROC	Rochester Tower	27	1	3	31	18	22
ROW	Roswell Tower	10	1	4	15	12	14
RST	Rochester Tower	15	0	1	16	11	14
RSW	Fort Myers Tower	23	5	5	33	24	29
RVS	Riverside Tower	14	0	0	14	9	10
S46	Seattle TRACON	42	12	0	54	41	50
S56	Salt Lake City TRACON	32	11	6	49	36	44
SAN	San Diego Tower	22	3	0	25	18	22
SAT	San Antonio Tower	34	14	1	49	38	47
SAV	Savannah Tower	20	1	4	25	19	24

Appendix B: Terminal Facility Controller Staffing Ranges

| ID | FACILITY NAME | ACTUAL ON BOARD AS OF 09/20/14 | | | | STAFFING RANGES | |
		CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
SBA	Santa Barbara Tower	24	10	0	34	22	26
SBN	South Bend Tower	13	1	8	22	18	21
SCK	Stockton Tower	7	0	3	10	7	8
SCT	Southern California TRACON	214	27	3	244	192	235
SDF	Standiford Tower	33	8	6	47	34	41
SDL	Scottsdale Tower	8	4	3	15	9	11
SEA	Seattle Tower	27	0	1	28	23	28
SEE	Gillespie Tower	10	1	2	13	11	13
SFB	Sanford Tower	16	4	1	21	15	18
SFO	San Francisco Tower	26	6	0	32	28	34
SGF	Springfield Tower	26	1	3	30	20	25
SHV	Shreveport Tower	14	0	9	23	18	22
SJC	San Jose Tower	14	0	0	14	10	13
SJU	San Juan Tower	12	2	8	22	12	15
SLC	Salt Lake City Tower	29	4	0	33	24	29
SMF	Sacramento Tower	14	0	3	17	10	12
SMO	Santa Monica Tower	10	2	1	13	8	10
SNA	John Wayne Tower	25	3	0	28	19	23
SPI	Springfield Tower	8	0	6	14	10	13
SRQ	Sarasota Tower	11	1	4	16	10	12
STL	St Louis Tower	20	2	3	25	14	17
STP	St Paul Tower	13	0	0	13	8	10
STS	Sonoma Tower	7	1	2	10	7	8
STT	St Thomas Tower	8	1	2	11	7	9
SUS	Spirit Tower	10	0	3	13	9	11
SUX	Sioux Gateway Tower	11	0	5	16	9	11
SYR	Syracuse Tower	20	0	7	27	17	21
T75	St Louis TRACON	30	0	1	31	25	31
TEB	Teterboro Tower	16	5	4	25	14	17
TLH	Tallahassee Tower	16	3	3	22	14	18
TMB	Tamiami Tower	16	0	0	16	14	17
TOA	Torrance Tower	9	2	0	11	8	10

		ACTUAL ON BOARD AS OF 09/20/14				STAFFING RANGES	
ID	FACILITY NAME	CPC	CPC-IT	DEVELOPMENTAL	TOTAL	LOW	HIGH
TOL	Toledo Tower	16	2	3	21	16	20
TPA	Tampa Tower	45	7	2	54	45	54
TRI	Tri-Cities Tower	15	1	4	20	14	17
TUL	Tulsa Tower	28	0	6	34	22	27
TUS	Tucson Tower	13	1	5	19	11	14
TVC	Traverse City Tower	8	0	1	9	8	10
TWF	Twin Falls Tower	6	1	2	9	7	8
TYS	Knoxville Tower	18	4	7	29	22	26
U90	Tucson TRACON	16	3	1	20	15	18
VGT	North Las Vegas Tower	6	7	1	14	9	11
VNY	Van Nuys Tower	18	5	2	25	17	20
VRB	Vero Beach Tower	13	0	2	15	10	13
Y90	Yankee TRACON	18	5	6	29	18	21
YIP	Willow Run Tower	12	0	0	12	10	12
YNG	Youngstown Tower	16	1	1	18	22	26
	TERMINAL TOTAL	6,369	974	882	8,225	6,118	7,477

	EN ROUTE TOTAL	4,823	226	785	5,834	4,537	5,547
	TERMINAL TOTAL	6,369	974	882	8,225	6,118	7,477
	GRAND TOTAL	11,192	1,200	1,667	14,059	10,655	13,024
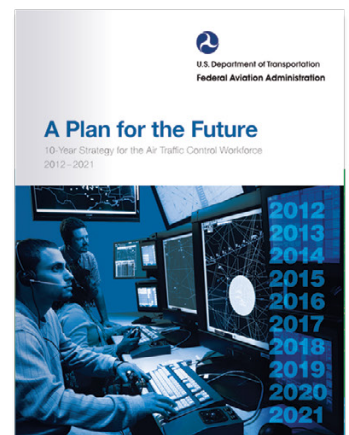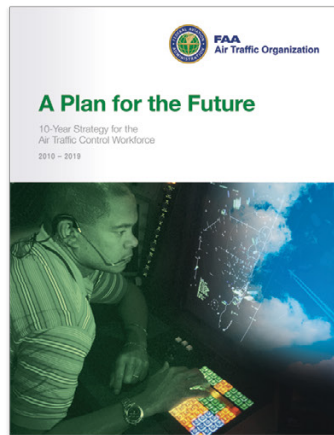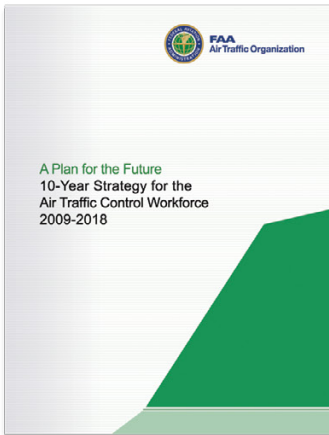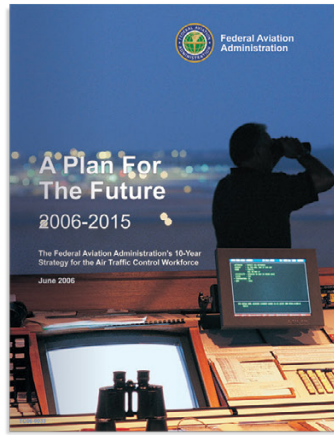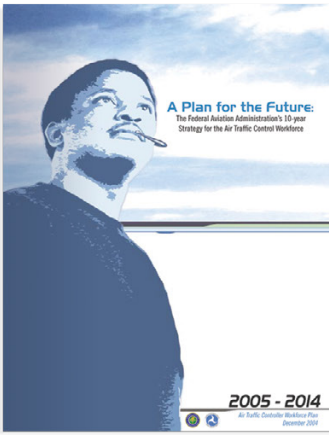
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