

April 1997

AVIATION SAFETY

Opportunities Exist for FAA to Refine the Controller Staffing Process





United States
General Accounting Office
Washington, D.C. 20548

**Resources, Community, and
Economic Development Division**

B-271807

April 9, 1997

The Honorable Frank Wolf
Chairman
The Honorable Martin Olav Sabo
Ranking Minority Member
Subcommittee on Transportation
and Related Agencies
Committee on Appropriations
House of Representatives

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

In response to your request, this report discusses the results of our review of the Federal Aviation Administration's (FAA) efforts to address short- and long-term controller staffing needs. The report contains recommendations to the Secretary of Transportation aimed at enhancing FAA's ability to forecast and meet these needs.

As arranged with your offices, unless you announce its contents earlier, we plan no further distribution of this report until 7 days after the date of this letter. At that time, we will send copies of the report to the Secretary of Transportation; the Administrator of the FAA; other appropriate congressional committees; the Director of the Office of Management and Budget; and other interested parties. We will also make copies available to others on request.

If you or your staff have any questions, I can be reached at (202) 512-2834. Major contributors to this report are listed in appendix III.

A handwritten signature in black ink that reads "John H. Anderson, Jr." in a cursive script.

John H. Anderson, Jr.
Director, Transportation Issues

Executive Summary

Purpose

The Federal Aviation Administration (FAA) is responsible for managing the nation's air transportation system so more than 18,000 aircraft can annually carry 500 million passengers safely and on schedule. Because of significant hiring in the early 1980s to replace strikers who had been fired, many of FAA's more than 17,000 air traffic controllers may become eligible to retire within the next decade, raising concerns that FAA could be left with too few fully trained controllers.

The Chairman and Ranking Member of the Subcommittee on Transportation, House Committee on Appropriations, and the Ranking Member of the House Committee on Transportation and Infrastructure, asked GAO to (1) identify the key variables FAA uses to project future controller staffing needs and evaluate their reasonableness; (2) determine whether the agency has identified a sufficient number of controller candidates to satisfy its short- and long-term staffing needs and evaluate FAA's plans to train new controllers; and (3) identify impediments that hinder FAA from staffing air traffic control (ATC) facilities at specified levels.

Background

In 1981, thousands of air traffic controllers who participated in a nationwide strike were fired and barred by a presidential directive from reemployment with FAA as air traffic controllers. As a result of the strike, FAA hired thousands of new controllers to rebuild its controller workforce. In 1995, following the repeal of the directive, FAA began rehiring some of the fired controllers.

FAA uses staffing standards forecast models to determine the staffing needs for controllers and to formulate its annual staffing and budget requests. The models forecast needs using (1) periodic industrial engineering studies that measure the amount of time it takes a controller to perform necessary work tasks; (2) estimates of growth in air traffic; and (3) estimates of attrition among controllers. The models are also used to determine the specified level of controllers FAA needs to operate its ATC facilities.

Air traffic controller candidates currently receive training from several sources. Most candidates with no prior controller experience currently receive initial training at one of four post-secondary educational institutions that participate in FAA's collegiate training initiative program or

at the Mid-America Aviation Resource Consortium.¹ In addition, other candidates receive training as part of FAA's cooperative education program, which allows students to receive controller training while completing academic requirements toward a college degree. Once hired by FAA, these candidates receive an average of 2 to 4 years of on-the-job training at ATC facilities before being fully certified as controllers. Candidates with prior experience, such as former FAA or Department of Defense controllers, receive refresher training at the FAA Academy in Oklahoma City, Oklahoma, as well as shorter on-the-job training.

Results in Brief

FAA uses two key variables—estimates of air traffic growth and controller attrition—to project future controller staffing needs. While FAA's estimates of air traffic growth are reasonable, GAO's analysis indicated that FAA could be overstating retirements, which account for most controller attrition, for fiscal years 1999 through 2002. Rather than using actual information on controllers' age and service time to project future retirements, FAA bases its estimates on assumptions about when controllers will be eligible to retire.

FAA has identified a sufficient number of controller candidates to meet its short-term staffing needs in fiscal years 1997 and 1998. However, beyond fiscal year 1998, it is uncertain whether current sources can provide the controller candidates FAA will need to meet its hiring goals for fiscal years 1999 through 2002. The majority of available candidates are controllers who were hired in 1981 and who FAA officials believe could be eligible to retire within a few years of reemployment. However, FAA has not conducted any analysis to support this position. To help meet its long-term hiring goals, FAA is expanding its collegiate program to include more schools and has reactivated the cooperative education program.

Beginning in fiscal year 1998, FAA will require that all new controllers receive some training at its Academy. FAA believes that this will reduce on-the-job training time and costs. This revision, however, could increase the federal costs of initial controller training because FAA will pay a portion of training expenses currently being paid by participants in the collegiate program.

FAA officials identified several principal impediments that hinder their ability to staff ATC facilities at specified levels. The first is FAA

¹The Mid-America Aviation Resource Consortium is a federally funded program under which students receive intensive air traffic controller training. The Congress established the program in 1989 to supplement FAA's controller training program.

headquarters' practice of generally not providing funds to relocate controllers until the end of the fiscal year, which causes delayed controller moves and continued staffing imbalances. The second impediment is the limited ability of regional officials to recruit controller candidates locally to fill vacancies at ATC facilities. In addition, FAA regional officials also believe that limited hiring of new controllers in recent years has hindered their ability to fill vacancies. Partly due to these impediments, as of April 1996 about 53 percent of ATC facilities were not staffed at levels specified by FAA's staffing standards. Specifically, these facilities were either more than 10 percent over or more than 10 percent under specified levels. Although FAA officials believe certain circumstances justify deviations from the staffing standards, there are facilities where staffing differences are not justified. FAA has implemented several initiatives to improve its ability to staff the facilities at specified levels. It is too early, however, to determine the effectiveness of these initiatives.

Principal Findings

FAA Could Improve Its Forecasts of Controller Staffing Needs by Using Available Data

The two key variables that FAA uses to project controller staffing needs are estimates of future air traffic growth and future controller attrition. FAA's projections of air traffic growth have been reasonable. In fiscal years 1991 through 1995, FAA's estimates of the amount of air traffic to be handled by certain facilities differed by between 0.6 and 7.4 percent from the actual levels. Since the projections are designed to be accurate within 10 percent, FAA officials believe that these estimates are accurate enough for its purposes.

GAO could not evaluate the reasonableness of FAA's projections for controller attrition because FAA does not maintain previous projections that GAO could compare to actual attrition levels. However, in examining the process FAA uses to estimate attrition, GAO found that FAA's projections of retirements—which account for most attrition—may be overstated. FAA bases its projections on assumptions they make about when controllers will be eligible to retire rather than using available data on actual retirement eligibility. GAO found that many controllers may not qualify for retirement as early as FAA assumes. In addition, FAA assumes that the same percentage of controllers will retire in the future as in the past but does not have a basis for this making this assumption.

While definitively predicting how many controllers will retire in any year is nearly impossible, FAA could improve its attrition estimates by using actual information on the age and service time of recent retirees and current controllers. Using data on actual retirements from fiscal years 1992 through 1996, GAO found that, on average, controllers retired when they had about 31 years of federal service and were about 56 years old. Combining these data with similar data on current controllers, GAO estimated that retirements could be significantly lower than FAA projects for fiscal years 1999 through 2002. For example, while FAA projects that 510 controllers will retire in fiscal year 2002, data on recent retirees indicate that the number of retirees in fiscal year 2002 could range from 211 to 273 controllers.

Because it takes about 3 years to fully train a new controller, if actual retirements differ significantly from FAA's estimates, it could take FAA several years to adjust its hiring to reflect actual retirements. If FAA overestimates the number of future retirees, it would have too many controllers for several years, resulting in increased costs. If FAA underestimates the number of retirees, it could be several years before fully trained controllers are available, which could result in an increase in overtime for the remaining controllers and, in extreme cases, flight delays due to decreased levels of FAA operations.

Short-Term Staffing Needs Can Be Met, but Uncertainty Exists About FAA's Ability to Meet Long-Term Needs

A sufficient number of candidates are available from various sources to meet FAA's plans to hire 1,300 new controllers in the short term, fiscal years 1997 and 1998, including former FAA and Department of Defense controllers as well as graduates from the collegiate program and the Mid-America Aviation Resource Consortium.

In the long term, however, it is uncertain whether current sources can provide the new controllers FAA plans to hire during fiscal years 1999 through 2002. The majority of available candidates are controllers who were fired from FAA during the 1981 controller strike. FAA officials believe that these controllers may only fill staffing needs in the short term because many of them could retire at the same time as current controllers. While data on the age and service time of the former controllers who qualify for rehire are available, FAA has not analyzed these data to determine when the former controllers would become eligible to retire and thus would need to be replaced.

To ensure that it has enough controller candidates, FAA is expanding the number of post-secondary schools participating in the collegiate and cooperative education programs. According to FAA officials, the collegiate program will include 18 additional schools by September 1997.

FAA intends to provide a portion of initial controller training for all collegiate program candidates at the FAA Academy in order to standardize training on the latest equipment and reduce on-the-job training time and costs. However, under this approach, FAA will assume some of the costs of training that many candidates in the collegiate program are currently paying. FAA has not analyzed the cost-effectiveness of changing its approach to training new controllers.

FAA Officials Identified Impediments That Contribute to Staffing Imbalances at ATC Facilities

In April 1996, FAA's total controller workforce was 17,163, compared to the staffing standard of 17,465—a difference of about 2 percent. However, when GAO examined staffing at specific ATC facilities, there was a greater difference between actual staffing and the standards at about half of the facilities. Specifically, about 21 percent of ATC facilities were staffed at levels more than 10 percent above FAA's standards, while 32 percent of ATC facilities were staffed at levels more than 10 percent below the standards. While some differences may be acceptable because of certain circumstances, such as workload factors that are unique to particular facilities, FAA headquarters officials acknowledged that some facilities have too many controllers, while others have too few.

FAA regional officials told us that one impediment to alleviating the staffing imbalances is FAA's practice of waiting until the end of the fiscal year to distribute funds to relocate controllers among facilities. Funds initially designated to move controllers are used during the year to supplement cost increases for other operating expenses. According to FAA regional officials, this practice delays controller moves, creates uncertainty, and inhibits the timely and effective allocation of resources within the regions. FAA headquarters officials agreed that this practice causes problems but told GAO that sufficient funds have always been available to pay for controller moves by the end of the fiscal year.

A second impediment, according to regional officials, is that they have limited authority to hire new controllers from their geographic areas. FAA headquarters officials agreed and explained that they currently require that most new controllers come from two pools of candidates—the controllers who were fired in 1981 or graduates of the collegiate

program—regardless of the candidates’ geographic preferences. This often requires new controllers to move in order to get hired. Once hired, many new controllers request transfers to other more desirable facilities. More local recruiting, FAA officials explained, would help reduce the number of controller transfers and resignations, particularly at facilities that are hard to staff, because newly hired controllers would begin working in their preferred geographic areas.

A third impediment, cited by officials in all FAA regions, is limited hiring in recent years because of budget constraints, which has resulted in fewer new controllers being assigned to some ATC facilities. Regional officials told us that new controllers are needed to fill vacancies created by attrition, as well as to provide a buffer against future retirements. According to these officials, an inability to fill vacancies has led to increased overtime and reduced controller training at some facilities.

While FAA is proposing a variety of initiatives to address its staffing problems—including more regional recruiting and hiring, and instituting an interim incentive pay program for hard-to-staff facilities—it is too soon to determine their effectiveness.

Recommendations

To improve FAA’s process for estimating and meeting future controller staffing needs, GAO recommends that the Secretary of Transportation direct the Administrator of FAA to (1) incorporate actual information on the age, years of service, and retirement eligibility date of current controllers into its projections of future controller retirements; (2) use age and service data to determine when controllers hired in 1981 and rehired could retire and therefore would need to be replaced; and (3) monitor the costs of training for collegiate program graduates hired in fiscal years 1997 and 1998 to determine whether anticipated savings will be realized under the revised training program.

Agency Comments

We provided copies of a draft of this report to FAA for its review and comment. FAA officials, including the Acting Deputy Associate Administrator for Air Traffic Services, concurred with our recommendations and provided clarifying comments which have been incorporated as appropriate.

Contents

Executive Summary		2
Chapter 1		12
Introduction	Role of Air Traffic Controllers in the U.S. Air Transportation System	12
	Available Controller Candidates and Air Traffic Controller Training	14
	The Two Sets of Retirement Rules That Affect Controllers' Eligibility for Retirement	15
	Objectives, Scope, and Methodology	16
Chapter 2		19
FAA Could Improve the Accuracy of Its Forecasts of Controller Staffing Needs by Using Available Data	Controller Staffing Needs Are Based on Staffing Standards Forecast Models	19
	FAA's Recent Staffing Requests Reflect Its Estimates of Increased Controller Attrition	21
	Workload Estimates Are Reasonable, but Attrition Estimates May Overstate Future Retirements	24
	Five Factors Limit the Reasonableness of FAA's Projections of Long-Term Controller Needs	27
	Data on the Age and Service Time of Recently Retired Controllers Indicate That Fewer Controllers Could Retire in Future Years Than FAA Has Forecast	31
	Conclusions	38
	Recommendation	39
	Agency Comments	39
Chapter 3		40
FAA Can Meet Short-Term Staffing Needs While Developing Plans to Address Long-Term Needs	A Sufficient Number of Controller Candidates Is Available to Fill Short-Term Staffing Needs	40
	Rehiring of Former PATCO Members May Only Fill Staffing Needs in the Short Term	41
	FAA Is Expanding Its Controller Candidate Pool to Address Long-Term Staffing Needs and Is Revising Its Controller Training Program	43
	Conclusions	46
	Recommendations	47
	Agency Comments	47

Chapter 4		48
FAA Has Identified Several Impediments That Hinder Its Ability to Staff ATC Facilities at Specified Levels	<ul style="list-style-type: none"> Many ATC Facilities Are Not Staffed at Specified Levels 48 FAA Officials Identified Impediments That Contribute to Staffing Imbalances at ATC Facilities 52 FAA Has Several Initiatives Under Way to Address Staffing Differences 55 Conclusions 57 	48
<hr/>		
Appendixes	<ul style="list-style-type: none"> Appendix I: Explanation of the Model We Used to Estimate Future Controller Retirements 60 Appendix II: FAA Regional Offices, Air Traffic Control Facilities, and NATCA Representatives Contacted for Our Review 62 Appendix III: Major Contributors to This Report 63 	60
<hr/>		
Tables	<ul style="list-style-type: none"> Table 1.1: Retirement Eligibility Rules for Controllers 16 Table 2.1: FAA’s Controller Workforce, Fiscal Years 1993-96 21 Table 2.2: FAA’s Estimates of Controller Hiring, Attrition, and the Total Controller Workforce, Fiscal Years 1997-2002 22 Table 2.3: Actual and Predicted Levels of En Route Center Activity in Millions of Aircraft Handled, Fiscal Years 1991-95 25 Table 2.4: FAA’s Estimates and Actual Controller Retirements and Resignations, Fiscal Year 1995 26 Table 2.5: Projections of Controller Retirements According to FAA’s Staffing Plan and Those Derived From Age and Service Data, Fiscal Years 1997-2002 37 Table 3.1: Controller Hiring and Available Controller Candidates, Fiscal Years 1997 and 1998 41 Table 4.1: Summary of PCS Funding, Spending, and Moves for Fiscal Years 1993-97 53 Table I.1: Estimated Number of Controller Retirements Based on Age and Service Time 61 	16
<hr/>		
Figures	<ul style="list-style-type: none"> Figure 1.1: Aircraft Tracking at ATC Facilities 13 Figure 2.1: FAA’s Controller Workforce Compared to the Staffing Standards, Fiscal Years 1993-96 20 Figure 2.2: FAA’s Estimates of the Number of Controllers Eligible for Retirement, Fiscal Years 1997-2007 23 	13

Figure 2.3: FAA’s Estimates of the Number of Controllers Becoming Eligible to Retire Compared to Those Projected to Retire, Fiscal Years 1997-2006	30
Figure 2.4: FAA’s Retirement Projections Compared to the Annual Number of Controllers Reaching 31 Years of Federal Service, Fiscal Years 1997-2011	32
Figure 2.5: FAA’s Retirement Projections Compared to the Annual Number of Controllers Reaching 56 Years of Age, Fiscal Years 1997-2011	34
Figure 2.6: FAA’s Retirement Projections Compared to Retirement Projections Based on Controllers’ Age and Years of Federal Service, Fiscal Years 1997-2011	36
Figure 3.1: Comparison of FAA’s Existing and Revised Training Programs	45
Figure 4.1: Comparison of the Current Number of Controllers and Staffing Standards Levels for En Route Centers	50
Figure 4.2: Comparison of the Current Number of Controllers and Staffing Standards Levels for Terminal Facilities	51

Abbreviations

ATC	Air Traffic Control
ATO	Office of Air Traffic Operations
ATS	Air Traffic Services
CSRS	Civil Service Retirement System
CTI	collegiate training initiative
DOD	Department of Defense
FAA	Federal Aviation Administration
FERS	Federal Employees Retirement System
FPL	full performance level
GAO	General Accounting Office
MARC	Mid-America Aviation Resource Consortium
NATCA	National Air Traffic Controllers Association
PATCO	Professional Air Traffic Control Organization
PCS	permanent change of station
TRACON	terminal radar approach control

Introduction

Each year, over 18,000 aircraft and more than 500 million passengers travel through the air transportation system in the United States. The Federal Aviation Administration (FAA) has responsibility for managing this system and ensuring the safe and efficient movement of air traffic. To successfully accomplish this mission, FAA must have a sufficient number of adequately trained air traffic controllers working at air traffic control (ATC) facilities. Currently, FAA operates nearly 400 ATC facilities and employs over 17,000 individuals in its controller workforce.¹

For nearly a decade after the air traffic controller strike in August 1981, FAA had to rebuild its controller workforce. Between fiscal years 1982 and 1990, FAA hired thousands of controllers to replace those fired by a presidential directive in 1981 and indefinitely barred from seeking future employment as FAA controllers. Most controllers hired during that period have remained with FAA. In August 1993, the bar was repealed through a presidential memorandum, and in 1995, FAA began rehiring some of the former controllers. FAA anticipates that a large number of these controllers, in addition to the controllers who did not participate in the strike and controllers hired after the strike, will become eligible to retire beginning in the early 2000s, when they first meet minimum retirement qualifications.

Role of Air Traffic Controllers in the U.S. Air Transportation System

Air traffic controllers play a critical role in the nation's air transportation system. Specifically, controllers are responsible for ensuring the safe, orderly, and expeditious flow of air traffic in the air and on the ground. Controllers manage air traffic visually and through the use of various types of equipment, such as radars and computers, at various ATC facilities—control towers, terminal radar approach control (TRACON) facilities,² and air route traffic control centers (commonly called “en route centers”).

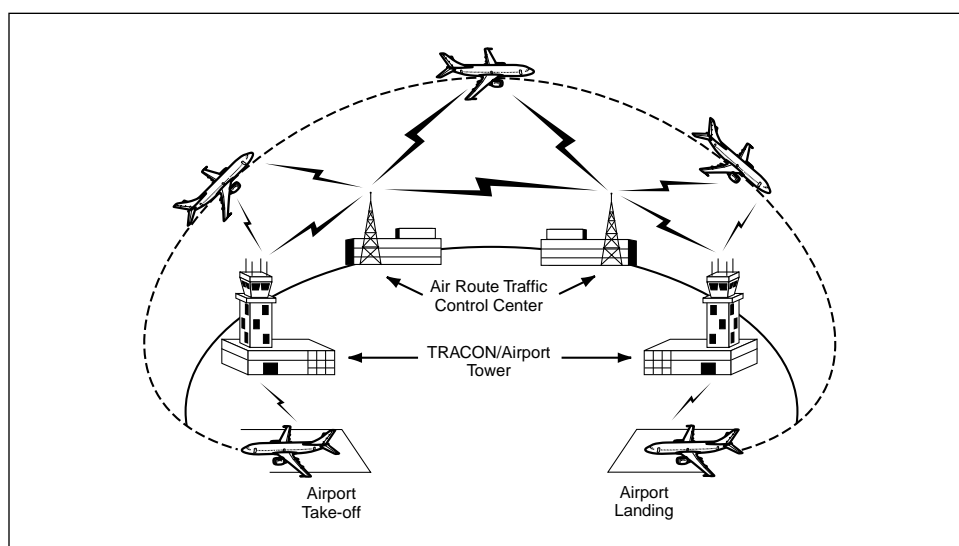
Controllers' responsibilities for managing air traffic vary according to the type of ATC facility. For instance, controllers that work at control towers are responsible for ensuring the safe separation of aircraft on the ground and in flight in the vicinity of airports, generally within a 5-mile radius. These controllers manage the flow of aircraft during takeoffs and landings and coordinate the transfer of aircraft with adjacent ATC facilities as

¹The controller workforce comprises about 14,500 ATC specialists (controllers), 2,000 first-line supervisors, and 560 air traffic management coordinators.

²FAA classifies TRACON facilities and control towers as terminal facilities. Therefore, to maintain consistency, we use this term when referring to ATC facilities in this report.

aircraft enter or leave an airport's airspace. Controllers working at TRACON facilities manage the arrival and departure of aircraft within a 5- to 30-mile radius of airports. Controllers working at en route centers manage aircraft beyond a 30-mile radius. These controllers assign aircraft to specific routes and altitudes to separate aircraft while they are flying along federal airways or when operating into or out of airports not served by a terminal facility. These controllers also coordinate the transfer of aircraft control with adjacent en route centers or terminal facilities. The typical en route center has responsibility for more than 100,000 square miles of airspace, which generally extends over several states. Depending on the location of the en route center, some controllers manage domestic, international, and oceanic air traffic. Figure 1.1 shows how controllers working at the different ATC facilities track aircraft during ground, take off, landing, and in-flight operations. As of April 10, 1996, FAA operated 387 ATC facilities, consisting of 24 en route centers and 363 terminal facilities.

Figure 1.1: Aircraft Tracking at ATC Facilities



FAA determines the appropriate level of staffing for its ATC facilities by using staffing standards forecast models. These models produce staffing standards—the specified level of controller staff needed to manage the ATC system, within 10 percent. For example, the staffing standards indicated in fiscal year 1996 that there should have been 17,465 controllers in the controller workforce. The standards also specified staffing levels for each

ATC facility, but according to FAA officials, the facility-level standards are not designed to be as accurate as the national standards.

Available Controller Candidates and Air Traffic Controller Training

FAA relies on a number of sources to fill its controller positions. These sources are (1) individuals with no prior controller training or work experience in the ATC environment, (2) individuals who have received some controller training but generally do not have work experience in the federal ATC environment, and (3) individuals with prior controller work experience.

The first group includes individuals who respond to vacancy announcements for controller positions. The second group includes graduates of the collegiate training initiative (CTI) program, who received initial ATC academic and technical skills training prior to being hired by FAA as controllers.³ This type of training introduces the students to the terminology, airspace configurations, and technical skills necessary to manage air traffic and operate equipment. The third group includes former controllers fired in 1981, who were members of the Professional Air Traffic Controller Organization (PATCO) union; former controllers who left FAA voluntarily and are eligible for reinstatement; and former Department of Defense (DOD) civilian and military controllers.

Controller candidates who have no prior controller training or work experience had received initial controller training at the FAA Academy in Oklahoma City, Oklahoma.⁴ However, FAA discontinued initial controller training for newly hired controllers at the Academy in 1992 due to a sharp decrease in controller hiring.

Candidates who currently receive initial controller training through the CTI program are trained at one of four CTI schools located in various parts of the country. These schools are the Community College of Beaver County in Beaver Falls, Pennsylvania; Hampton University in Hampton, Virginia; University of North Dakota in Grand Forks, North Dakota; and University of Alaska-Anchorage in Anchorage, Alaska. The type, length, and cost of controller training provided by the CTI schools vary, and students pay the cost of their training at all these schools. In addition, in 1989 the Congress

³In January 1991, FAA established the CTI program to test whether postsecondary educational institutions could provide and validate controller training and screening. This program was intended to supplement FAA's controller training program.

⁴The FAA Academy in Oklahoma City provides management and technical training to controllers, inspectors, and other FAA personnel.

established the Mid-America Aviation Resource Consortium (MARC) in Eden Prairie, Minnesota, to train controller candidates. Unlike the CTI schools, the MARC program is not part of a broader academic program, and the cost of training MARC students is paid by federal funds.

Controller candidates with prior controller work experience, such as former PATCO members and former DOD controllers, are not required to repeat the initial controller training when hired by FAA. However, they must complete certain refresher courses at the FAA Academy.

Once assigned to an ATC facility, controllers are classified as “developmental controllers” until they complete all requirements to be certified for all of the ATC positions within a defined area of a given ATC facility. It generally takes new controllers who have had only initial controller training 2 to 4 years—depending on the availability of facility staff or contractors to provide on-the-job training—to complete all the certification requirements to become full-performance-level (FPL) controllers. It normally takes individuals who have prior controller experience 1 to 2 years to become FPL controllers.

The Two Sets of Retirement Rules That Affect Controllers’ Eligibility for Retirement

Controllers working at FAA’s ATC facilities are eligible to retire under two sets of retirement rules—the general retirement rules for federal employees and special rules for controllers only. Depending on when they were hired, controllers are covered by either the Civil Service Retirement System (CSRS) or the Federal Employee Retirement System (FERS). Under these rules, controllers can retire if they meet certain age and years-of-service requirements. For example, a controller who is 55 years old can retire after 30 years of federal service. Under the special controller retirement rules, controllers may be able to retire earlier than under the general CSRS and FERS rules if they have enough service time as an active controller or immediate supervisor. For instance, controllers can retire at age 50 if they have spent at least 20 years as an active civilian controller or immediate supervisor or at any age if they have spent at least 25 years as an active civilian controller or immediate supervisor. Table 1.1 summarizes all of these rules.

Table 1.1: Retirement Eligibility Rules for Controllers

Type of retirement	Age	Years of service
CSRS (applicable for most federal employees hired before 1984)	62	5
	60	20
	55	30
FERS (applicable for most federal employees hired in or after 1984)	62	5
	60	20
	55 to 57 ^a	30
Special controller retirement under either CSRS or FERS (service time must be as an active controller or immediate supervisor)	50	20
	any	25

^aRetirement eligibility under FERS is subject to a minimum retirement age that differs depending on the birth date of the employee.

Source: Office of Personnel Management's publications.

Objectives, Scope, and Methodology

In March 1996, the Chairman and Ranking Member of the Subcommittee on Transportation, House Committee on Appropriations, and Ranking Member of the House Committee on Transportation and Infrastructure, asked us to examine FAA's efforts for addressing future and existing controller staffing needs. Specifically, we were asked to (1) identify the key variables FAA uses to project future controller staffing needs and evaluate their reasonableness, (2) determine whether FAA has identified a sufficient number of controller candidates to satisfy its short- and long-term controller staffing needs and evaluate FAA's plans to train new controllers, and (3) identify impediments that hinder FAA from staffing ATC facilities at specified levels.

To address the first objective, we interviewed officials in FAA's Office of Air Traffic Resource Management, Office of Human Resources Management, and Office of Business Information and Consultation who are responsible for managing the controller workforce and preparing the staffing standards models. These officials provided information on the data used to support FAA's staffing requests, including FAA's projections of air traffic and attrition, which we compared to available data on actual

traffic and attrition. We also used personnel data supplied by FAA to estimate the age and service characteristics of future retirees on the basis of characteristics of actual retirees between fiscal years 1992 and 1996. Additional information on how we made these projections is in appendix I. We did not, however, verify the validity of the staffing estimates generated by the staffing standards forecast models because the National Research Council—which is the principal operating agency of the National Academy of Sciences and the National Academy of Engineering—was reviewing FAA’s methodologies for estimating the number of controllers needed at ATC facilities. However, the Council was not reviewing the part of the models that estimates future attrition. Furthermore, the Council expects to issue a final report in the spring of 1997.

To address the second objective, we interviewed officials at the FAA Academy in Oklahoma City, Oklahoma, the MARC, and the four CTI schools to obtain information on the number of controller candidates trained at those facilities during fiscal years 1993 to 1996 and the annual capacity of these facilities to train new controllers. We also interviewed FAA headquarters officials and analyzed pertinent data to determine (1) what was the pool of controller candidates available to meet anticipated staffing needs, (2) whether FAA had developed plans to satisfy long-term staffing needs, and (3) what actions FAA had under way to expand the pool of available controller candidates.

To address the third objective, we compared controller staffing levels specified by FAA’s controller staffing standards with actual staffing at the national, regional, and facility levels as of April 10, 1996. We also reviewed pertinent documents and interviewed officials in FAA’s Air Traffic Resource Management Office and the National Air Traffic Controller Association (NATCA) in Washington, D.C.

To obtain a nationwide perspective on controller staffing issues, we sent a survey to, followed by a semistructured telephone interview with, air traffic managers at the nine FAA regional offices. In addition, we sent the same survey to air traffic managers at 15 ATC facilities (see app. II), including 3 en route centers, and at 12 terminals, as well as NATCA representatives located at the Eastern, Great Lakes, and Southern regions to obtain their perspectives on (1) their staffing needs as compared to current controller staffing levels and the impact of these differences on controller operations, (2) the impediments or principal causes of staffing differences at ATC facilities, and (3) the initiatives FAA has under way to address the impediments. We selected a judgmental sample of 15 ATC

facilities to obtain geographical diversity and a representative mix of facilities where the current controller staffing levels were greater or less than the 10-percent difference acceptable to FAA. The three NATCA regions were selected because all 15 ATC facilities that we contacted were located in these regions.

We conducted our review from April 1996 through February 1997 in accordance with generally accepted government auditing standards.

We provided copies of a draft of this report to FAA for its review and comment. FAA officials, including the Acting Deputy Associate Administrator for Air Traffic Services, commented on the report, and changes in response to their comments are contained throughout the report.

FAA Could Improve the Accuracy of Its Forecasts of Controller Staffing Needs by Using Available Data

FAA's projections of future controller staffing needs are primarily based on its staffing standards forecast models that use two key variables to forecast future needs—estimates of future air traffic growth and estimates of future controller attrition. While the air traffic estimates have been reasonable, FAA could not provide data needed to evaluate its attrition estimates. FAA's attrition estimates could overstate retirements in future years because the agency has not compiled some of the information needed to determine when controllers will be eligible to retire and because it does not consider available data on controllers' age and service time in its attrition estimates. By analyzing such data, we found that controller retirements could be significantly lower than FAA projects beginning in 1999.

Controller Staffing Needs Are Based on Staffing Standards Forecast Models

Historically, FAA has based its staffing requests on its long-standing staffing standards forecast models—it uses separate models for en route centers, TRACON facilities, and control towers. The models forecast the number of controllers that will be needed by using three types of data:

- periodic industrial engineering studies that measure the amount of time it takes a controller to perform necessary work tasks, such as assigning an airplane to a new altitude;
- estimates of changes in air traffic activity; and
- estimates of future controller attrition.

According to FAA officials, the staffing standards process undergoes periodic revision to update data and improve methodologies. As a result of these updates, FAA's estimate of the total number of controllers it needs can change from year to year.

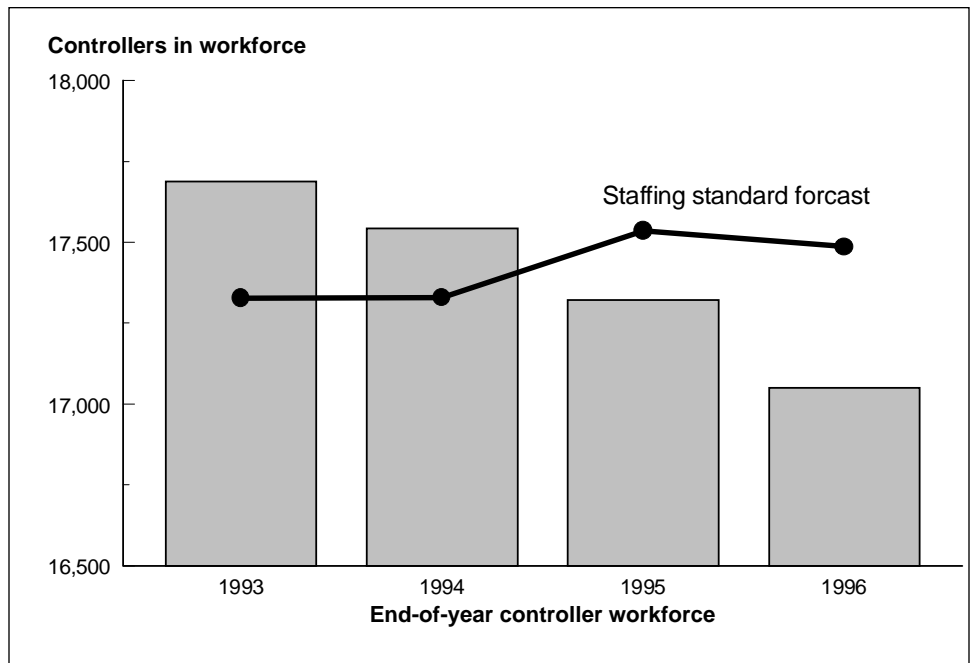
According to FAA officials, its models have been used to estimate controller staffing needs at ATC facilities nationwide, plus or minus 10 percent, and have served as key components for formulating FAA's annual budget. Before being submitted to the Congress, the staffing budget is reviewed within FAA, as well as by the Department of Transportation and by the Office of Management and Budget.

The size of the controller workforce grew each fiscal year from 1981 through 1992, when it reached 17,982 controllers. In fiscal year 1991, the last full year in which FAA offered initial training only at its Academy in Oklahoma City, FAA hired a total of 1,235 new controller candidates. Subsequently, FAA's hiring of new controllers decreased significantly

Chapter 2
FAA Could Improve the Accuracy of Its
Forecasts of Controller Staffing Needs by
Using Available Data

because it had more controllers than specified by the staffing standards. Between fiscal years 1993 and 1996, FAA hired a total of 611 new controllers—fewer than the 1,513 who had left the controller workforce over the same period—resulting in a decrease in the size of the controller workforce (see fig. 2.1 and table 2.1). According to FAA officials, most of the decrease in the size of the controller workforce was due to the congressionally directed initiative to contract out the functions of lower-level control towers to private companies, instead of staffing them with FAA employees. As part of a larger presidential effort to reduce the number of federal employees, in 1994 FAA also offered a retirement incentive, called a buyout, to staff, including those controllers who worked at the towers whose functions were contracted out. In fiscal year 1995, FAA’s end-of-year controller workforce dropped below the level specified by the staffing standards. Although the actual controller workforce differed from the staffing standards by as much as 400 in some years, nationwide staffing levels were well within the standards’ 10-percent tolerance level.

Figure 2.1: FAA’s Controller Workforce Compared to the Staffing Standards, Fiscal Years 1993-96



Source: FAA’s data.

Chapter 2
FAA Could Improve the Accuracy of Its
Forecasts of Controller Staffing Needs by
Using Available Data

Table 2.1: FAA's Controller Workforce, Fiscal Years 1993-96

Fiscal year	1993	1994	1995	1996
Start-of-year controller workforce	17,982	17,688	17,544	17,322
Workforce specified by the staffing standards	17,327	17,329	17,535	17,486
Newly hired controllers	220	134	157	100
Attrition	514	278	379	342
End-of-year controller workforce	17,688	17,544	17,322	17,080

Source: FAA's Air Traffic Staffing Plan and Staffing Standards.

This report does not evaluate FAA's staffing standards. We have previously reported on FAA's staffing standards, and FAA has taken action to address our prior recommendations.¹ In addition, the standards process is currently undergoing a congressionally requested review by an expert panel convened by the National Academy of Sciences. The study was requested to determine if a comprehensive methodology could be developed to provide more accurate estimates of the required number of controllers at each ATC facility, and its findings are expected to be published in the spring of 1997.

FAA's Recent Staffing Requests Reflect Its Estimates of Increased Controller Attrition

After the controller workforce dropped below the levels specified by the standards in 1995, FAA initiated plans to increase hiring. FAA currently plans to increase both hiring and the overall size of the controller workforce over the next 4 years. In fiscal year 1997, FAA requested and received funds to hire 500 new controllers—250 to replace controllers expected to leave the workforce that year and 250 to meet projected future needs. FAA's fiscal year 1998 request includes funds for 800 new controllers—300 replacements and 500 new positions. Table 2.2 provides FAA's estimates of controller hiring, attrition, and the total workforce through fiscal year 2002. As the table shows, estimated attrition is expected to increase from 280 controllers in fiscal year 1997 to 550 controllers in fiscal year 2002.

¹See *FAA Staffing: Improvements Needed in Estimating Air Traffic Controller Requirements* (GAO/RCED-88-106, June 21, 1988).

Chapter 2
FAA Could Improve the Accuracy of Its
Forecasts of Controller Staffing Needs by
Using Available Data

Table 2.2: FAA's Estimates of Controller Hiring, Attrition, and the Total Controller Workforce, Fiscal Years 1997-2002

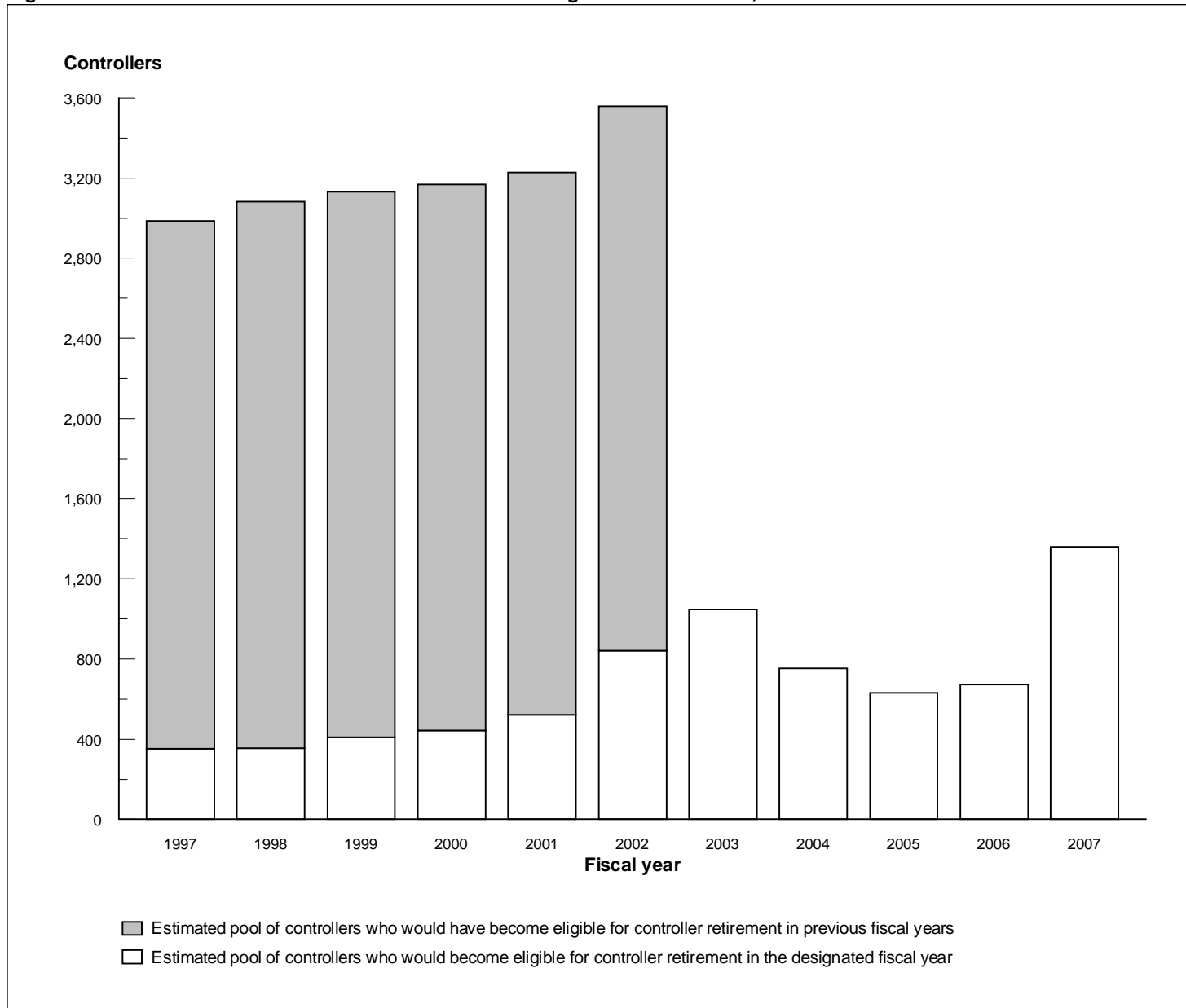
Fiscal year	Start-of-year controller workforce	Planned new hires	Estimated attrition	End-of-year controller workforce	Net change
1997	17,080	500	280	17,300	+220
1998	17,300	800	300	17,800	+500
1999	17,800	650	400	18,050	+250
2000	18,050	700	450	18,300	+250
2001	18,300	350	500	18,150	-150
2002	18,150	422	550	18,022	-128

Source: FAA's Air Traffic Staffing Plan.

According to officials at FAA headquarters, the attrition estimates that support its recent staffing requests are based in part on the staffing standards forecast models and in part on another method that is intended to address an anticipated increase in the number of controllers eligible to retire. This second method is based on FAA's assumption that 20 percent of those who are eligible to retire will do so each year. According to FAA officials, because many controllers hired after the 1981 PATCO strike will first be eligible to retire around fiscal year 2001, they expect more controllers to retire each year as more become eligible. Figure 2.2 shows FAA's estimates of the number of controllers who will become eligible to retire each year through fiscal year 2007, as well as the estimated size of the total pool of those eligible to retire each year through fiscal year 2002, the last year of FAA's controller staffing plan. However, FAA officials were not able to specify how much of the estimated increase in attrition is predicted by the staffing standards forecast models and how much is derived from its estimate of future retirements.

Chapter 2
FAA Could Improve the Accuracy of Its
Forecasts of Controller Staffing Needs by
Using Available Data

Figure 2.2: FAA's Estimates of the Number of Controllers Eligible for Retirement, Fiscal Years 1997-2007



Source: FAA's data.

In addition to reflecting changes in the number of controllers eligible to retire, FAA's staffing plan also differs from the annual staffing levels projected by the staffing standards in several other ways. First, the plan anticipates hiring replacements 3 years before they are needed to provide them with adequate training. In this way, FAA will have fully trained replacements for those who retire. According to FAA officials, the plan also reflects an effort to spread out hiring over several years to reduce the training burden on its Academy and ATC facilities. Thus, because FAA's staffing plan is designed to hire enough controllers to be at the level specified by the standards in fiscal year 2002, controller staffing is expected to again be above the standards in fiscal years 1998-2001.

Officials we interviewed in eight of FAA's nine regions expressed concerns about the adequacy of the future controller workforce that were similar to those expressed by headquarters officials. The regional officials were concerned about an increase in attrition in the coming years due to the pending retirement eligibility of those controllers who did not strike, those hired after 1981, and former PATCO members who have been rehired by FAA. Many of these officials also emphasized that FAA needs an adequate supply of new controllers to provide time to train replacements for those who retire.

Workload Estimates Are Reasonable, but Attrition Estimates May Overstate Future Retirements

The first key variable FAA uses to project future controller staffing needs is an estimate of the growth in the volume of air traffic, which FAA's Office of Aviation Policy and Plans derives from a model that includes several measures of overall economic activity (e.g., the consumer price index) and aviation-specific statistics, as well as expert opinions on future trends. These estimates have been closer to actual traffic levels in the short term than over longer periods. For example, between fiscal years 1992 and 1995, the estimates of activity at en route centers that were made 1 year earlier came, on average, within 1 percent of the actual level of activity. The estimates made 4 years earlier were, on average, 7.4 percent higher than the actual level (see table 2.3). According to FAA officials, these estimates are reasonable because they fall within the 10-percent tolerance level of its models.

Chapter 2
FAA Could Improve the Accuracy of Its
Forecasts of Controller Staffing Needs by
Using Available Data

Table 2.3: Actual and Predicted Levels of En Route Center Activity in Millions of Aircraft Handled, Fiscal Years 1991-95

Fiscal year	1991	1992	1993	1994	1995	Average percentage difference between actual and projected levels
Actual level	36.2	37.2	37.6	38.9	40.2	
Level predicted 1 year earlier	38.5	37.3	37.5	37.9	39.8	0.6 %
Level predicted 2 years earlier	39.1	39.6	38.3	38.4	38.6	2.2 %
Level predicted 3 years earlier	39.7	40.1	40.6	39.4	39.3	4.9 %
Level predicted 4 years earlier	40.3	40.8	41.0	41.5	40.3	7.4 %

Source: FAA's Aviation Forecasts, fiscal years 1996-2007.

In addition to estimates of future workload, FAA's staffing standards forecast models use projections of future attrition to determine controller staffing needs. These projections, called pipeline models, are based on actual experience over a recent 3-year period. FAA looks at who entered and left the controller workforce through several methods, such as retirement or resignation, promotion, or moving to or from a staff position. Using 3 years of data on actual movements, FAA determines what percentage of controllers entered or left the workforce by each method, then projects that percentage to future years. For example, in fiscal year 1995, 114 of 6,432 controllers at en route centers (or 1.8 percent) retired or resigned. By performing the same comparison for fiscal years 1993 through 1995 and averaging the results, FAA determined that on average 1.69 percent of the controllers at en route centers retired or resigned during that period. FAA then used this percentage to project future retirements or resignations of controllers at its en route centers. By using similar calculations for all types of controller movements to estimate the net gain or loss of controllers, FAA annually determines how many new controllers need to enter the training pipeline as replacements. FAA uses a separate model that uses similar variables to estimate the pipeline needs of its TRACON facilities and control towers. FAA's two pipeline models are currently based on actual changes in its controller workforce during fiscal years 1993 through 1995 and are used to forecast the workforce needed for fiscal years 1996 through 2006.

Chapter 2
FAA Could Improve the Accuracy of Its
Forecasts of Controller Staffing Needs by
Using Available Data

While the pipeline models include estimates of the number of controllers who leave the workforce to take staff positions or return from such positions each year, according to agency officials, the number of controllers leaving to take such positions has roughly equalled the number of controllers returning, so there has been little net impact on the overall size of the controller workforce. Also, agency officials estimate that the number of controllers resigning from the workforce without qualifying for retirement will remain steady at about 40 controllers per year. As a result, although the models forecast attrition from all sources, the forecasts for new controllers are primarily the result of retirement estimates.

We asked FAA for previous versions of its pipeline models so we could compare attrition estimates made by earlier models to actual data from recent years. Because FAA does not maintain copies of the models from previous years, officials could not provide us with attrition estimates for years prior to fiscal year 1995. However, FAA did provide copies of the models used to project attrition for fiscal year 1995. Table 2.4 shows that 20 more controllers retired or resigned in fiscal year 1995 than projected by the terminal and en route center models. Without data from earlier years, however, we were not able to evaluate the reasonableness of the attrition estimates produced by FAA's previous pipeline models.

Table 2.4: FAA's Estimates and Actual Controller Retirements and Resignations, Fiscal Year 1995

Type of facility	Projected retirements	Actual retirements	Difference	Actual attrition as a percentage of total workforce
Terminal (TRACON and tower)	129	145	16	1.8%
En route center	110	114	4	1.7%
Total	239	259	20	1.7%

Source: FAA's 1995 and 1996 pipeline models.

Five Factors Limit the Reasonableness of FAA's Projections of Long-Term Controller Needs

Because the actual rate at which controllers retire depends on the decisions of thousands of individual controllers, definitively predicting how many controllers will actually retire in any year is impossible. Most controllers hired under FERS are required to retire from actively controlling air traffic when they first become eligible, if they are at least 56. In contrast, most controllers hired under CSRS are not subject to mandatory retirement rules, unless hired after 1972.² According to FAA officials, if a controller is not subject to mandatory retirement, such considerations as the state of the economy and the family status of the controller can affect the controller's decision about whether to continue working after becoming eligible to retire. Because such considerations are not within FAA's control, either a greater or lesser number of controllers could retire than forecast. If attrition estimates are too high, FAA could hire too many controllers, unnecessarily increasing the cost of operating the nation's ATC system. If attrition estimates are too low, FAA could have fewer controllers than needed, causing an unanticipated increase in the use of overtime and, in extreme cases, flight delays to ensure that the safety of the ATC system would not be compromised.

Despite the difficulty of accurately predicting future needs, FAA has to estimate these needs to justify its budget requests for staffing and equipment. Without accurate projections of controller staffing levels and retirements, FAA cannot hire sufficient replacements and provide them with the 2 to 4 years of training needed to achieve full performance level. However, five aspects of the way FAA determines its projections of future staffing needs raise questions about the reasonableness of projections in future years.

Percentage of Controllers Eligible to Retire Is Expected to Change

FAA's practice of estimating attrition as a fixed percentage of the controller workforce may not accurately reflect future attrition because the agency expects to experience a significant increase in the number of controllers becoming eligible to retire in the next several years. For example, between fiscal years 1995 and 2000, FAA estimates that the number of controllers who will become eligible for retirement each year will remain relatively constant at about 330 to 440. However, FAA also estimates that in fiscal year 2001, the number eligible to retire will increase to 522 controllers, in fiscal year 2002 to 841 controllers, and in fiscal year 2007 to 1,361 controllers. Should these estimates prove correct and more controllers become eligible to retire, it is likely that more controllers will exercise

²Under both systems, the President and the Secretary of Transportation have the authority, under certain circumstances, to waive mandatory retirement up to age 61 for individual controllers.

their option to retire. Since retirements account for most controller attrition, it is possible that the percentage of controllers who actually leave the workforce will be different than was experienced in fiscal years 1993 through 1995.

Attrition Estimates Could Be Inflated by Data From Buyout in 1994

The staffing standards forecast models estimate future attrition according to data on actual attrition during fiscal years 1993 through 1995. However, during fiscal 1994, 139 of the 510 controllers who retired voluntarily took the buyout previously described. Most of these controllers worked at level-1 towers, which were being contracted out to the private sector. Because FAA does not plan to offer buyouts for controllers in the future, including the departure of these controllers in estimates of future retirements could inflate future attrition estimates.

Changes in the Workforce Could Affect Retirement Rates

Several of the regional FAA and NATCA officials we interviewed questioned the reliability of using data on past retirees to predict future retirement, as FAA's staffing standards forecast models do. These officials indicated that recent changes in the workforce, including an increased workload, a better educated workforce, and the establishment of mandatory retirement rules, suggest that controllers who are working today may not retire at the same rate as past retirees. For example, these officials noted that because controllers with a college education could have more options for post-FAA employment, they could be more likely to retire early.

FAA's Models Do Not Estimate the Impact of Future Changes in Technology or Policy

FAA's staffing standards forecast models do not consider future changes in FAA's technology or policy. For example, FAA is currently purchasing new ATC equipment and developing a plan to allow for "free flight," or the ability of pilots to set their own flight path in certain areas. There was no consensus, however, among the FAA regional and headquarters officials that we spoke with on the impact of these changes. While some believe the changes will only increase the reliability of the air traffic system, others believed there will be a long-term increase in productivity, resulting in a need for fewer controllers in the future. Others anticipate a short-term decrease in productivity while controllers learn to use the new equipment. In addition, FAA is finalizing changes to its training program (see ch. 3) that could reduce the training burden on local ATC facilities. To the extent that current controllers and supervisors are used to provide on-the-job-training for newly hired controllers, these changes could allow the facilities to use more staff to control traffic. Because these changes are still being

developed, FAA has no way to quantify their impact on controller workload. However, if FAA continues to estimate future needs by looking at past performance without regard for planned changes, it will not be able to take advantage of the increased efficiency those changes could deliver until several years after they are implemented.

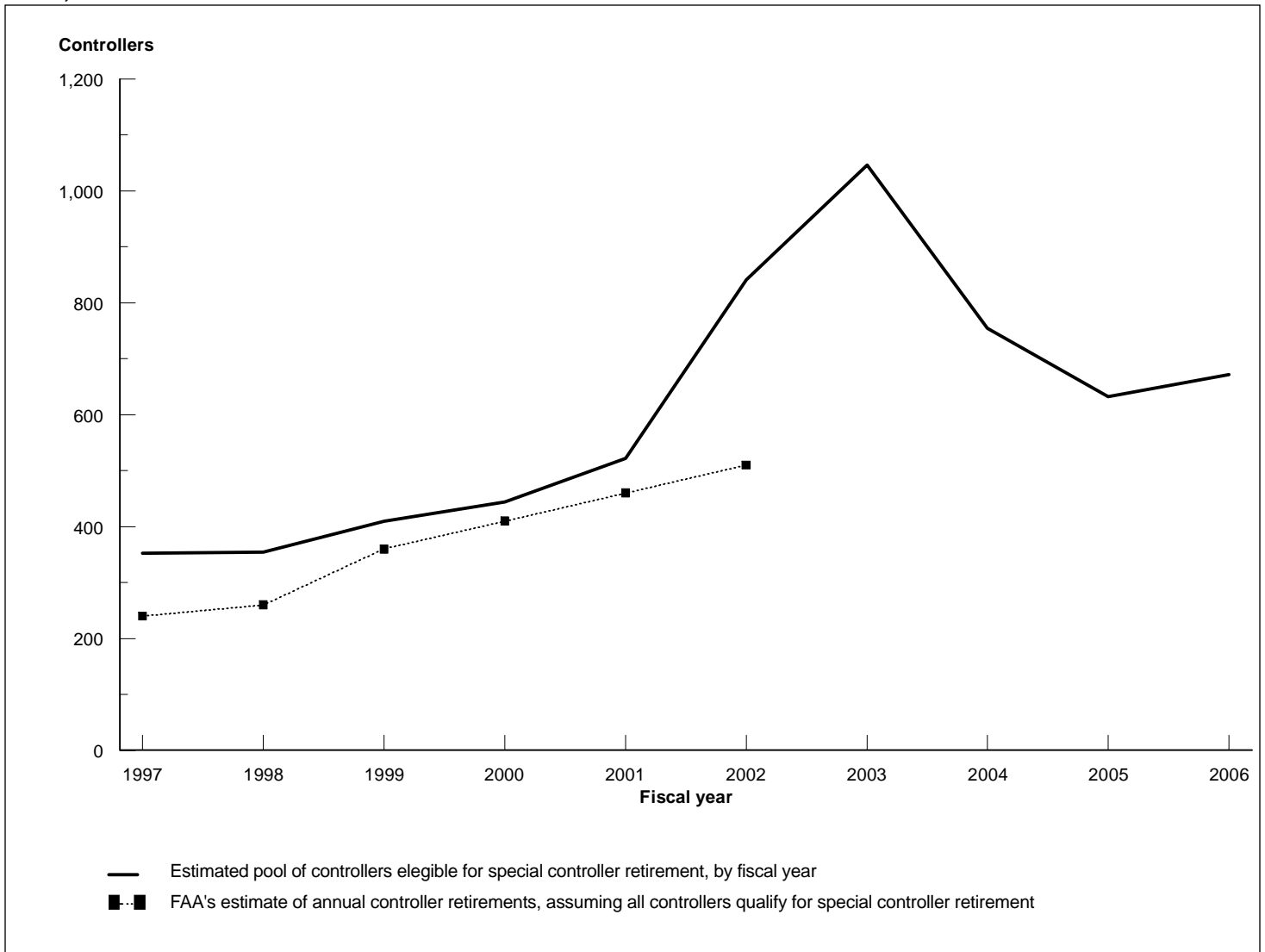
FAA Lacks Comprehensive
Data on When Controllers
Will Be Eligible to Retire

As discussed earlier, FAA's hiring plan for controllers is based on two main factors—the staffing standards forecast models and an adjustment to account for an increase in the number of controllers eligible to retire. However, the accuracy of FAA's estimates of controller retirements may be limited because FAA has not determined exactly when each controller can become eligible to retire, because of a lack of easy access to data on controllers' work history. Specifically, FAA estimates, on the basis of past retirement rates, that future retirements will equal about 20 percent of those controllers eligible to retire each year. Figure 2.3 shows FAA's estimates of the number of controllers who will become eligible to retire each year, as well as the number expected to retire through fiscal year 2002, the last year of FAA's current staffing plan.³ This figure illustrates FAA's position that the number of retirees will increase as the number of those eligible increases.

³FAA's retirement estimates differ by 40 controllers from its total attrition estimates to account for the number of controllers estimated to permanently leave the workforce every year for reasons other than retirement. FAA estimates that this rate will remain fairly constant through fiscal year 2002.

Chapter 2
FAA Could Improve the Accuracy of Its
Forecasts of Controller Staffing Needs by
Using Available Data

Figure 2.3: FAA's Estimates of the Number of Controllers Becoming Eligible to Retire Compared to Those Projected to Retire, Fiscal Years 1997-2006



Source: FAA's data and GAO's analysis of FAA's data.

While it is logical to conclude that more people would retire if more became eligible, the accuracy of FAA's projections is limited because the agency has not compiled the data necessary to determine when each controller will be eligible for special controller retirement. While FAA can

determine when an individual controller will be eligible to retire, the information is not currently stored in a way in which it could be used to determine the retirement eligibility of FAA's entire controller workforce. Instead of actual retirement eligibility data, FAA has based its estimates of future retirements on the assumption that all controllers spend their entire career as active controllers. For example, FAA has assumed that all controllers who are at least 50 years old and have worked for FAA for at least 20 years would be eligible to retire. While this assumption could prove true in many cases, data from FAA's pipeline models have indicated that more than 1,300 controllers moved between the controller workforce and staff positions each year between 1993 and 1995. Because many controllers spend at least some time in staff positions where they do not actively control traffic, the date on which they become eligible for special controller retirement may be later than the one FAA has used in its estimates. As a result, they could retire later than FAA has anticipated.

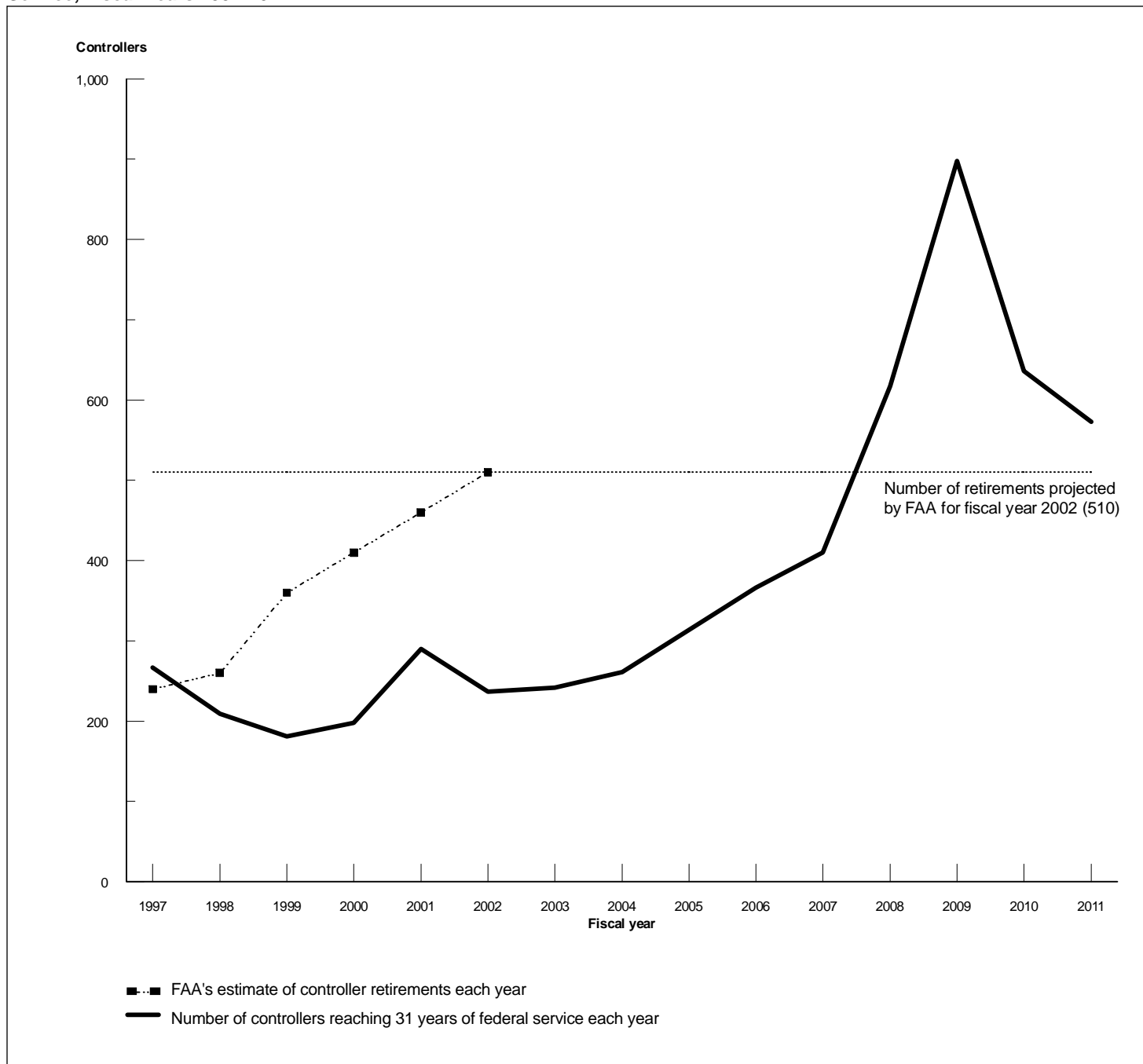
Data on the Age and Service Time of Recently Retired Controllers Indicate That Fewer Controllers Could Retire in Future Years Than FAA Has Forecast

Rather than estimating future retirements on the basis of assumptions about who will be eligible to retire, FAA could use actual information on the age and service time of those controllers who retired in recent years, as well as current controllers, to predict future retirements. Using data provided by FAA, we conducted such an analysis and found that, on average, controllers could retire later than projected by FAA's fiscal year 1999 through 2002 staffing plan.

The simplest way to use recent experience to estimate future retirements is to apply the average age and service time of recent retirees to those controllers currently working for FAA. Using this approach, we found that, on average, controllers who retired in fiscal years 1992 through 1996 had about 31 years of federal service. Fewer than 15 percent retired with 25 years of federal service or less, one of the requirements for special controller retirement. As figure 2.4 shows, should current controllers not retire until they have earned 31 years of federal service, the number of retirees will be much lower than FAA has projected for each year between fiscal years 1998 and 2002. In fact, while FAA expects 510 controllers to retire in fiscal year 2002, the first year in which at least 510 current controllers reach 31 years of federal service is fiscal year 2008.

Chapter 2
FAA Could Improve the Accuracy of Its
Forecasts of Controller Staffing Needs by
Using Available Data

Figure 2.4: FAA's Retirement Projections Compared to the Annual Number of Controllers Reaching 31 Years of Federal Service, Fiscal Years 1997-2011



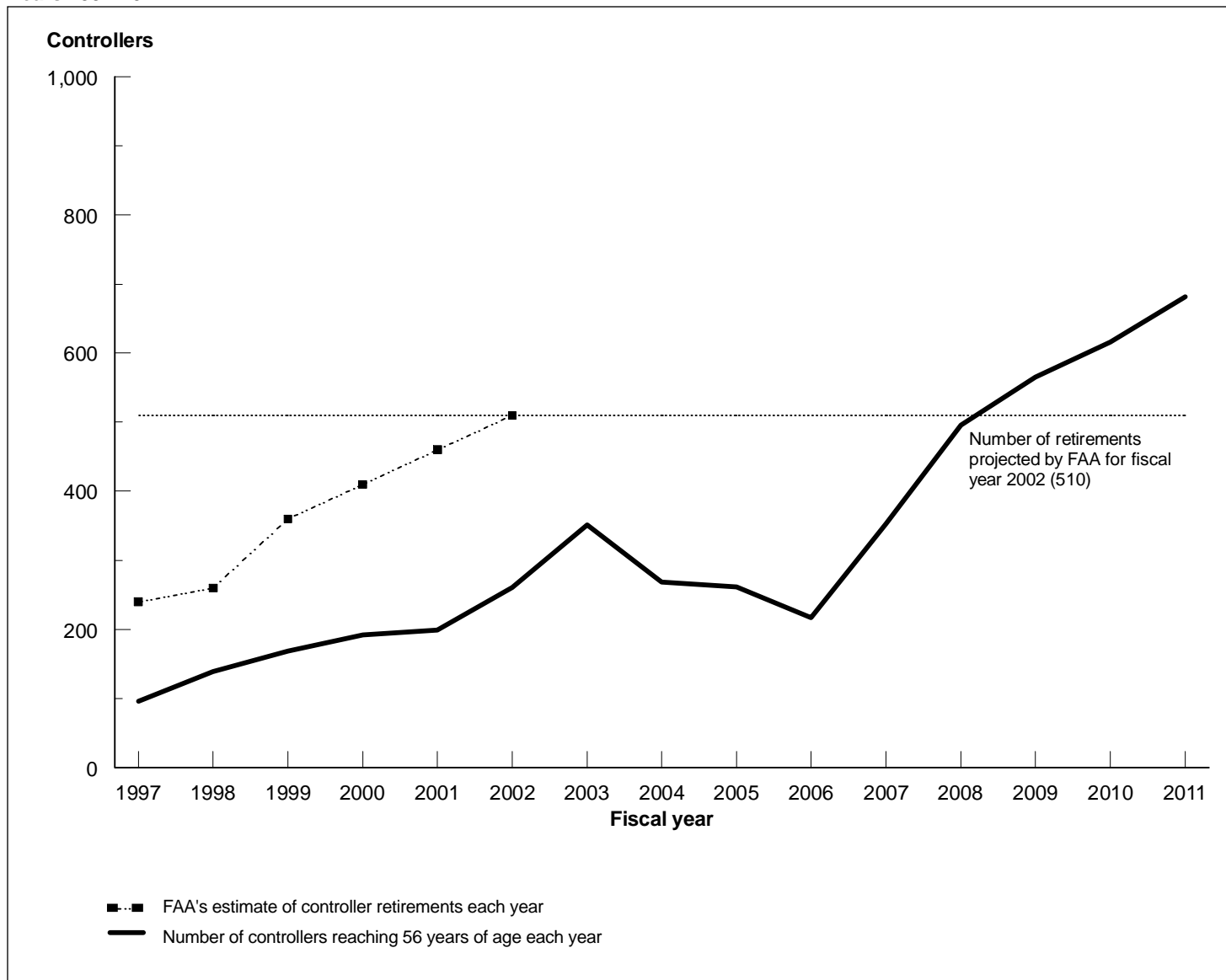
Source: FAA's projections and GAO's analysis of FAA's data.

Chapter 2
FAA Could Improve the Accuracy of Its
Forecasts of Controller Staffing Needs by
Using Available Data

Next, we looked at the age of the controllers who retired during the past 5 years and found that their average age was about 56. This age is also significant because federal law mandates that most controllers hired under FERS and controllers hired under CSRS after 1972 retire from actively controlling air traffic at age 56 unless granted an exemption. As figure 2.5 shows, the number of controllers who will turn 56 is lower than the number FAA expects to retire each year between fiscal years 1997 and 2002. The first year in which at least 510 current controllers turn 56 is fiscal year 2009.

Chapter 2
FAA Could Improve the Accuracy of Its
Forecasts of Controller Staffing Needs by
Using Available Data

Figure 2.5: FAA's Retirement Projections Compared to the Annual Number of Controllers Reaching 56 Years of Age, Fiscal Years 1997-2011



Source: FAA's projections and GAO's analysis of FAA's data.

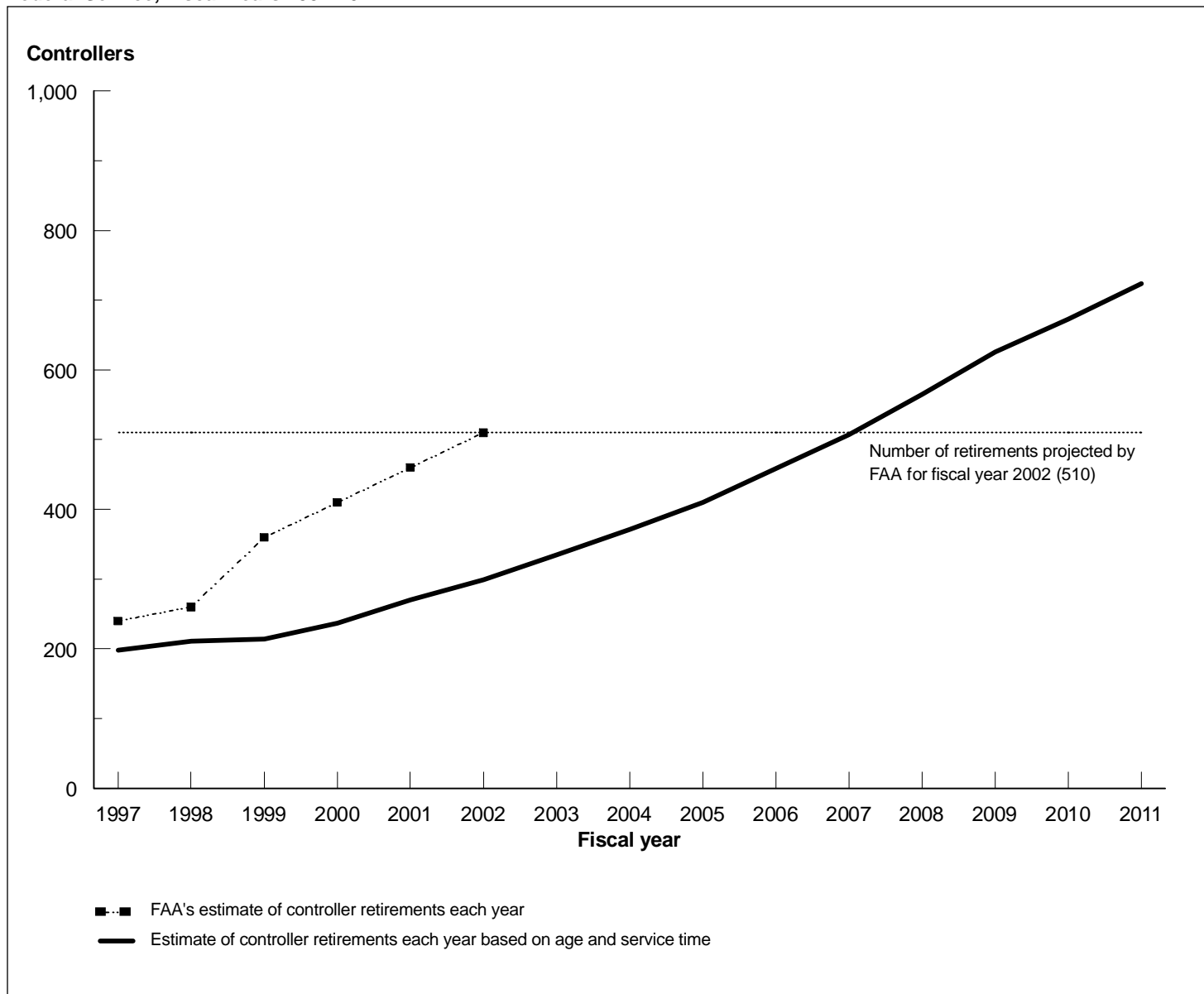
While using data on either the age or the service time of current controllers can illustrate changes in the characteristics of future retirees, it

Chapter 2
FAA Could Improve the Accuracy of Its
Forecasts of Controller Staffing Needs by
Using Available Data

is preferable to base estimates of future retirements on both variables because future retirees must meet both age and service criteria. According to the official responsible for FAA's staffing standards forecast models, such an analysis would project future retirements more accurately than the current staffing standards models. However, such an analysis is also more complicated. To illustrate the combined effect of the age and service of current controllers, we developed a probability model based on both factors to project when each current controller would be likely to retire. Figure 2.6 compares FAA's retirement projections with our model's projections for fiscal years 1997 through 2011. For each fiscal year between 1999 and 2002, our model projects that at least 100 fewer controllers will retire than FAA estimates. Using this model, the number of estimated retirees does not exceed 510 controllers until fiscal year 2008. Appendix I explains the model in more detail and contains additional data.

Chapter 2
FAA Could Improve the Accuracy of Its
Forecasts of Controller Staffing Needs by
Using Available Data

Figure 2.6: FAA's Retirement Projections Compared to Retirement Projections Based on Controllers' Age and Years of Federal Service, Fiscal Years 1997-2011



Source: FAA's projections and GAO's analysis of FAA's data.

Chapter 2
FAA Could Improve the Accuracy of Its
Forecasts of Controller Staffing Needs by
Using Available Data

Table 2.5 compares the number of controller retirements FAA has projected with projections based on age, service time, and a combination of both. As this table shows, while FAA's estimated levels of retirements are close to those calculated using the age and service data in fiscal years 1997 and 1998, the difference between the number of potential retirements under FAA's assumptions and the projections derived from the age and service data is greater in later fiscal years.

Table 2.5: Projections of Controller Retirements According to FAA's Staffing Plan and Those Derived From Age and Service Data, Fiscal Years 1997-2002

Fiscal year	FAA's estimate of controller retirements	Controllers with 31 years of federal service	Controllers reaching 56 years of age	Estimate of controller retirements based on age and service time	Range of differences between FAA's estimate and other estimates
1997	240	267	96	198	27 to 144
1998	260	209	139	211	49 to 121
1999	360	181	169	214	146 to 191
2000	410	198	192	237	173 to 218
2001	460	290	199	270	170 to 261
2002	510	237	261	299	211 to 273
Total	2240	1382	1056	1429	

Source: FAA's Staffing Plan and GAO's analysis of FAA's data.

FAA officials said that the accuracy of the agency's retirement estimates is not a significant issue because the agency monitors retirements monthly and can hire more or fewer controllers as needed in future years should its predictions prove inaccurate. However, while FAA can adjust its hiring plans annually to ensure that the actual controller workforce remains equal to the levels specified by its standards, that does not eliminate the need for accurate projections because of the time needed to fully train a new controller. FAA tries to hire new controllers about 3 years before the retirement of those they are intended to replace. As a result, while adjusting hiring to reflect actual retirements each year can ensure that FAA has the correct number of controllers in its workforce, this approach will not ensure that FAA has an adequate number of fully trained controllers.

While we do not question the need for FAA to hire enough controllers to safely operate our nation's ATC system in the current budget cycle, we are concerned that, should future controller retirements more closely follow the projections derived from FAA's data on controllers' age and service

time, the agency could hire too many controllers in later years. Should fewer controllers retire than FAA has forecast, this would in effect increase the cost of running the ATC system because FAA would be paying for both its new controllers and those who the agency anticipated would retire but did not for several years. Considering the salary of starting controllers and the time it takes to fully train them, hiring new controllers before they are needed can be costly. For example, FAA's estimate of future retirees for fiscal year 2002 differs from those projected by using age and service data by between 211 controllers and 273 controllers. A new controller currently makes about \$29,000 annually, and once benefits are added, the total cost of employing a new controller reaches about \$40,000 annually. Because it takes about 3 years for a new controller to reach the full performance level, the approximate cost of the salary and benefits for a fully trained new controller totals about \$120,000 for the first 3 years. If actual controller retirements in fiscal year 2002 are 211 controllers to 273 controllers fewer than FAA projects, FAA would spend between \$25.3 million and \$32.8 million between fiscal years 2000 and 2002 to hire and train those replacements that would not be needed.

Conversely, if FAA did not hire enough controllers to replace those who retired, those who remained would have to handle more of the workload. According to FAA officials, this increased workload could cause an unanticipated increase in the use of overtime, and, in extreme cases, lead to flight delays caused by the reduction in services at some air traffic facilities. According to FAA officials, while such delays would be costly to the airlines and their passengers, the delays would not affect flight safety. FAA was not able, however, to provide us with the data needed to estimate the costs associated with such delays.

Although officials we interviewed in eight of the nine FAA regions anticipated a significant increase in retirements in the next 10 years, they disagreed on how soon this increase could occur. While some stated that they expected to see a significant increase by fiscal years 2001 or 2002, others believed retirements would not increase significantly until fiscal year 2005 or later.

Conclusions

Because air traffic controllers are responsible for the safety of millions of passengers each year, better estimates by FAA of the future attrition of controllers would help ensure that the agency hires and trains an adequate workforce. While hiring enough controllers to meet future needs created by increases in air traffic and attrition, especially from retirements, is

Chapter 2
FAA Could Improve the Accuracy of Its
Forecasts of Controller Staffing Needs by
Using Available Data

essential, hiring more controllers than needed would increase the overall cost of running the nation's ATC system. On the other hand, hiring too few controllers would also be costly, due to an increased use of overtime and flight delays. Predictions of the number of controllers FAA will need in the future depend on many unknown variables, including how the workload of controllers might change as a result of technological advances, policy changes, and the future attrition rate of the current workforce. While there is no way to exactly predict how many controllers will retire in each of the next 15 years, the accuracy of FAA's methods of forecasting future staffing needs can be improved if FAA uses some key information on the age and service of current controllers.

Recommendation

We recommend that the Secretary of Transportation direct the Administrator of FAA to incorporate actual information on the age, years of service, and retirement eligibility date of current controllers into its projections of future controller retirements.

Agency Comments

Although FAA officials told us that they have management controls in place to adjust for actual attrition, they agreed with our recommendation and plan to take action to better project future controller retirements.

FAA Can Meet Short-Term Staffing Needs While Developing Plans to Address Long-Term Needs

FAA plans to hire about 1,300 new controllers in fiscal years 1997 through 1998 to meet its short-term controller staffing needs. A sufficient number of controller candidates is available to fill these staffing needs. The majority of candidates available are former PATCO members who left the controller workforce during the 1981 strike and could be eligible to retire at the same time as current controllers.

In fiscal years 1999 through 2002, FAA plans to hire a large number of new controllers to satisfy its long-term controller staffing needs. Because it is uncertain whether enough controller candidates will be available from the current sources to fill these needs, FAA officials have announced plans to expand the CTI program to include more schools and have reactivated the cooperative education program.¹ Furthermore, FAA has also developed plans to revise its new controller training program by requiring all new controller candidates enrolled in the CTI and MARC programs to receive standardized training at the FAA Academy before being assigned to ATC facilities. FAA believes that the revised training program will reduce on-the-job training time and costs at the facility level. However, agency officials have not performed any analyses to determine if the expected savings will offset the increased costs FAA will incur by providing training at the Academy to all newly hired controllers.

A Sufficient Number of Controller Candidates Is Available to Fill Short-Term Staffing Needs

FAA hired 257 new controllers during fiscal years 1995 through 1996 to meet its controller staffing needs. One hundred and twelve (or 44 percent) of the new controllers were former PATCO members, 99 (or 39 percent) were CTI and MARC graduates, and the remaining 46 (or 18 percent) were cooperative education program graduates, air traffic assistants working at the FAA, and former FAA and DOD controllers.²

FAA plans to begin significantly increasing controller hiring by adding 500 new controllers in fiscal year 1997 and 800 new controllers in fiscal year 1998. The new controllers will consist of former PATCO members, CTI and MARC graduates, cooperative education graduates, and former FAA and DOD controllers. As shown in table 3.1, we found that more than enough such controller candidates are available from these sources to fill FAA's projected staffing needs for fiscal years 1997 and 1998.

¹The cooperative education program is a work study program in which students have alternating classroom study and career-related work experience. This program allows students to become familiar with ATC facilities and operations while completing requirements toward a college degree.

²Percentages exceed 100 percent because of rounding.

**Chapter 3
 FAA Can Meet Short-Term Staffing Needs
 While Developing Plans to Address
 Long-Term Needs**

Table 3.1: Controller Hiring and Available Controller Candidates, Fiscal Years 1997 and 1998

Source of candidates	Controllers to be hired in fiscal year 1997	Controller candidates available for hire in fiscal year 1997	Controllers to be hired in fiscal year 1998	Controller candidates available for hire in fiscal year 1998
Former PATCO members	300	4483	^e	3,983
CTI and MARC graduates	150	200 ^a	^e	250 ^b
Cooperative education graduates	^c	Unknown ^d	^e	Unknown ^d
Former FAA and DOD controllers	^c	Unknown ^d	^e	Unknown ^d
Total	500	At least 4,683 candidates	800	At least 4,233 candidates

^aFAA, CTI, and MARC officials estimated that a total of 100 new CTI and MARC graduates will become controller candidates in fiscal year 1997. The other 100 candidates are CTI and MARC graduates currently on FAA's "waiting list" to be hired.

^bFAA, CTI, and MARC officials estimated that a total of 200 new CTI and MARC graduates will become controller candidates in fiscal year 1998. The other 50 will be CTI and MARC graduates not hired in fiscal year 1997.

^cFAA officials estimated that about 50 new controllers will be hired during fiscal year 1997 from the pool of cooperative education graduates and former FAA and DOD controllers.

^dAlthough the exact total is unknown, FAA believes that many former FAA and DOD controllers will be available in future years to fill controller vacancies because of the large number of inquiries received from these candidates.

^eFAA officials initially told us that in fiscal year 1998 they plan to hire 500 former PATCO members, 250 CTI and MARC graduates, and 50 candidates from the pool of cooperative education graduates and former FAA and DOD controllers. While commenting on a draft of the report, the officials told us that they are reexamining the number of candidates to be hired from each of these sources.

Source: Data from FAA and the CTI and MARC programs.

Rehiring of Former PATCO Members May Only Fill Staffing Needs in the Short Term

In August 1993, after nearly 12 years, the bar on hiring former PATCO members was repealed, and they were allowed to compete for employment as air traffic controllers within FAA. To date, FAA has hired 112 former PATCO members—37 in fiscal year 1995 and 75 in fiscal year 1996.

Chapter 3
FAA Can Meet Short-Term Staffing Needs
While Developing Plans to Address
Long-Term Needs

The age range of former PATCO members hired in fiscal years 1995 and 1996 was 42 to 67, and the average age was 50.2 years.³ According to FAA's data, the age range of the over 4,400 former PATCO members eligible for rehire in fiscal year 1996 was 37 to 68, with the average age being 49.9 years.⁴ The majority of the FAA officials interviewed at the headquarters, regional, and facility levels commented that while former controllers have prior controller work experience and could be a solution to the controller staffing problem, they could only be a short-term solution. The officials commented that many of the former PATCO members already hired or still eligible to be rehired could retire within a few years after being reemployed with FAA because their average age is about 50. We could not verify what the officials told us because FAA has not compiled the data necessary to determine when current controllers, including former PATCO members already hired, will become eligible to retire under the different controller retirement rules.

FAA officials commented that although they will rely on former PATCO members in fiscal years 1997 and 1998, and possibly in later years, to fill controller vacancies, they are uncertain about how long these former controllers will be able to work as air traffic controllers and when they will need to be replaced. The officials believe that because of the age range of the former controllers and the different retirement rules, FAA could be faced with an even more critical staffing shortage in future years because many former PATCO members and current controllers may be eligible to retire at the same time. Nevertheless, the officials told us that they have not conducted any analyses to determine when the former PATCO members currently in the controller candidate pool will become eligible for retirement.

³Since some former PATCO controllers were hired prior to 1972, they are not subject to mandatory retirement rules.

⁴FAA developed its list of eligible PATCO members in 1993 after about 4,500 fired controllers responded to a job announcement in September 1993.

FAA Is Expanding Its Controller Candidate Pool to Address Long-Term Staffing Needs and Is Revising Its Controller Training Program

In addition to the 1,300 new controllers FAA plans to hire in fiscal years 1997 and 1998 to meet its short-term staffing needs, FAA plans to hire a large number of new controllers in fiscal years 1999 through 2002 to meet its long-term controller staffing needs. To satisfy the agency's long-term staffing needs, FAA officials said they expect to get some controller candidates from current sources. Specifically, the officials commented, and CTI and MARC officials agreed, that these schools can produce at least 200 graduates per year under their existing programs, which represents about 800 candidates during this 4-year period. PATCO members may also provide some controller candidates, and there is high interest from former FAA and DOD controllers to fill controller positions. However, taken together, these current sources may not provide enough controllers after fiscal year 1999.

To expand the pool of available controller candidates, FAA headquarters officials announced in January 1997 their plans to expand the CTI program to include 18 additional schools and to reactivate the cooperative education program. According to FAA officials we interviewed, schools currently offering aviation degrees and located near hard-to-staff facilities will be given higher priority. The officials believe this approach will provide a better geographical match between staffing needs at the facility level and the available candidates. The final school selections will be completed by September 1997. Although FAA has decided on the number of schools to include in its expanded program, the officials could not tell us the number of controller candidates they expect to be available from these programs to meet their long-term staffing needs.

In addition to expanding the pool of available controller candidates, FAA officials told us that they have revised the agency's initial controller training program. This revision will be the third major change in FAA's training program within the past 10 years. Until fiscal year 1990, all new controller candidates were required to receive initial screening and controller training, which included academic and skill-building training, at the Academy in Oklahoma City, Oklahoma. In fiscal years 1990 and 1991, FAA began relying on the MARC and CTI schools, respectively, to supplement its training program and to make more controller candidates available. FAA hired CTI and MARC graduates and placed them directly at ATC facilities, bypassing any training at the Academy. The graduates completed their on-the-job training, which consisted of classroom and hands-on instructional training provided by FPL controllers and contractors, at the facilities. In fiscal year 1992, however, FAA stopped providing initial controller training for newly hired controllers at the Academy because of a

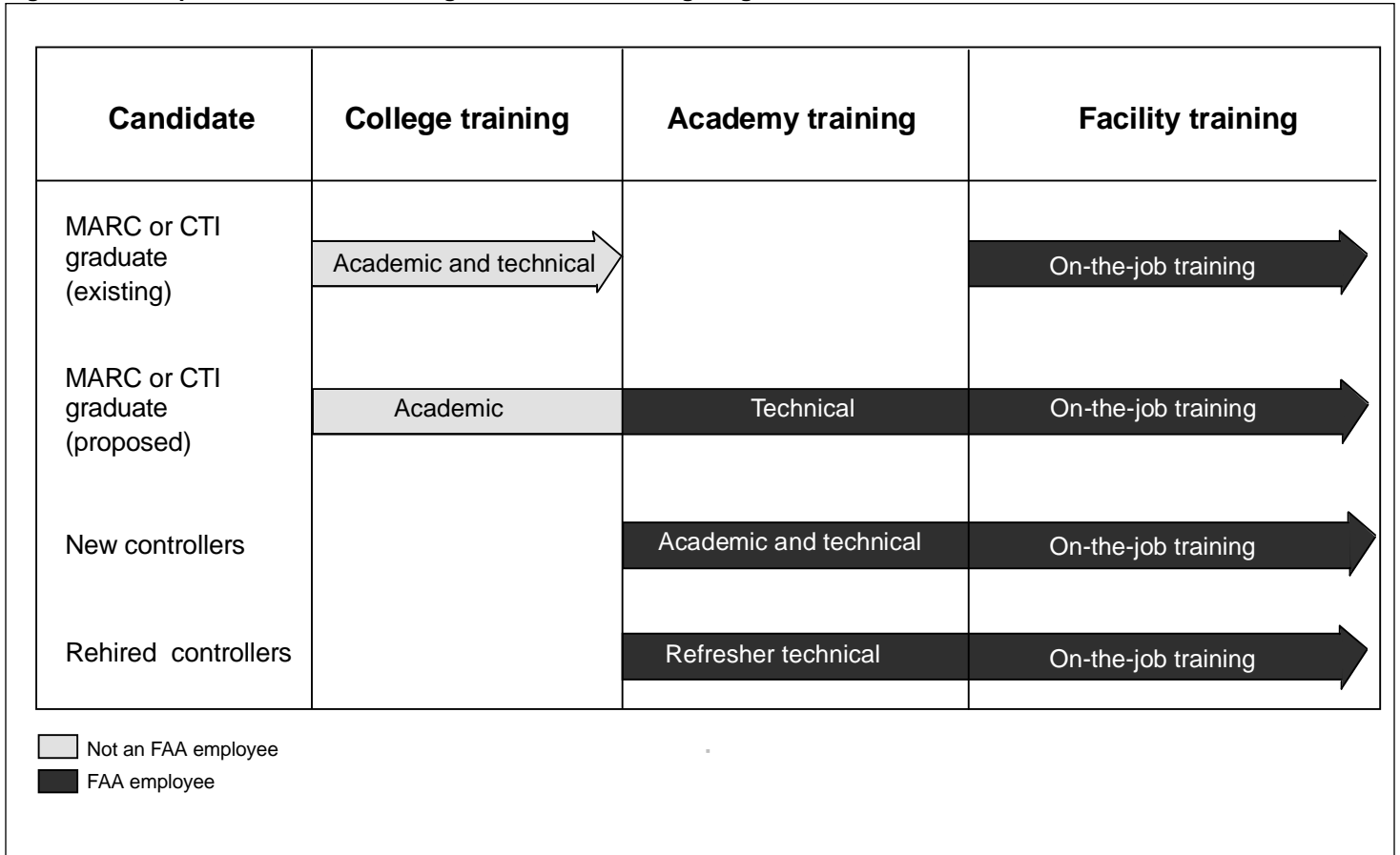
Chapter 3
FAA Can Meet Short-Term Staffing Needs
While Developing Plans to Address
Long-Term Needs

sharp decrease in controller hiring. Nevertheless, the MARC and CTI schools continued to provide controller training even though only 250 graduates were hired by FAA from fiscal years 1992 through 1995.

Beginning in fiscal year 1998 under its revised controller training program, FAA will require all controller candidates enrolled in the CTI and MARC programs to successfully complete the technical skill-building portion of initial controller training at the Academy before being assigned to a facility. The CTI and MARC controller candidates will continue to receive academic and some technical skill-building training at their schools. Newly hired controllers, other than ones from the CTI and MARC programs, will receive academic and technical skill-building training at the Academy. Former PATCO members, as well as FAA and DOD controllers will continue to receive refresher training at the Academy. Figure 3.1 compares FAA's existing and revised training programs.

**Chapter 3
 FAA Can Meet Short-Term Staffing Needs
 While Developing Plans to Address
 Long-Term Needs**

Figure 3.1: Comparison of FAA's Existing and Revised Training Programs



Source: FAA's data.

FAA believes that the revised approach to controller training will reduce on-the-job training time and costs at the facility level because all new controllers entering ATC facilities will receive standardized training on the latest ATC equipment and will be well versed in existing ATC policies, procedures, and requirements. The officials told us that in the long term, the Academy can provide the skill-building training more efficiently than hundreds of individual ATC facilities. Furthermore, the officials said that they expect graduates of a combined CTI-Academy training program to spend less time in on-the-job training because the Academy will give them early experience working with the ATC equipment actually used at the facilities.

Although FAA headquarters officials commented that revising the controller training program will reduce training time and costs at the facility level, we did not find nor could FAA provide evidence to support this position. While some CTI schools do not have the latest ATC equipment, they are able to simulate air traffic conditions. Moreover, FAA could not provide evidence that there is any difference between controllers trained on the latest ATC equipment and simulators. Although FAA believes that it may realize some cost savings from centralizing training at the Academy, federal training costs will increase in the short term because FAA will pay the expenses for a portion of the training of CTI graduates, who currently pay these costs themselves as part of the controller training curriculum.

Despite the lack of data on controller training costs, FAA still plans to revise its training program—without knowing whether the anticipated reduction in training time and costs for newly hired controllers will occur and offset increased training costs at the Academy. During the 1997 calendar year, FAA plans to hire CTI and MARC graduates with and without Academy training. By monitoring its training costs and following the progress of the two groups of new controllers, FAA could determine whether the anticipated savings will be realized.

Conclusions

FAA predicts that it will need to hire about 3,400 new controllers over the next 6 years. Although a sufficient number of controller candidates are available to meet the agency's short-term staffing needs, the majority of the candidates are former PATCO members, who could, if hired, be eligible for retirement at the same time as many current controllers. Because FAA does not know when these controllers will retire, it is uncertain when they will need to be replaced. In addition, it is uncertain whether FAA's current sources for controller candidates can provide a sufficient number of candidates to meet its long-term staffing needs. Therefore, FAA's efforts to expand the pool of available candidates could help to address this potential problem.

Although FAA officials believe that revising the existing controller training program will reduce on-the-job training time and costs, this change could result in FAA incurring training costs currently being paid by controller candidates. Also, since FAA has no data to support its assertion that CTI and MARC graduates take longer to complete on-the-job training than other controller candidates or that centralizing a portion of the training at the Academy will reduce training costs, the savings FAA expects to gain from

revising its program may not offset the increased training costs at the Academy.

Recommendations

We recommend that the Secretary of Transportation direct the Administrator of FAA to (1) determine, for future planning purposes, when former PATCO members currently in the controller candidate pool will become eligible to retire and would need to be replaced, by evaluating demographic data, such as the former controllers' age, years spent actually controlling traffic, and years of potential retirement eligibility, and (2) monitor the training costs for CTI and MARC graduates hired in fiscal years 1997 and 1998, who will be trained under the old and new programs, to determine whether the anticipated savings will be realized and whether such savings will offset the increased costs of providing centralized training at the Academy.

Agency Comments

FAA officials agreed with our recommendations and plan to take action to better determine when controllers will retire and the cost of training new controllers.

FAA Has Identified Several Impediments That Hinder Its Ability to Staff ATC Facilities at Specified Levels

Controller staffing at the national and regional levels closely reflected the levels specified by the staffing standards. However, we identified significant differences between actual staffing and the levels specified by the standards at about half of FAA's ATC facilities. According to FAA officials, certain circumstances, such as workload factors unique to particular facilities, justify deviations from the standards. In addition, FAA officials believe that some differences are justified on the basis of the professional judgment of facility managers. However, they also believe that some facilities have too many controllers, while others have too few, relative to the workload at the facilities.

FAA officials pointed out that at facilities where there are too many or too few controllers, several factors hinder FAA's ability to alleviate the staffing differences. These impediments include FAA's practice of waiting until the end of the fiscal year to distribute funds to move controllers, regional officials' inability to conduct regional hiring of new controllers, and limited hiring in recent years of new controllers to fill vacancies. Although several FAA officials commented that staffing differences can not be totally alleviated, FAA has proposed a variety of initiatives to address existing differences. Because these initiatives are relatively recent, their effectiveness may not be known for several years.

Many ATC Facilities Are Not Staffed at Specified Levels

As of April 10, 1996, we found that at the national and regional levels, there were only slight differences between the actual number of controllers and the levels specified by the standards. For example, at the national level, the actual controller workforce was 17,163, compared to 17,465 as specified by the staffing standards, representing a difference of less than 2 percent. At the regional level, the actual staffing levels for all nine regions were within 5 percent of the levels specified by the standards.

In response to our survey, FAA regional and NATCA officials said that a larger number of controllers were needed than the levels specified by the staffing standards. More specifically, FAA officials in six of the nine regions commented that nearly 1,100 additional controllers were needed in their regions. In contrast, FAA's staffing standards indicated that over 400 additional controllers were needed in those regions. FAA officials in the other three regions considered their current staffing levels adequate to meet their needs. According to NATCA representatives, controller staffing needs were even greater at the regional level than those reported by FAA's regional officials. For example, according to NATCA's estimates, FAA needs an additional 1,750 controllers in the three regions they represent, while

Chapter 4
FAA Has Identified Several Impediments
That Hinder Its Ability to Staff ATC
Facilities at Specified Levels

FAA regional officials estimated that only 670 additional controllers are needed in those regions.

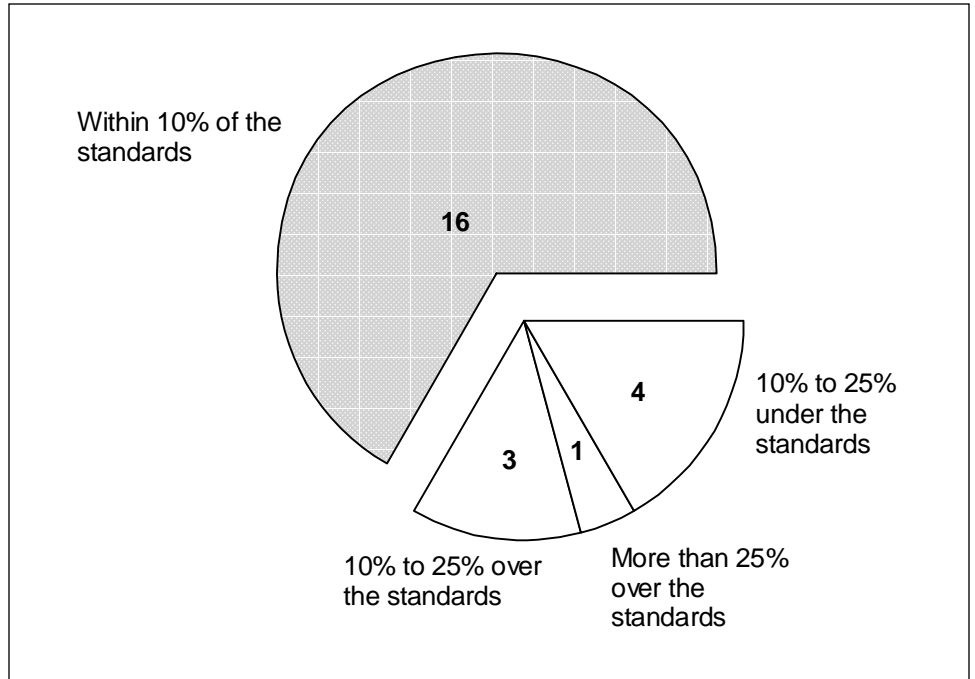
FAA headquarters officials told us that different staffing needs estimates exist because FAA regional officials and NATCA representatives use different approaches to determine the estimates. However, FAA headquarters officials rely on validated engineered staffing standards.

In responding to our survey, most of the FAA regional officials told us that they based their estimates on the staffing standards, as well as other data, such as staffing needs information gathered directly from facility managers. In addition, NATCA officials reported using data on facility workloads and projected attrition. We did not verify the validity of the data or the procedures reported to us by the regional FAA and NATCA officials.

As shown in figure 4.1, staffing levels at 16 of the 24 en route centers were within 10 percent of the levels specified by the standards. Four of the eight remaining facilities were staffed at levels greater than 10 percent over the staffing standards, whereas the other four facilities were staffed at least 10 percent under the standards levels.

Chapter 4
FAA Has Identified Several Impediments
That Hinder Its Ability to Staff ATC
Facilities at Specified Levels

Figure 4.1: Comparison of the Current Number of Controllers and Staffing Standards Levels for En Route Centers

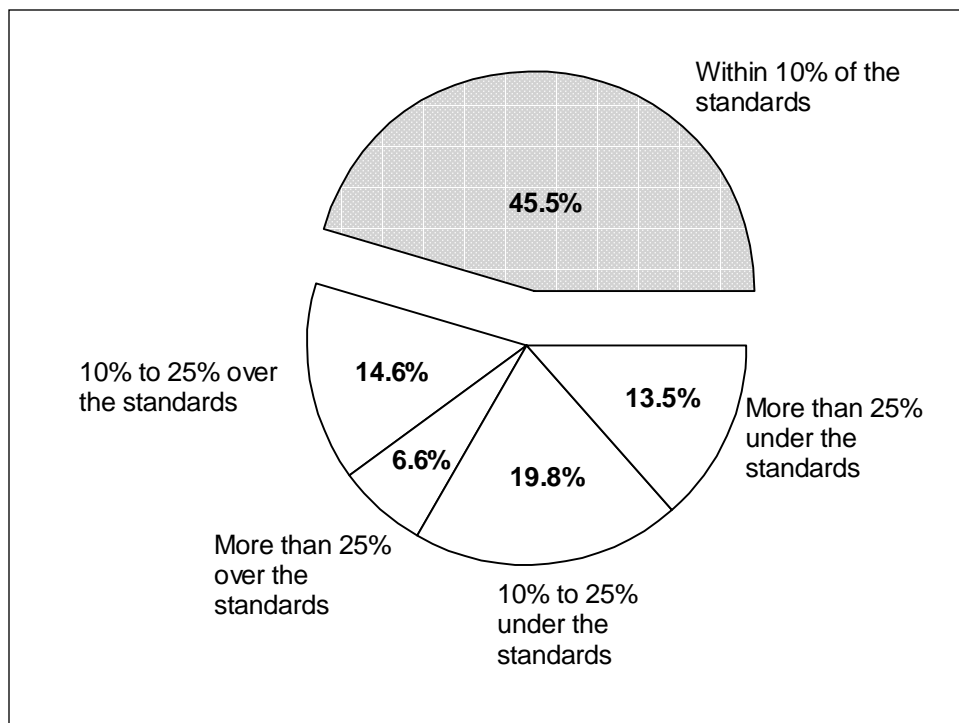


Source: FAA's data.

In contrast to en route centers, we found that 165 (or 45.5 percent) of the 363 terminal facilities were staffed at levels within 10 percent of the staffing standards, as shown in figure 4.2. Another 77 terminal facilities (or 21.2 percent) were staffed at levels greater than 10 percent above the staffing standards, while the remaining 121 facilities (or 33.3 percent) were staffed more than 10 percent below the staffing standards.

Chapter 4
FAA Has Identified Several Impediments
That Hinder Its Ability to Staff ATC
Facilities at Specified Levels

Figure 4.2: Comparison of the Current Number of Controllers and Staffing Standards Levels for Terminal Facilities



Source: FAA's data.

FAA officials at the headquarters, regional, and facility levels acknowledged that significant differences exist between actual staffing and the levels specified by the standards at many terminal facilities. However, they also noted that the standards are used as a management tool in conjunction with professional judgment and that certain circumstances could cause terminal facilities to justifiably deviate from the standards. Circumstances, such as changes in air traffic levels or a given terminal facility's capacity, could increase or decrease the number of controllers needed. For example, officials in FAA's Southern Region told us that ongoing airport improvements, which are expected to be completed in the summer of 1997, have the potential to significantly increase the capacity at a principal international airport in that region. As a result of these improvements, the officials commented that controller staffing needs could increase significantly. Although they could not estimate the exact number of additional controllers needed because the impact of the increased capacity will not be known until the airport improvements are completed, they indicated that the additional staffing needs are not reflected in the latest

staffing standards. Circumstances such as these often explain why some facilities are overstaffed or understaffed relative to the staffing standards. However, FAA headquarters officials acknowledged that there are facilities where staffing differences are not justified and pointed out that they are working to address staffing problems.

FAA Officials Identified Impediments That Contribute to Staffing Imbalances at ATC Facilities

FAA officials at the headquarters, regional, and facility levels identified a number of impediments that hinder FAA's ability to reduce staffing differences at facilities where there are too many or too few controllers relative to their workloads. These impediments include FAA's practice of not providing funds to move controllers until the end of the fiscal year, a practice that delays the prompt movement of controllers to fill vacancies, and regional officials' inability to recruit local candidates to minimize controller transfers among facilities. In addition, regional officials we contacted cited the recent lack of hiring and the need for a continuous source of new controllers to fill vacancies caused by ongoing attrition. The officials also said that other factors, such as their inability to attract controllers to less desirable facilities, quality of life concerns, and unexpected attrition, will continuously impede their ability to alleviate staffing differences.

Reprogramming of Funds Delays Controller Moves

FAA designates a specified amount of funds at the beginning of the fiscal year for permanent-change-of-station (PCS) moves to relocate controllers from facility to facility to address staffing needs. Also, these funds are used to fill critical managerial and controller vacancies nationwide and maintain an appropriate level of controllers at ATC facilities. We found that FAA does not distribute the majority of PCS funds until the end of the fiscal year. FAA headquarters officials told us that PCS funds are often used as discretionary funds throughout the fiscal year to supplement shortfalls in the Air Traffic Services (ATS) budget. These funds are reprogrammed to pay for cost increases related to salaries and for the contract tower and weather programs.

FAA headquarters officials told us that while PCS moneys are used to supplement cost increases for other ATS operations during the year, there have been sufficient funds by the end of the fiscal year to pay for all requested and approved controller moves. These end-of-year funds are available because other ATS units do not spend all moneys budgeted for their operations. FAA headquarters officials then reprogram the unspent funds to pay for controller moves. For example, as shown in table 4.1, FAA

**Chapter 4
 FAA Has Identified Several Impediments
 That Hinder Its Ability to Staff ATC
 Facilities at Specified Levels**

designated \$17.5 million in fiscal year 1996 for PCS moves. Initially, ATS distributed \$3.7 million in PCS funds and reprogrammed \$13.8 million to supplement cost increases for the contract tower and weather programs. Subsequently, ATS made an additional \$19.2 million available for PCS moves, which was not provided to the FAA regions until the end of the fiscal year.

Table 4.1: Summary of PCS Funding, Spending, and Moves for Fiscal Years 1993-97 (Dollars in Millions)

Fiscal year	Funds initially designated for PCS moves	Initial distribution from appropriated PCS funds	PCS funds reprogrammed to other ATS units	Total ATS funds spent for PCS moves	PCS controller moves
1993	No data	\$8.5	No data	\$21.7	552
1994	\$21.6	4.3	\$17.3	14.1	333
1995	17.5 ^a	14.4	3.1 ^b	39.8	882
1996	17.5	3.7	13.8	22.9	456
1997	15.5	2.5	13.0	15.5 ^c	319 ^c

Source: FAA data.

^a\$17.5 million earmarked by the Congress.

^bPCS funds held in reserve, distributed at end of fiscal year.

^cEstimate.

According to FAA regional officials we surveyed, the practice of distributing PCS funds at the end of the fiscal year delays the prompt transfer of controllers. At facilities where vacancies are not filled promptly, overtime use may be excessive and some controllers may be denied opportunities to take leave or attend training. In addition, regional officials commented that reprogramming PCS funds creates uncertainty and inhibits the effective allocation of resources within their regions. They believe that a stable distribution of funds throughout the fiscal year would help them better address existing staffing differences. A majority of facility managers we surveyed also expressed concerns about PCS funding levels, and several commented that the availability of sufficient PCS funds would help them reduce staffing differences at ATC facilities.

We found that officials at the FAA headquarters, regional, and facility levels had different views about whether sufficient funds have been available in past years to pay for all requested PCS moves. While FAA headquarters officials stated that sufficient funds for requested and approved PCS moves have been available by the end of the fiscal year, a majority of the regional

officials we surveyed said that sufficient PCS funds were often not available for all controller moves throughout the fiscal year. We could not verify what the officials told us because FAA does not maintain information on the number of PCS moves initially requested and subsequently approved at the end of the fiscal year. FAA headquarters officials commented that the practice of using PCS funds to supplement cost increases for ATC operations could create problems in the controller workforce in the future if FAA continues to experience substantial shortfalls in its overall budget. Specifically, the FAA headquarters officials told us that if funds were not made available by the end of a fiscal year, controller moves could not be made, and staffing differences at ATC facilities could increase. FAA headquarters officials noted, however, that the agency's flexibility to provide PCS funding throughout the fiscal year has been constrained by the necessity to have discretionary funding available to supplement potential budget shortfalls, such as cost increases related to salaries and contract programs.

**Lack of Ability to Conduct
Regional Hiring Hinders
Alleviation of Staffing
Problems at ATC Facilities**

Although FAA regional officials have the authority to recruit controller candidates for facilities in their regions, they do not have the ability to recruit locally due to constraints in hiring on an agencywide basis. While some regional officials have recruited controller staff under certain circumstances, they must generally select new controllers from the available pool of controller candidates—primarily former PATCO members and graduates from the four CTI schools and MARC—regardless of the candidates' geographic preferences.

FAA officials also told us that the ability to recruit locally would help improve retention because new controllers could be recruited directly from their preferred geographic areas. FAA headquarters officials believe that controllers tend to stay longer in locations more desirable to them, thereby, reducing the potential for controller transfers from facilities with staffing problems.

In response to our survey, regional and terminal facility officials also told us that localized hiring would allow them to recruit and retain controllers in areas where hard-to-staff facilities are located. Under current practice, a controller from a small town in the Midwest may be placed at a facility in a large metropolitan area that is difficult to staff. As a result, the controller may later request a transfer to another facility that the controller prefers or resign from FAA; such events may cause a staffing shortage and adversely affect employee morale.

Regional Officials Cite a Lack of Recent Hiring and the Need for New Controllers to Address Staffing Differences

Officials in all nine of FAA's regions expressed concerns about the lack of recent hiring and the need for a continuous supply of new controllers to fill vacancies due to transfers, promotions, and retirements at ATC facilities. The majority of regional officials said that an ongoing supply of newly hired controllers would help address staffing shortages that increase the use of overtime and limit opportunities for controllers to take leave or attend training. In response to our survey, some officials raised concerns that the shortages could increase if large numbers of controllers retire in future years. For example, officials in the Great Lakes Region told us that although they hired 40 new controllers in fiscal year 1996, these new controllers were insufficient to replace the controllers lost through ongoing attrition. In addition, officials in the Western-Pacific Region told us that a sufficient supply of new controllers is needed for lower-level facilities, which serve as a staffing source for higher-level ATC facilities. Although the Western-Pacific officials said that they have been working with headquarters officials to acquire more new controllers for their region, they have been unsuccessful because FAA has hired very few new controllers in recent years.

Other Circumstances Hinder FAA's Ability to Address Staffing Needs

Officials at the FAA headquarters, regional, and facility levels commented that certain circumstances will continuously affect their ability to alleviate staffing differences. These circumstances include (1) FAA's inability to attract controllers to facilities located in less desirable—remote or high-cost—areas; (2) quality of life concerns, such as controllers' desire to live in certain parts of the country; (3) unanticipated attrition resulting from controller retirements, resignations, and deaths; and (4) unexpected changes in air traffic in certain areas, such as the openings and closings of air carrier hubs.

FAA Has Several Initiatives Under Way to Address Staffing Differences

FAA headquarters officials cited several initiatives under way at the headquarters, regional, and facility levels to address staffing differences. These initiatives include programs to promote regional recruitment and hiring of new controllers for regions with staffing problems, an interim incentive pay program to attract controllers to facilities with long-standing controller staffing problems, and the creation of the Office of Air Traffic Operations (ATO) within FAA headquarters to better coordinate controller transfers and develop an information-based method to more accurately determine controller staffing needs at the facility level.

Regional Recruitment and Hiring Would Reduce Staffing Differences

As part of its initiatives to alleviate staffing problems, FAA is considering actions to increase hiring directly from areas with hard-to-staff facilities, such as expanding the CTI program to include more schools near these facilities and reactivating the cooperative education program. By creating a pool of candidates near hard-to-staff facilities, FAA expects that regions can attract additional new controllers from their preferred geographic areas. Under the proposed initiatives, regional officials will play a greater role in recruiting employees on a more localized basis.

In response to our survey, the majority of regional officials we contacted told us that a greater role in local hiring would significantly help reduce controller staffing differences. Moreover, FAA officials told us that localized hiring would reduce the costs for PCS moves and produce a more motivated and satisfied controller workforce.

Interim Incentive Pay Program Is Designed to Address Staffing Differences

In April 1996, FAA established an interim incentive pay program, similar to a pay demonstration program implemented in 1989, to attract controllers to seven major facilities that have a history of staffing problems.¹ This program provides an incentive of 10-percent of the base pay for controllers working at these seven facilities: the New York En Route Center, New York TRACON facility, Chicago En Route Center, O'Hare TRACON facility, O'Hare Tower, Bay TRACON facility, and Oakland En Route Center. The interim incentive program is intended to be in effect until fiscal year 1998 when a new ATS pay system is expected to be implemented. The new pay system is one of several efforts under FAA's new personnel reform initiatives, which the agency began implementing in April 1996.²

In response to our survey, officials at the Chicago En Route Center commented that the interim incentive pay program has played an important role in attracting new controllers to their facility. For example, over the last year, several new controllers have transferred to the facility, which has helped address staffing problems. FAA headquarters officials told us that they expect the interim program will help recruit and retain controllers at other hard-to-staff facilities until a long-term program is in place, such as the new pay system FAA is developing.

¹In 1989, FAA implemented the Pay Demonstration Program to recruit and retain experienced controllers at hard-to-staff facilities. Controllers working at the selected facilities were given an additional 20 percent premium pay. This program ended in June 1994 because of budget constraints.

²The FAA Administrator was given the authority to reform the agency's personnel system under the 1996 Transportation Appropriations Act.

**Office of Air Traffic
Operations Oversees
Controller Allocations to
Reduce Staffing
Differences**

In early 1996, FAA headquarters created ATO to (1) ensure that facilities are staffed at appropriate levels, (2) verify that newly-hired controllers are placed where critical staffing vacancies exist, and (3) monitor regional staffing allocations, among other resource allocation functions. ATO officials work with headquarters, regional, and facility officials to ensure that staffing imbalances do not occur due to controller transfers or reassignments and to verify that new controllers are placed where vacancies exist.

For example, ATO officials gather information on staffing requirements and air traffic operations from regional and facility officials to verify that facilities are staffed according to current needs. Using this information, ATO officials have consulted with headquarters officials who are responsible for agencywide resources and budgeting to make recommendations on staffing allocations. As part of this process, ATO officials have monitored controller moves and transfers to ensure that staffing imbalances do not occur because of changes in controller allocations. Agreement between ATO and other headquarters officials must be reached on changes in controller allocations.

To better address staffing needs at ATC facilities, ATO has developed and is testing a new computer program to provide a mechanism for air traffic managers in FAA headquarters, regions, and facilities to evaluate the past utilization of controller resources and more effectively project controller staffing requirements. According to ATO officials, the new computer program will provide more accurate facility-level staffing requirements than the staffing standards because it includes operational data on the number of hours controllers have actually performed ATC functions and activities such as training, leave, and administrative duties. ATO officials told us that the new computer program will also provide a standardized method to better project controller staffing needs at individual ATC facilities. They plan to use this program in conjunction with the staffing standards. FAA is currently pilot testing this program at some en route centers, with plans to have it fully operational by the end of fiscal year 1997.

Conclusions

While FAA officials face several impediments that have hindered the alleviation of staffing differences at many terminal facilities, the impediments are not insurmountable. However, FAA's practice of distributing PCS funds at the end of the fiscal year not only delays controller transfers but could create staffing problems in future years. FAA

Chapter 4
FAA Has Identified Several Impediments
That Hinder Its Ability to Staff ATC
Facilities at Specified Levels

officials recognize the potential for these problems but face difficult choices in their efforts to move controllers to fill critical vacancies, while maintaining the flexibility to respond to budget shortfalls throughout the fiscal year. Although FAA's recent initiatives may reduce some staffing differences, it is too soon to determine their effectiveness.

Explanation of the Model We Used to Estimate Future Controller Retirements

To estimate the number of potential controller retirees over the next 15 years, we developed a computer model that simulates the retirement patterns of the current controller workforce. The model uses data from the Federal Aviation Administration (FAA) on the age and federal service time of controllers who retired in fiscal years 1992 through 1996 to project the future retirement date of current controllers. Because the rate of retirements due to disability is not expected to differ significantly over time, such retirements were excluded from our analysis.

The key to our retirement model is the probability of retirement for an age and length of service combination, called a “cohort.” To develop the probabilities, we used 17 3-year age ranges and 17 3-year length of service categories. For example, controllers between the ages of 55 and 57 and those with between 34 and 36 years of service were grouped together. For each fiscal year from 1992 through 1996, we determined the total number of controllers in each age and length of service combination and the number of those controllers who had retired.¹ The probability of retirement for any age and length of service cohort was then calculated by simply dividing the total number of retired controllers by the total number of controllers in that cohort. The probabilities were then averaged over the 5 years to arrive at a final retirement probability for each cohort. The resulting probabilities can be envisioned as a table with 17 rows for the various age ranges and 17 columns for the various categories for length of service. This table, called the retirement probability matrix, served as the basis for the model we used to project each controller’s retirement.

The model used FAA’s data on the age and length of service of the 17,019 controllers who were actively working as controllers or supervisors as of October 1, 1996. Each controller’s age and length of service was then entered and the probability of the controller’s retirement was determined using the retirement probability matrix. For example, a controller between the ages of 55 and 57 with 34 to 36 years of service had a probability of retirement of 0.19. A uniform random number between 0.00 and 1.00, inclusive, was then generated for that controller. In this example, if the random number were between 0.00 and 0.19, inclusive, we estimated that the controller would retire in fiscal year 1997. If the random number exceeded 0.19, we added 1 year to that controller’s age and 1 year to that controller’s length of service. This process was repeated for each of the 17,019 controllers.

¹In our analysis, we included those controllers who accepted buyouts, such as the fiscal year 1994 buyout described in chapter 2. During such buyouts, employees can retire with less service time and at a lower age than required for normal retirement. Therefore, because FAA does not plan any future buyouts for controllers, our model may slightly overestimate the number of future retirements.

Appendix I
Explanation of the Model We Used to
Estimate Future Controller Retirements

The process was then continued for those controllers who were not estimated as having retired in 1997 but with each controller now being 1 year older and with 1 more year of service. As before, the controller's new age and new length of service determined the probability that the controller would retire in that year. Random numbers were then generated, a retirement decision was made for each of the remaining controllers, and each controller was either counted as having retired in 1998 or 1 year was again added to both the age and the length of service. This process was repeated 15 times to represent a 15-year horizon.

Because we were dealing with a process that is of a probabilistic nature (i.e., a controller may or may not have retired in any one year), we repeated the process 300 times. The results for the 300 iterations were then averaged to estimate the number of controllers retiring in year 1 through year 15 (representing fiscal years 1997 through 2011).

The following table presents the results of this analysis. It shows the minimum, average, and maximum number of controllers estimated to retire during each fiscal year between 1997 and 2011.

Table I.1: Estimated Number of Controller Retirements Based on Age and Service Time

Fiscal year	Minimum retirements^a	Average retirements^b	Maximum retirements^c
1997	159	198	230
1998	177	211	256
1999	168	214	249
2000	198	237	283
2001	232	270	310
2002	260	299	343
2003	298	335	397
2004	310	371	420
2005	349	410	463
2006	410	459	514
2007	448	507	570
2008	512	565	636
2009	557	626	687
2010	599	673	743
2011	645	724	790

^aThe lowest number of retirees projected by the model's 300 iterations, by year.

^bThe average number of retirees projected by all of the model's 300 iterations, by year.

^cThe greatest number of retirees projected by the model's 300 iterations, by year.

FAA Regional Offices, Air Traffic Control Facilities, and NATCA Representatives Contacted for Our Review

FAA Regions

Alaskan Region - Air Traffic Division
Central Region - Air Traffic Division
Eastern Region - Air Traffic Division
Great Lakes Region - Air Traffic Division
New England Region - Air Traffic Division
Northwest Mountain Region - Air Traffic Division
Southern Region - Air Traffic Division
Southwest Region - Air Traffic Division
Western-Pacific Region - Air Traffic Division

Air Traffic Control Facilities

Great Lakes Region

Chicago, Illinois - Air Route Traffic Control Center
Green Bay, Wisconsin - Air Traffic Control Tower
Minneapolis-St. Paul, Minnesota - Air Traffic Control Tower
Youngstown, Ohio - Air Traffic Control Tower
Pontiac, Michigan - Air Traffic Control Tower
Champaign, Illinois - Air Traffic Control Tower
Grand Rapids, Michigan - Air Traffic Control Tower

Southern Region

Miami, Florida - Air Route Traffic Control Center
Sarasota-Bradenton, Florida - Air Traffic Control Tower
Jacksonville, Florida - Air Traffic Control Tower
Chattanooga, Tennessee - Air Traffic Control Tower
Daytona Beach, Florida - Air Traffic Control Tower
Fayetteville, North Carolina - Air Traffic Control Tower
Pensacola, Florida - Terminal Radar Approach Control Facility

Eastern Region

New York City, New York - Air Route Traffic Control Center

National Air Traffic Controllers Association (NATCA)

NATCA Eastern Region¹
NATCA Great Lakes Region
NATCA Southern Region

¹Telephone interview conducted; completed survey not returned to us.

Major Contributors to This Report

Resources,
Community, and
Economic
Development Division

Nancy A. Boardman
Alice G. Feldesman
Lynne L. Goldfarb
Isidro L. Gomez
Wanda T. Hawkins
Mitchell B. Karpman
David A. Rogers
Marnie S. Shaul
James R. Sweetman, Jr.

Office of the General
Counsel

David K. Hooper

Ordering Information

The first copy of each GAO report and testimony is free. Additional copies are \$2 each. Orders should be sent to the following address, accompanied by a check or money order made out to the Superintendent of Documents, when necessary. VISA and MasterCard credit cards are accepted, also. Orders for 100 or more copies to be mailed to a single address are discounted 25 percent.

Orders by mail:

U.S. General Accounting Office
P.O. Box 6015
Gaithersburg, MD 20884-6015

or visit:

Room 1100
700 4th St. NW (corner of 4th and G Sts. NW)
U.S. General Accounting Office
Washington, DC

Orders may also be placed by calling (202) 512-6000 or by using fax number (301) 258-4066, or TDD (301) 413-0006.

Each day, GAO issues a list of newly available reports and testimony. To receive facsimile copies of the daily list or any list from the past 30 days, please call (202) 512-6000 using a touchtone phone. A recorded menu will provide information on how to obtain these lists.

For information on how to access GAO reports on the INTERNET, send an e-mail message with "info" in the body to:

info@www.gao.gov

or visit GAO's World Wide Web Home Page at:

<http://www.gao.gov>

**United States
General Accounting Office
Washington, D.C. 20548-0001**

**Bulk Rate
Postage & Fees Paid
GAO
Permit No. G100**

**Official Business
Penalty for Private Use \$300**

Address Correction Requested

