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Who's Flying This Plane? - Education and Training for Aviation Careers

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Summary

In the late 1980s, a period of strong airline growth coincided with the beginnings of downsizing the military. Since the military has historically been a major supplier of trained pilots and maintenance technicians, concern arose about whether there was an impending pilot and technician shortage. With a slowing of airline growth in the early 1990s, no immediate shortage emerged, but the concern about the impact of military downsizing remains. Another area of concern has been the struggle of minorities and women to overcome barriers and prejudices that have restricted their access to many workplaces, including pilot and senior management jobs in aviation.

In light of these concerns about the aviation workforce, Congress directed the U.S. Department of Education to commission the National Academy of Sciences to conduct a study of education and training for civilian careers, with particular emphasis on the access of women and minorities to aviation jobs. This study was the work of a committee of 15 experts drawn from a variety of pertinent fields coupled with professional staff from the National Academy of Science and others who gave freely of their time and expertise. This paper summarizes some of the findings of this study.

Introduction

Civilian aviation is a key part of the transportation system of the United States and a major contributor to national economic prosperity. As with other industries on which the nation's competitiveness hinges, the American public has a vested interest in the strength of the airlines. Aviation differs from most other industries, however, in that it has been extensively overseen and regulated by public agencies since its earliest days. For much of the history of the aviation industry, the federal government made the key decisions that determined route structures, fares, equipment, infrastructure, work rules, and worker qualifications. Even in the wake of deregulation in 1978, federal agencies continue to have important oversight responsibilities for aviation safety and the public still tends to expect government to pay special attention to how the aviation industry is faring.

In the late 1980s, a period of strong airline growth coincided with the beginnings of downsizing the military. Since the military has historically been a major supplier of trained pilots and maintenance technicians, concern arose about whether there was an impending pilot and technician shortage. With a slowing of airline growth in the early 1990s, no immediate shortage emerged, but the concern about the impact of military downsizing remains. Another area of concern has been the struggle of minorities and women to overcome barriers and prejudices that have restricted their access to many workplaces, including pilot and senior management jobs in aviation.

In light of these concerns about the aviation workforce, Congress directed the U.S. Department of Education to commission the National Academy of Sciences to conduct a study of education and training for civilian careers, with particular emphasis on the access of women and

minorities to aviation jobs. This paper summarizes some of the findings of this study.¹ This study was the work of a committee of 15 experts drawn from a variety of pertinent fields coupled with professional staff from the National Academy of Science and others who gave freely of their time and expertise. The author of this paper, who was a member of that committee, takes full responsibility for any errors made in summarizing the committee's report.

The Aviation Industry and Its Workforce

Aviation companies, together with the many businesses associated with air transportation, generate millions of jobs for U.S. workers. Still, because air transportation is a capital intensive enterprise, it employs relatively few people directly. Of the roughly three quarters of a million people in air transport, most work for the relatively handful of companies that qualify as major airlines. The industry has grown steadily since World War II, as reflected in Table 1.

Aviation makes an important contribution to the economy, but it is also strongly influenced by economic conditions. During recession, when the economy is growing slowly, airline passenger traffic growth usually falls off sharply and may even decline, as fewer people take vacations involving air travel and as business cut back on travel. Airlines respond to this decline by reducing employment through slower hiring and employee furloughs. When the economy is doing well, airline travel usually grows quickly: airlines then call back furloughed workers and may also increase their hiring.

The industry's responsiveness to economic conditions is reflected in statistics on new hires, which gyrate substantially from year to year. Table 2 shows pilot hires by air carrier group

¹ The complete report for this study can be found in Janet S. Hansen and Clinton V. Oster, Jr., editors, *Taking Flight*:

and year for 1985 through 1994.² As the table indicates, there is substantial volatility in pilot hiring in all four of the carrier groups. Table 3 shows maintenance mechanic hires for these same carrier groups for the years 1989 through 1995. Here again, there is considerable volatility in the number of mechanics hired from year to year.

As these figures indicate, the late 1980s was a period of rapid airline expansion which triggered a rare concern that demand for trained personnel would outstrip supply. The concern quickly faded as the industry underwent one of its frequent shifts in economic fortune. Its labor market went from perceived shortage to an oversupply of trained and available pilots and mechanics, who are increasingly called aviation maintenance technicians. The period highlighted, however, the fact that the issue of supply and demand in aviation is closely linked to the question of what constitutes a "qualified" job candidate. To fly or work on an airplane, individuals must meet minimum conditions laid down by the Federal Aviation Administration (FAA) and hold appropriate FAA certifications. These minima are generally far below the standards that the major airlines expect and, for the most part, have been able to demand, even in periods when labor markets were tight. Airlines face less an issue of whether "qualified" candidates are available than an issue of how much training and experience they can require of new hires and how much they will have to provide themselves.

A major reason people are concerned about making sure that the aviation industry has the employees it needs and that all individuals have equal access to jobs in this industry is that

Education and Training for Aviation Careers (Washington: National Academy Press, 1997).

² FAPA relies on the following air carrier designations and descriptions: global carriers have annual revenues of at least \$5 billion, including at least \$1 billion from international operations; major carriers have at least \$1 billion in revenue; national carriers have revenues between \$100 million and \$1 billion; turbojet (scheduled) carriers have annual revenues of less than \$100 million and fly primarily jet airplanes; and turboprop (scheduled) passenger carriers have annual revenues of less than \$100 million and fly primarily turboprop planes.

aviation jobs are widely perceived as good jobs: exciting, rewarding, and perhaps most important of all, high paying. This perception stems in large part from the glamorous public image of the pilot, but it also has a basis in reality. Pilots, particularly those working for major airlines, have always been among the nation's leading wage earners; senior captains today can make over \$200,000 annually at some larger carriers. Average earnings among employees in air transportation still exceed those of the typical American industrial worker, although not by as much as then did prior to deregulation when aviation was protected from price competition. Table 4 shows mean monthly earnings of captains and first officers for major airlines and for regional airlines. Major airline captain salaries are high, but their increases have not kept pace with inflation in the past decade. There is also a substantial gap between first officer salaries and captain salaries. There is an even larger gap between major airline pilot salaries and regional airline salaries.

Aviation occupations, although changing, do not mirror the diversity of the overall American workforce. Although aviation employees as a group are not dramatically different in sex, race, and ethnic makeup from all employees, the representation of women and racial minorities varies substantially from occupation to occupation. Table 5 shows the proportion of pilots who are either black or female for some of the nation's leading airlines. Overall for this group of airlines, only 1.2 percent of the pilots are black and only 2.3 percent are female. These employment patterns are in part the result of a history of explicit and implicit policies against hiring women and minorities for aviation jobs in the military and at the airlines, policies that have been subject of legal challenge and government investigation for several decades. The aviation workforce is still affected by a history of discrimination. Although substantial progress

has been made, concerns about discrimination still exist and blacks and women remain severely underrepresented in the pilot ranks of the major airlines.

The Impact of Military Downsizing

Historically, the military has been an important source of trained professionals, especially pilots, for commercial aviation. The major carriers have relied on the military for about 75 percent of their pilots. Referring back to table 2, the bottom portion of the table shows the share of new pilot hires with a military background. These numbers are generally quite high for the global/major airlines, but are much lower for the smaller airlines.

Since the late 1980s, the military services have been undergoing a fundamental reshaping, restructuring, and drawing down of force size. These efforts have led to reductions in the inventory of officers and enlisted personnel in aviation-related occupations in the services and have lowered the numbers of individuals being recruited into these specialties. In 1995, for example, the number of military personnel in their first year of service who were either pilots or pilot trainees was less than 40 percent of the total 10 years earlier. The number of first-year enlisted aviation maintenance personnel in 1995 was about 46 percent of the total in 1985.

Such reductions will eventually affect the ability of the civilian air carriers to draw on the military for trained aviation personnel. The major air carriers, faced with a reduced supply of military-trained pilots and technicians, will have to meet their future hiring needs by relying to a greater extent than they presently do on civilian sources of supply, as smaller air carriers already do.

As a major training ground for pilots and aviation maintenance technicians, the military's aviation-related workforce is not noticeably more diverse than the civilian aviation workforce. Table 6 shows the proportion of military officers and of fixed wing military pilots that are either women or are black or Hispanic. These figures are not dramatically better than in the civilian airline industry. Minorities and women are better represented in military aviation specialties than they used to be, but -- with the exception of minority male technicians -- their presence in these jobs is small, still significantly lagging their representation in the overall population. Because the proportion of pilots who are minority and women in particular is very low, the military drawdown will not have much on the diversity of the pool of trained pilots available to the air carriers. It does mean, however, that opportunities are shrinking for minorities and women, as well as white men, to receive aviation training by joining the armed services.

Civilian Training for Aviation Careers

In the future, airlines will depend more heavily than in the past on civilian sources for initial training of their specialized workforce. A glimpse of what this future might be like came in the late 1980s, when rapidly rising demand for workers led to more hiring from civilian training programs. This situation drew attention to the differences between the structured and consistent backgrounds of individuals trained in the military and the diverse and more varied experiences of those trained through civilian aviation pathways. Before the issues surrounding civilian training could be fully explored, a reversal of economic fortune caused new airline hiring to plummet and interest to shift away from strengthening civilian training. Some promising new training initiatives were aborted or de-emphasized.

These issues are emerging again, as airlines are now recovering economically and are again facing the pressures of expansion and the need to replace aging workforces. The question remains whether a training system less dependent on the military over the long run can be expected to provide the air transportation industry with the numbers and kinds of workers necessary to operate efficiently and safely. Five civilian pathways through which individuals can prepare for aviation careers were identified and examined. The first pathway, military training, is discussed above. The other four pathways are in the civilian sector: collegiate training, on-the-job training, foreign hires, and ab initio training.

Collegiate training. Approximately 280 postsecondary institutions -- including four-year and two-year colleges, vocational-technical schools, and other specialized schools -- offer nonengineering aviation programs in such fields as flight education, maintenance, and airline management education. Almost 200 institutions are certificated by the FAA to offer maintenance training. The collegiate pathway is already the major training route for certification aviation maintenance technicians and is likely to become a more important training source for pilots. Unlike technicians, however, pilots are not ready for employment with the major airlines after completing undergraduate training. They typically must spend years working their way up through commercial, nonairline flying jobs before they have the qualifications the airlines require to secure an employment interview.

On-the-job training. Pilots and technicians can currently earn the necessary FAA licenses and certifications without attending a comprehensive formal aviation education program, by passing specific tests and fulfilling other requirements. Pilots can attend one of the more than 1,700 flight schools (600 of which are FAA-certified pilot schools), then work as flight

instructors and in other commercial jobs that help them build flying experience and qualify for advanced certificates. This pathway is highly variable and idiosyncratic. Technicians can work under the guidance of certified technicians in aviation repair shops to qualify for FAA exams. The major airlines, however, seem to prefer to hire maintenance technicians who are graduates of FAA-certified technical programs, most of which are found in technical schools and colleges.

Foreign hires. U.S. airlines have shows little inclination to hire pilots and aviation maintenance technicians who have trained abroad. If anything, the flow tends to be in the opposite direction, with American-trained pilots looking for jobs with foreign airlines when U.S. openings are scarce. Given the adequate supply of American-trained personnel, foreign hires are unlikely to be a significant source of personnel for U.S. airlines in the near future.

Ab initio ("from the beginning") training. Under this pathway, airlines take carefully selected individuals with no flying experience and put them through intensive pilot training courses designed to meet the airline's specific needs. Ab initio training is popular with foreign airlines; Lufthansa and many other global carriers have ab initio training programs in this country. But U.S. airlines have not wanted or needed to pay for this type of "grow your own" training, because they have had access to a plentiful supply of candidates from the military and the nation's large general aviation sector.

Each of these pathways offers advantages and disadvantages to the airlines and prospective employees and each produces (or potentially could produce) pilots or technicians with different characteristics. The military pathway for pilots, for example, costs industry very little, provides rigorous and demanding training that weeds out candidates who do not meet high standards, and is highly adaptable to technological change. It is therefore easy to understand why

the military pathway for pilot training has been so attractive to civilian airlines as a source of new hires. But the military's role as a provider of trained personnel for the airlines is clearly on the wane. Foreign-trained personnel have not been much of a factor in U.S. aviation labor markets. U.S. airlines are unlikely to be willing to pay for the high costs of ab initio training as long as they have plenty of applicants from other sources.

That leaves on-the-job training and collegiate-based programs as the pathways that seem most likely to replace military training as the primary route to the major airlines. Collegiate aviation increasingly will dominate on-the-job training because it has the potential to produce pilots and technicians specifically trained to standards recognized by commercial carriers.

Challenges for Civilian Training

Several challenges will have to be addressed to ensure that civilian training dominated by the collegiate pathway fulfills its potential to meet the specialized workforce needs of commercial aviation.

First, civilian programs must produce enough people to compensate for reductions in military personnel and supply airlines' demand as they expand and/or replace aging workforces. Civilian training will be able to meet labor market demands, based on the demonstrated ability of the training sector to adapt to changing needs. Moreover, the airlines are in a powerful position to influence the aviation labor market; at the extreme, they can do as many foreign airlines do and train their own workers. But nothing in the U.S. experience suggests that this will be necessary or likely. U.S. air carriers have many intermediate options for influencing the number and quality of the candidates available to them, short of undertaking and paying for training

themselves. Many of these options were explored during the hiring boom of the late 1980s and could be expanded on now.

Successfully exploiting these options will depend on the continuing professionalization and standardization of collegiate aviation programs. The airlines and the aviation industry as a whole ought to become more active and systematic partners in fostering the maturation of collegiate aviation and developing commonly recognized training standards to guide the development of appropriate curricula. Schools and industry together need to build the institutional mechanisms that foster standard-setting and recognize programs meeting the standards.

Collegiate aviation programs should support the development of a system of accreditation similar to that found in engineering and business. The accreditation system should be developed in close cooperation with the airlines to ensure that curricula are responsive to their needs. The commercial aviation industry should support the development of an accreditation system as well as provide more sustained and consistent support to individual aviation programs.

The FAA should facilitate school-industry cooperation and the development of an aviation accreditation system. Industry-school relations are not yet well developed in aviation, and accreditation is in its early stages. The industry is accustomed to having the FAA involved in important aviation-related discussions, and its participation in efforts to build partnerships and develop an effective standard-setting mechanism will help legitimize these efforts. FAA should also review its training and certification requirements to ensure that they support rather than hinder the efficient and effective preparation of aviation personnel.

Diversifying the Aviation Workforce

From the earliest days of flight, women and minorities shared the national fascination with airplanes. Unlike white men, however, women and blacks in particular faced a variety of roadblocks to participating in aviation, including legal barriers, segregation, and stereotypes that emphasized the masculine nature of flying. Aviation is not unique; its history reflects not only its own traditions but also broad societal patterns in America. Aviation, like the nation, has undergone change. Nevertheless, neither society as a whole nor aviation in particular is anywhere near being able to declare victory in the battle to provide equal opportunities and equal treatment to all individuals.

Increasing the diversity of the aviation workforce (and especially broadening access to its highly skilled and most senior positions) is a task that must include but also extend beyond the industry itself. It must reach back long before the time that potential employees apply for jobs because today very few women and blacks are certified to be pilots and mechanics. Enlarging the pool of people interested in and qualified for aviation careers can address two concerns simultaneously. It can increase the number of minorities and women available for employment. It can also forestall any future supply problems by ensuring that the nation's increasingly diverse workforce is being fully utilized by the aviation industry.

The challenge of improving diversity in aviation must be addressed along three dimensions. Efforts must be made to develop the *interest* of individuals from underrepresented groups in undertaking aviation careers. There must be equal opportunities for minorities and women to develop the *basic academic competencies* to successfully pursue aviation careers if they choose. And any remaining *barriers* must be addressed that formally or informally have a

disproportionate effect on the ability of minorities and/or women to pursue aviation careers if they have the interest and the basic academic competencies.

Developing interest. Individuals from underrepresented groups need to know that aviation now offers career opportunities they can aspire to. Fortunately many activities aimed at involving young people and others in aviation are already under way, sponsored by the federal and state governments, by private associations, by airlines and aircraft manufacturers, and by the many professional associations that represent companies or employees involved in all aspects of commercial aviation. Because of their historic exclusions from much of aviation, however, there is less of an aviation tradition among blacks and women than among white men, so voluntary programs are less apt to attract them without special recruiting efforts. All organizations seeking to encourage interest in and knowledge of aviation should focus special attention on the continuing need to reach and involve individuals from groups who have been and still are underrepresented.

Most aviation outreach activities focus on precollege age groups, thus missing the opportunity that exists for outreach and support in the collegiate institutions that enroll significant numbers of minority and women students in aviation education programs. These schools offer excellent opportunities for industry in particular to provide assistance to individuals to encourage their persistence in aviation and support for institutions that are demonstrating their ability to attract underrepresented groups into the aviation field. To increase the pool of qualified applicants from underrepresented groups for pilot, aviation maintenance technician, and other positions in the aviation industry, airlines and other employers should work aggressively to build

linkages with the aviation programs at historically black colleges and universities and other schools and colleges with large minority and female enrollments.

Resources of time and money are likely to be most efficiently used when the various groups involved in promoting aviation and aviation education work together. Many partnerships already exist, yet there is more room for progress. Cutbacks in the aviation education program at FAA are a special concern, in particular cutbacks affecting FAA publications that are widely used to disseminate basic information about aviation careers. Industry should work in partnership with state and private groups and the FAA to maintain basic aviation education and information services. The FAA and its parent agency, the DOT, should reconsider their decision to cease providing (at no cost) basic information on the aviation industry and career opportunities that can be used by other aviation agencies and organizations to promote interest in the field

In small and large ways, aviation suffers from image problems that may hamper its attempt to diversify its workforce, from persistent use of the term airmen to describe pilots and technicians in FAA publications to narrow perceptions about aviation careers and the low regard with which technical jobs and vocationally oriented education and training are often held in this country. The responsible agencies and groups should work to create more accurate public understanding of modern aviation careers and acceptance of the technical education needed to prepare for them.

Basic academic competencies. Students need a solid grounding in mathematics and science to successfully pursue collegiate aviation programs. Research has provided a great deal of evidence about differences in mathematics and science participation and achievement among minorities and women at the precollege level. The task of improving mathematics and science

competencies so that minorities and women can pursue aviation careers if they so choose is bound up in much larger questions of reforming precollege education and of improving the preparation of all students for science, math, engineering, and technology careers. It is worthwhile to support efforts to improve the general preparation of elementary and secondary school students in mathematics and science and to stress the continuing need to focus special attention on improving opportunities for and the academic achievement of minorities and women. Those responsible for specialized aviation programs at the precollege level should collaborate with larger systemic efforts to improve educational performance.

Barriers. Formal barriers restricting the employment of blacks and women in aviation may be gone, but there are still obstacles to overcome. One clear-cut one is the cost of training. More subjectively, no one should be under any delusion that invidious behavior has entirely ceased to plague the workplace. The more intangible barriers that result from such behavior, such as those that might affect how individuals are selected for jobs or the climate they encounter in schools and businesses, also need continuing attention.

The costs of specialized training for aviation careers, particularly flight training for pilots, are substantial. High costs are likely to pose a special barrier for students who come from households with below-average incomes, as many black and Hispanic individuals do. In addition to the expenses of flight training that would-be pilots face during their college years can be added the costs of flying time and certifications that individuals must accumulate after graduation -- what we call "transitional training" -- to qualify for airline interviews. Industry should take the lead in developing financial assistance programs to help applicants for pilot positions meet the costs of flight and transitional training.

Investigating barriers that may restrict access to aviation jobs for minorities and women leads to the issue of selection procedures, especially for professional pilots who are still predominantly white and male. Little public information is available about how pilots are selected for civilian employment. A more transparent process would be helpful both for training schools and for job candidates. The airlines should formalize and publicize their hiring criteria so that schools can develop appropriate programs of study and individuals can make informed decisions about training and career paths.

Because the criteria used to select pilots are considered proprietary information by the airlines, most of the available research literature focuses on military pilot selection and training. The military's experience suggests that the predictive validities in its pilot selection system are low. Human factors researchers have highlighted the need for new job task analysis in aviation, reflecting the use of modern technology and the crew-oriented environment of the commercial airline cockpit. New instruments are being developed to measure traits not traditionally emphasized in pilot selection. Some preliminary evidence suggests that women and minorities may perform better on new measures than on some traditional instruments. All airlines should examine their selection criteria and use procedures consistent with the best available knowledge of job tasks and effective crew performance.

Finally, improving the diversity of the aviation workforce requires recognizing that the struggle of minorities and women to become full members of the aviation community is not yet over. The remaining job will in some ways require even more effort than what was needed to overcome blatant policies of discrimination and exclusion, because it means addressing habits or attitude and behavior that are much more difficult to identify and root out. Like other industries,

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aviation also has to shatter the so-called glass ceiling: the invisible artificial barriers blocking women and minorities from advancing up the corporate ladder to management and executive level promotions.

Table 1 - U.S. Scheduled Airline Measures of Growth

Year	Enplanements (thousands)	Revenue Passenger Miles (millions)	Passenger Revenue (millions of 1993 dollars)	Employees
1950	19,220	10,243	\$3,646	86,057
1960	57,872	38,863	\$11,657	167,603
1970	169,922	131,710	\$28,404	297,374
1980	296,903	255,192	\$49,187	360,517
1990	465,560	457,926	\$64,605	545,809

Source: Civil Aeronautics Board and Air Transport Association

Table 2 - Pilot hires by air carrier group and year, 1985-1994

Air carrier group	1985	1987	1988	1989	1990	1991	1992	1993	1994
Number Hired									
Global/major	4,544	3,958	3,328	5,868	3,304	2,404	1,836	491	1,041
National	1,306	1,319	1,908	1,769	1,059	1,001	405	764	1,438
Turbojet	1,990	1,760	1,447	1,389	416	599	385	812	1,128
Turboprop	3,046	4,073	3,114	4,375	2,998	1,971	1,702	1,189	1,656
TOTAL	10,886	11,110	9,797	13,401	7,777	5,975	4,328	3,256	5,263
Percentage with Military Background									
Global/major	47%	66%	69%	na	76%	80%	85%	93%	82%
National	33%	40%	38%	na	38%	46%	58%	48%	34%
Turbojet	24%	39%	41%	na	39%	45%	51%	25%	64%
Turboprop	16%	17%	18%	na	22%	14%	25%	13%	22%

Source: data provided by FAPA.

Table 3 - Maintenance Mechanic Hires by Air Carrier Group and Year

Air carrier group*	1989	1990	1991	1992	1993	1994	1995
Global/major	9,018	5,358	1,130	812	341	386	560
National	1,508	1,028	650	414	524	539	852
Turbojet	883	523	278	195	190	390	198
Turboprop	1,484	1,412	858	759	352	477	411
TOTAL	12,893	8,321	2,916	2,180	1,407	1,792	2,021

Source: Data provided by FAPA

Table 4 - Mean Gross Monthly Earnings of Pilots (U.S. Certificated Carriers)

Carrier Type	Year	Nominal		Inflation Adjusted	
		Captains	First Officers	Captains	First Officers
Majors	1984	\$8,953	\$5,946	\$8,953	\$5,946
	1989	\$10,097	\$5,779	\$8,460	\$4,842
	1995	\$11,495	\$6,546	\$7,796	\$4,439
Regionals	1984	\$3,485	\$1,890	\$3,485	\$1,890
	1989	\$3,518	\$2,019	\$2,948	\$1,692
	1995	\$4,459	\$3,419	\$3,024	\$2,319

Source: Bureau of Labor Statistics

Table 5 - Black and Female Airline Pilots

Airline	Black Number	Percent	Female Number	Percent	Total Pilots
American	70	0.7%	175	1.8%	9,928
AMR Eagle	20	0.8%	6	0.2%	2,400
Continental	10	0.2%	40	1.0%	4,100
Delta	54	0.6%	35	0.4%	9,406
FedEx	64	2.9%	99	4.4%	2,234
Northwest	28	0.5%	75	1.4%	5,239
Southwest	24	1.1%	47	2.7%	1,715
TWA	26	0.8%	44	1.4%	3,147
United	212	2.7%	500	6.2%	8,015
UPS	55	3.7%	82	5.5%	1,503
USAir	59	1.0%	115	2.0%	5,709
Total	622	1.2%	1,218	2.3%	53,396

Source: Unpublished data from the Organization of Black Airline Pilots

Table 6 - Active Duty Military Officers and Fixed-Wing Pilots, By Sex and Minority Status

Category	1980 Number	Share	1985 Number	Share	1990 Number	Share	1994 Number	Share
All Officers	278,014		309,137		296,886		245,841	
Female	21,467	7.7%	30,321	9.8%	34,241	11.5%	31,831	12.9%
Black and Hispanic	17,045	6.1%	24,550	7.9%	27,148	9.1%	24,739	10.1%
Fixed Wing Pilots	25,597		26,862		24,591		21,476	
Female	71	0.3%	329	1.2%	372	1.5%	315	1.5%
Black and Hispanic	431	1.7%	623	2.3%	661	2.7%	644	3.0%

Source: Unpublished data provided by Defense Manpower Data Center, U.S. Department of Defense