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AVIATION WORKFORCE

Supply of Airline Pilots and Aircraft Mechanics

Statement of Statement of Heather Krause, Director, Physical Infrastructure

GAO-23-106769T

GAO Highlights

Highlights of GAO-23-106769T, a testimony before the Subcommittee on Aviation, Committee on Transportation and Infrastructure, House of Representatives

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AVIATION WORKFORCE

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Why GAO Did This Study

The aviation industry has raised questions about whether the demand for commercial airline pilots and aircraft mechanics may exceed supply in the future. Industry's demand for pilots and mechanics is driven by a number of factors. These factors include projected demand for air travel and the number of aircraft that airlines expect to use to fulfill that demand, as well as anticipated workforce attrition and retirements.

This testimony highlights: (1) what is known about the current supply of and demand for commercial airline pilots and aircraft mechanics; (2) challenges related to aviation workforce supply, according to industry stakeholders; and (3) actions the aviation industry and FAA have taken to address those challenges.

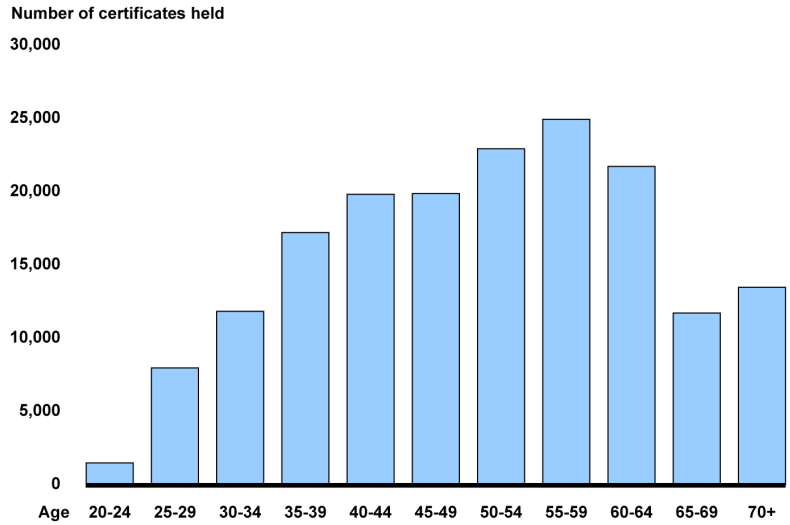
This statement is based on GAO's body of published work on aviation workforce issues, including a draft report currently with the Department of Transportation and FAA for comment. For the draft report, GAO examined industry and government data on airline pilot and aircraft mechanics, including professional certifications, student enrollments, and hiring, wage, and employment data. GAO also interviewed representatives from domestic passenger and regional airlines; repair stations; faculty from training schools; and aviation industry and labor groups.

View GAO-23-106769T. For more information, contact Heather Krause at 202-512-8234 or krauseh@gao.gov

What GAO Found

In ongoing work, GAO determined that the current supply of pilots—as measured by the number of individuals qualified to be U.S. passenger airline pilots—grew from 2017 through 2022. Enrollments in U.S. pilot training schools also increased in recent years. Pilot supply may increase over the next two decades, according to Federal Aviation Administration (FAA) pilot certification data and forecasts. However, the extent to which projected supply would exceed or fall short of industry's demand for pilots is unknown given uncertainties surrounding future demand. Publicly available data on hiring, employment, and wages indicate strong current demand for pilots. Meeting that demand has been particularly difficult for regional airlines—which generally serve smaller communities—and has, according to them, affected their operations.

Distribution of Active Airline Transport Pilot Certificates in 2022 by Age Group



Source: GAO analysis of FAA information. | GAO-23-106769

Note: Pilots age 65 and over are no longer eligible for employment with scheduled U.S. passenger airlines, but could work as pilots or instructors elsewhere.

The number of people newly certificated by FAA to be aircraft mechanics grew from 2017 through 2022. Less is known about how many mechanics enter or exit the aviation industry each year or the demand for aircraft mechanics. However, aviation businesses GAO interviewed reported challenges maintaining sufficient numbers of mechanics.

Aviation industry stakeholders have taken steps to address workforce supply challenges. Airlines and repair stations are increasing pay for pilots and mechanics. For example, several regional airlines raised pay substantially in 2022. FAA is also undertaking efforts to support industry workforce development, including awarding grants to attract young people to aviation careers.

Chairman Graves, Ranking Member Cohen and Members of the Subcommittee:

I am pleased to be here today to discuss the supply of and demand for commercial airline pilots and aircraft mechanics and industry and Federal Aviation Administration (FAA) responses to workforce supply challenges. The U.S. civil aviation workforce is responsible for helping move over half a billion people and hundreds of tons of goods each year. Like many other critical sectors of the nation's economy, the aviation industry has been adversely affected by the COVID-19 pandemic. Passenger demand for air travel plummeted in 2020, creating cascading effects across sectors including airlines, airports, and repair stations. However, passenger demand has steadily rebounded since spring 2021. In 2023, traffic levels in North America are expected to exceed pre-pandemic traffic levels, according to a March 2022 forecast from the International Air Transport Association.

As a result, industry questions about whether it has a sufficient number of workers to meet demand have reemerged. Industry's demand for pilots and mechanics is driven by several factors, including projected demand for air travel, the number of aircraft that airlines expect to use to fulfill that demand, as well as anticipated workforce attrition and retirements. We have previously reported on airlines' concerns that new workers—particularly commercial airline pilots and aircraft mechanics—are not entering the industry at a pace sufficient to replace attrition and retirements and support both the industry's projected growth and expansion into electrified aviation operations that may enter service in the next 5 years.[1] The aviation industry's response to the COVID-19 pandemic may have exacerbated these concerns, as airlines and other

[1]GAO, *Aviation Workforce: Current and Future Availability of Airline Pilots*, GAO-14-232 (Washington, D.C.: Feb. 28, 2014); *Current and Future Availability of Aviation Engineering and Maintenance Professionals,* GAO-14-237 (Washington D.C.: Feb. 28th, 2014); and *Transforming Aviation: Stakeholders Identified Issues to Address for 'Advanced Air Mobility',* GAO-22-105020 (Washington, D.C.: May 9, 2022).

businesses encouraged workers to retire or voluntarily separate to reduce costs during the industry downturn.[2]

My statement today will highlight (1) what is known about the supply of and demand for commercial airline pilots and aircraft mechanics, and what is projected for the future; (2) challenges related to increasing the supply of pilots and mechanics, according to industry stakeholders; and (3) actions the aviation industry and FAA have taken to address workforce supply concerns.

This testimony is based on our body of work on aviation workforce issues.[3] In particular, we are drawing from a draft report being developed in response to a provision in the FAA Reauthorization Act of 2018 that GAO study the aviation and aerospace workforce of the future. The draft report is currently out for comment with the Department of Transportation (DOT) and FAA. We expect to issue the report next month. In addition, in May 2022, we reported on issues that industry and the federal government will need to address before an emerging form of air transportation—Advanced Air Mobility (AAM)—can be widely implemented, including challenges to developing a skilled AAM industry workforce.[4]

For the draft report, we examined industry and government data on airline pilot and aircraft mechanics. These data included the number of airline transport pilot and mechanic certificates FAA estimated to be active from

[2]Among other assistance, federal COVID-19 relief laws provided up to $63 billion in financial assistance for passenger airlines and other eligible applicants to pay employee wages, salaries, and benefits. The financial assistance, depending on the program, required recipients to refrain from conducting involuntary furloughs, among other requirements. For example, recipients were to use financial assistance from the three rounds of the Payroll Support Program (PSP) exclusively for the continuation of wages, salaries, and benefits. Recipients were required to refrain from conducting involuntary furloughs or terminations and reducing pay rates and benefits for prescribed periods of time.

[3]See GAO, *Aviation Workforce: Current and Future Availability of Airline Pilots*, GAO-14-232 (Washington, D.C.: Feb. 2014); *Current and Future Availability of Aviation Engineering and Maintenance Professionals,* GAO-14-237 (Washington D.C.: Feb. 2014); *Collegiate Aviation Schools: Stakeholders' Views on Challenges for Initial Pilot Training*, GAO-18-403 (Washington, D.C: May 15, 2018); *Aviation Maintenance: Additional Coordination and Data Could Advance FAA Efforts to Promote a Robust, Diverse Workforce*, GAO-20-206 (Washington, D.C.: Feb. 6, 2020); and *Transforming Aviation: Stakeholders Identified Issues to Address for 'Advanced Air Mobility',* GAO-22-105020 (Washington, D.C.: May 9, 2022).

[4]Advanced Air Mobility is expected to use revolutionary aircraft—which may feature electrified propulsion systems, increased levels of automation, and vertical take-off and landing capabilities—to transport people and cargo.

2017 through 2022, students enrolled in training programs, and hiring, wage, and employment data for these occupations. We determined the data were sufficiently reliable by conducting selected manual and electronic tests of the data. We also interviewed a range of aviation stakeholders, including representatives from domestic passenger and regional airlines; repair station operators that perform inspections and maintenance on aircraft; faculty from collegiate aviation schools and aviation maintenance schools; and multiple industry associations and labor groups representing a cross-section of aviation interests. The results of these interviews are not generalizable to the entire commercial aviation industry.

We also held two discussion groups with a non-generalizable selection of currently-employed aircraft mechanics, identified with labor union assistance, in which we discussed their perspectives on their careers to that point, including what factors attracted them to aviation careers and what obstacles they have faced. We also interviewed FAA program officials with subject matter expertise in areas such as pilot and mechanic certification and education and outreach programs, and reviewed relevant FAA documentation including grant project applications and rulemaking documents. More detailed information on our scope and methodology for this work can be found in the report we are issuing next month.

Similarly, our work on AAM workforce issues included interviews with a non-generalizable sample of 36 stakeholders including AAM companies, trade organizations, standards bodies, colleges and universities, state and local governments, and organizations that represent aerospace workers on these issues, among other methods.

More detailed information on our objectives, scope, and methodology for that work can be found in the issued report. The work on which this testimony is based is being conducted in accordance with generally accepted government auditing standards.

Available Data on the Supply of and Demand for Airline Pilots and Aircraft Mechanics

Pilot Supply Has Grown Since 2017 and Is Projected to Increase over the Next Two Decades

In our draft report, we determined that pilot supply grew from 2017 through 2022 based on FAA's Airline Transport Pilot (ATP) certification data and collegiate aviation student enrollment data.[5] Pilot supply may further increase over the next two decades based on projected growth in ATP certifications. However, the extent to which this projected supply would exceed or fall short of industry's demand for pilots is unknown given the uncertainties surrounding future demand, among other things.[6]

- ATP certifications: From 2017-2022, the supply of individuals qualified to be airline pilots —those under 65 years old and holding both an ATP certificate and an active medical certificate— increased by about 3,000 (or 2 percent, from 144,557 to 147,934 certificates), according to FAA data. The number of new ATP certifications issued each year by FAA grew more than 100 percent during this time period (from 4,449 to 9,588 certificates).[7]
- Student enrollments: The number of individuals enrolled in 4-year pilot training schools almost doubled from 2017 through 2021, from 15,329 to 30,088 students, according to data obtained from the University Aviation Association.[8]
- Upcoming retirements: According to FAA data, the average pilot age has remained at roughly 51 years old from 2017 through 2022. About 15 percent of all ATP certificate holders (25,214 of about 173,000) were 65—the mandatory retirement age for U.S. passenger airlines—or older in 2022 (see fig. 1).[9]

According to FAA data, an average of about 4,300 ATP holders under 65 will reach mandatory retirement age each year from 2022 through 2042. Approximately 15 percent of current ATP certificate holders will turn 65 by

[5]Other sources of airline pilot supply include non-collegiate vocational pilot schools, non-collegiate, instructor-based pilot schools, and the military; however, these sources were outside the scope of our audit work.

[6]We have long reported that the demand for air travel is highly cyclical and affected by the state of the economy, as well as to political, international, and health-related events. See GAO*, Commercial Aviation: Airline Industry Contraction Due to Volatile Fuel Prices and Falling Demand Affects Airports, Passengers, and Federal Government Revenues* (Washington, D.C.: Apr. 2009).

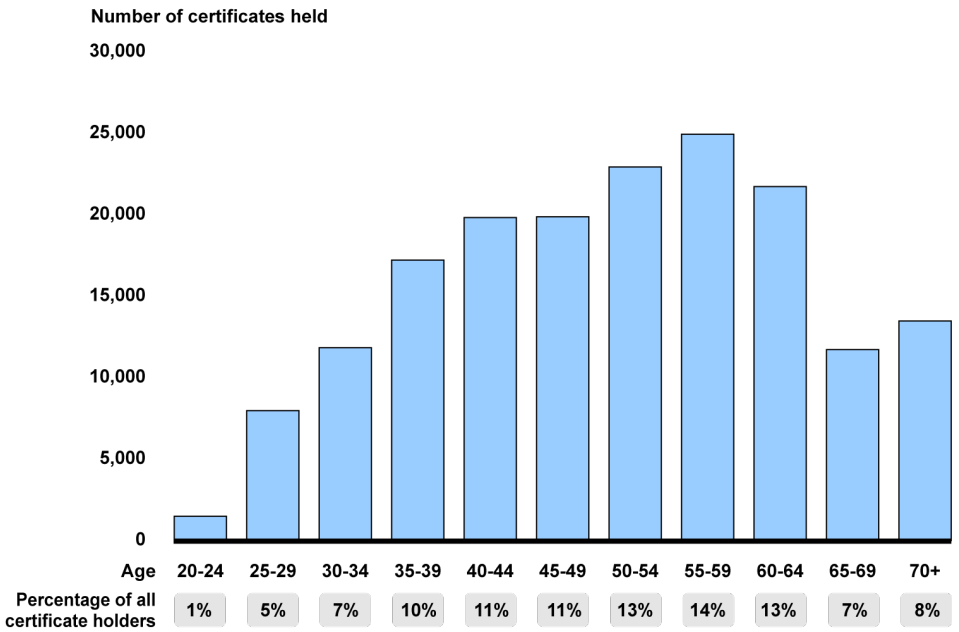
[7]The pool of ATP certificate holders may include pilots who are unavailable for work, not suitable or competent to act as pilots in airline operations, or unwilling to work at wages being offered.

[8]At the time of our analysis, 2022 enrollment data were not yet available.

[9]While pilots age 65 and over are no longer eligible to fly for scheduled U.S. passenger airlines, they may be eligible to work as pilots or instructors elsewhere.

2027, 32 percent by 2032, 47 percent by 2037, and 61 percent by 2042. Other factors, such as early retirements or pilots leaving the aviation industry could further reduce pilot supply; however, these data are not publicly available.

Figure 1: Distribution of Active Airline Transport Pilot Certificates in 2022 by Age Group



Source: GAO analysis of FAA information. | GAO-23-106769

Note: Pilots age 65 and over are no longer eligible for employment with scheduled U.S. passenger airlines, but could work as pilots or instructors elsewhere.

- Forecasted increase in pilot supply: Based on FAA's forecast of ATP certificate growth, which, according to FAA officials, factors in mandatory retirements, the number of ATP certificate holders under 65 may increase 10-17 percent from 2022 through 2042. To project the growth of ATP certificate holders who are under 65, according to FAA officials, an annual growth rate between 0.5 and 0.8 percent could be applied to the pool of certificate holders. Using those lower and upper bounds, the pool of certificate holders could grow from 147,934 in 2022 to either 163,452 (10 percent growth) or as many as 173,492 (17 percent growth) ATP certificate holders in 2042. However, the extent to which the projected supply would exceed or fall short of industry's demand for

pilots is unknown given the uncertainties surrounding future demand.[10]

Current Demand for Pilots is Strong

Publicly available data on hiring and employment by U.S. passenger airlines—and the interaction of hiring and employment with wages—indicate there is strong demand for pilots, as noted in our draft report.

- Hiring: Pilot hiring, one of the key measures of demand for airline pilots, recovered strongly in 2021 following a steep drop after the onset of the pandemic. According to data from Future and Active Pilot Advisors (FAPA), nine mainline U.S. airlines hired 28,418 pilots from 2017 through 2022—an average of almost 4,700 pilots per year.[11] However, that growth was not evenly distributed across that time period. For example, in 2020 those nine airlines collectively hired about 1,500 pilots, coinciding with the steep drop in demand for air travel early in the pandemic. In 2021, the nine airlines hired 4,067 pilots, and in 2022 hired 11,194 pilots, according to FAPA data.

It is not possible to determine from the FAPA data to what extent those nine airlines hired pilots who were new or returning to the labor force, as opposed to pilots who were employed by other airlines. However, representatives from two regional airlines told us as part of our ongoing work that they have lost pilots to hiring by larger airlines in recent years.

- Employment: According to the latest available full-year data reported by airlines to DOT, the number of pilots employed by 22 mainline and regional airlines increased from 70,747 in 2017 to more than 73,000 in 2021. The 2021 employment numbers mark a turnaround from 2020, when pilot employment at those airlines dropped by almost 9 percent compared to 2019, as many pilots retired, were furloughed, or left the profession, at least

[10]We have long reported that the demand for air travel is highly cyclical and affected by the state of the economy, as well as to political, international, and health-related events. See GAO, *Commercial Aviation: Airline Industry Contraction Due to Volatile Fuel Prices and Falling Demand Affects Airports, Passengers, and Federal Government Revenues* (Washington, D.C.: Apr. 2009).

[11]FAA defines mainline airlines as those providing service primarily via aircraft with 90 or more seats. See FAA, *FAA Aerospace Forecast Fiscal Years 2022–2042*. The nine mainline U.S. passenger airlines for which FAPA makes pilot hiring data publicly available are Alaska Airlines, Allegiant Air, American Airlines, Delta Air Lines, Frontier, Hawaiian Airlines, Southwest Airlines, Spirit Airlines, and United Airlines.

temporarily. However, the 2021 employment numbers remain below 2018 levels.[12]

- Pay: Mainline and regional airline first officer pay rose from 2017 through 2021, according to our analysis of data from the Air Line Pilots Association. At 10 mainline airlines, starting pay for a first officer in their first year rose from an average of about $62 per hour in 2017 to almost $76 per hour in 2021, an annualized rate of 5.3 percent.[13] At 12 regional airlines, first-year, hourly pay for a first officer rose from an average of $35 an hour in 2017 to almost $45 an hour in 2021, an annualized rate of about 6 percent.[14]

In addition, demand for pilots is especially acute among regional airlines, which have lost pilots to other employers, according to representatives from regional airlines. For example, in July 2022, representatives from a regional airline told us they have lost about 100 pilots a month to larger airlines. One regional airline estimated that U.S. regional airlines would collectively lose about 11,000 pilots—or 65 percent of their workforce—to larger airlines in 2022. Representatives from three regional airlines told us they typically lose more experienced captains to mainline airlines, which makes it challenging for regional airlines to have enough captains to develop their less experienced first officers. In 2018, we also reported that regional airlines indicated difficulties finding sufficient numbers of qualified pilots to meet demand.[15]

The federal government and the aviation industry forecast that demand for pilots will continue to be strong in the future. For example, the Bureau of Labor Statistics (BLS) projects an average of about 18,000 job openings annually for the aircraft pilots and flight engineers occupational

[12]According to U.S. Bureau of Labor Statistics (BLS) data, employment of the aircraft pilots and flight engineers occupational group increased by about 0.7 percent per year from 2017-2021. In comparison, employment across all occupations increased by about 0.2 percent each year according to BLS.

[13]In real 2021 dollars, pay rose from about $68 per hour in 2017 to $76 per hour in 2021, an annualized rate of 2.7 percent per year. We adjusted pay for inflation in real 2021 dollars using the Consumer Price Index from the U.S. Department of Labor, Bureau of Labor Statistics.

[14]In real 2021 dollars, pay rose from about $39 an hour in 2017 to about $44 an hour in 2021, an annualized rate of 3 percent per year. We adjusted pay for inflation in real 2021 dollars using the Consumer Price Index for the U.S. Department of Labor, Bureau of Labor Statistics.

[15]GAO-18-403.

group until 2031.[16] While these forecasts are helpful in gaining a sense of aviation workforce demand in the years to come, developing forecasts is inherently difficult, as they are based on numerous assumptions and actual demand might differ from projected demand due to a variety of factors. For example, the projections assume continued economic growth, but if a recession or another unexpected event like the COVID-19 pandemic were to occur, the projections of workforce demand are likely to be higher than actual demand.

The Number of Individuals with Aircraft Mechanic Certificates Increased, but Stakeholders Noted Challenges to Hiring

In our draft report, we determined that aircraft mechanic supply grew from 2017 through 2022 based on mechanic certification and aviation maintenance student enrollment data.

- New mechanic certificates: The number of newly issued mechanic certificates increased 11 percent from 2017 through 2022 (6,398 to 7,119 certificates), an annualized growth rate of about 2 percent.
- All mechanic certificates: The total pool of mechanic certificates also increased 12 percent from 2017 through 2022, from 286,268 to 320,042, an annualized growth rate of about 2 percent per year. However, these data provide limited information on the current mechanic workforce, as the number of mechanics who have retired from, or otherwise left, the aviation industry since 2017 is unknown. Additionally, as we reported in 2020, individuals holding mechanic certificates might never work in the aviation industry, or might begin their career in the aviation industry and leave for a job in another industry.[17]
- Student enrollments: According to survey data compiled by the Aviation Technician Education Council, estimated enrollment at aviation maintenance technician schools rose from 17,791 students in 2017 to roughly 21,000 students in 2021. However, representatives we spoke with from two maintenance schools indicated that their enrollments have either remained fairly steady or decreased in recent years. For example, representatives from one school told us they had a waiting list for enrollment before the pandemic, but now are unable to fill all of their available seats.

Available data provide a limited picture of the current demand for aircraft mechanics, as noted in our draft report. Hiring data from repair stations

[16]The aircraft pilots and flight engineers occupational group includes commercial passenger and cargo airline pilots, charter pilots, flight instructors, and helicopter pilots, among other occupations.

[17]GAO-20-206.

and other aviation industry employers are not publicly available, which limits visibility into the extent to which employers are trying and able to fill vacancies. Data reported to DOT by airlines indicate that employment of maintenance labor (a category which includes more than aircraft mechanics) at 22 mainline and regional airlines decreased by about 13 percent from 2017 through 2021; however, average annual pay increased by about 12 percent over this period.[18] Although other factors may be involved, the decline in airline employment coupled with an increase in wages suggest that there could be a decrease in the number of mechanics willing and able to work for airlines, due to retirements or to individuals finding employment elsewhere.

Interviews we conducted for our draft report also identified recent challenges in meeting current aircraft mechanic workforce needs. Specifically, representatives from four airlines, three repair stations, and a labor union told us that aviation businesses have experienced challenges maintaining a sufficient number of mechanics. Representatives from two of the repair stations told us that inadequate staffing levels have contributed to backlogs in work and delays in maintenance activities. Representatives from one regional airline reported that it was 5 to 7 percent below its desired staffing level in April 2022, while representatives from another regional airline reported that their attrition has outpaced new hires over the prior 12 months.

Similar to the pilot demand forecasts, the federal government and the aviation industry forecast that demand for aviation maintenance workers—including aircraft mechanics—may be strong in the future. For example, BLS projects an average of about 11,500 job openings annually for the aircraft mechanics and service technicians occupational group from 2021 until 2031.[19] However, according to one consulting firm's forecast for 2022 through 2032, aviation maintenance supply challenges in North America could limit the number of aircraft in service to meet passenger demand.[20]

[18]DOT's "Maintenance Labor" category includes apprentice mechanics, carpenters, chief mechanics, cleaners, crew chiefs, electricians, engineers, foremen, inspectors, lead mechanics, mechanics, mechanic helpers, non-productive shop labor, and shop labor not identified with specific maintenance projects.

[19]The aircraft mechanics and service technicians occupational group includes occupations such as aircraft engine specialists, airframe mechanics, flight test mechanics, and helicopter engine mechanics.

[20]Oliver Wyman, *Global Fleet and MRO Market Forecast 2022-2032*. MRO is an acronym that stands for maintenance, repair, and overhaul organizations.

Ongoing Challenges to Increasing the Supply of Pilots and Aircraft Mechanics

Aviation industry stakeholders we interviewed as part of our draft report identified a number of challenges to increasing pilot and mechanic supply, several of which we have previously reported. Our forthcoming report will provide more details on the challenges noted here as well as others affecting the available supply of pilots and mechanics. In addition, these challenges may be exacerbated by the additional demand for workers to support new types of aviation operations—such as AAM.

- Pilot education costs: Affordability is an important factor affecting the potential pool of applicants for pilots and other aerospace professions. For example, according to data from the University Aviation Association, the average cost of a 4-year degree plus flight training "lab fees" in 2021 was $85,745 for in-state students and $138,511 for out-of-state students. The full cost of a collegiate flight education exceeds the maximum amount of certain types of federal financial aid available to eligible students. Some aviation industry stakeholders we interviewed for our May 2022 report characterized the high costs of training as a barrier to entry for students who are not from affluent backgrounds, and stated that some potential students choose not to pursue aerospace education because of these high costs.[21]
- ATP certification requirements: Stakeholders hold differing views on FAA's 1,500-flight-hour requirement to be hired as a first officer and its effect on pilot supply.[22] Representatives from regional airlines we spoke with characterized the requirement as a barrier to entry that has played a part in constraining the pilot labor pool and contributed to current pilot supply challenges. However, the Air Line Pilots Association (ALPA) stated that the 1,500-flight-hour requirement has contributed to enhanced aviation safety and attributes the pilot supply challenges that airlines have recently experienced to their decisions to implement workforce reductions during the Covid-19 pandemic. ALPA has also stated that, based on the pool of ATP certificate holders, there is more than sufficient

[21]GAO-22-105020.

[22]Pursuant to a statutory requirement, in July 2013, FAA began requiring all first officers to have an ATP certificate, which requires 1,500 hours of flight experience. Pub. L. No. 111-216, § 217(c)(1) 124 Stat. 2348, 2367. Pilots with fewer than 1,500 hours can obtain a "restricted-privileges" ATP certificate (R-ATP), under which specific academic training courses or military experience can reduce the required hours of total flight time to fly certain operations. FAA made this change for airline first officers following the 2009 Colgan Air Inc. crash in New York, and subsequent legislation that required FAA to modify, among other things, first officer qualifications.

availability of qualified pilots to fly for airlines given the right opportunity. Additionally, faculty from three collegiate aviation programs told us that the 1,500-hour requirement has helped schools retain flight instructors longer because their time instructing students counts toward the 1,500 hours. However, many pilot training facilities included in our May 2022 report reported being overstretched due to a lack of flight instructors, among other challenges.[23]

- Infrastructure constraints: Faculty we interviewed from two collegiate aviation programs indicated that their ability to produce more pilots is constrained by existing school infrastructure, including facilities and aircraft to train students. For example, faculty from one school told us that limited classroom space, among other infrastructure constraints, has hampered its ability to take on additional enrollments. The school is planning a new building to house the aviation program's administration as well as provide additional classrooms. Additionally, some stakeholders said current aerospace training facilities may not be able to produce sufficient numbers of workers to handle demand from both the traditional aerospace sector and the emerging AAM industry.[24]
- Pay and working conditions: According to FAA officials we interviewed for our draft report, mechanics are often underpaid, given the responsibilities they have for ensuring the safety and airworthiness of an aircraft. Additionally, several participants in our mechanic discussion groups described challenging working conditions, including the likelihood of working the overnight graveyard shift early in one's career, working outside in inclement weather, and regular exposure to noise and chemicals.
- Competition for talent from other industries: According to several aviation stakeholders, the set of skills mechanics acquire from maintenance schools is valued by other industries, which may offer more attractive compensation or work environments than the aviation industry.
- Limited awareness and stigma of aviation maintenance careers: Several aviation industry stakeholders told us that interest in aircraft mechanic and other aviation maintenance careers suffers from a lack of public awareness of the career opportunities.

[23]GAO-22-105020.

[24]GAO-22-105020.

According to FAA officials, mechanics are not as visible to the public as other careers in the aviation industry. According to representatives from one regional airline, support mechanisms for promoting aviation maintenance professions—such as engagement with high schools and maintenance schools, promotional marketing, and recruitment—are not as well developed as those supporting and promoting the airline pilot profession.

In addition, stakeholders we interviewed for our draft report, along with an aviation industry workforce study, cited limited workforce diversity as a challenge to increasing both pilot and mechanic supply. For example, in May 2022 we reported that some stakeholders viewed the industry as failing to cultivate a more diverse workforce, which in turn has factored into hiring shortfalls across the aerospace industry. These stakeholders said the aerospace industry has not traditionally done a good job of engaging students from diverse backgrounds and has also struggled retaining them once hired. These stakeholders cited a variety of reasons, including a lack of attention to the issue.[25]

Data and studies also show limited diversity among pilots and mechanics. Although women represented 47 percent of the total U.S. workforce in 2021, an aviation industry workforce study showed that women comprised 5 percent of Air Line Pilots Association member pilots and 3.6 percent of association member captains in 2021.[26] The study also noted that racial and ethnic groups including Black or African American, Asian, and Hispanic or Latino persons are underrepresented in these careers. For example, representatives from a non-profit pilot association told us that 3 to 5 percent of the pilot workforce are Latino. Additionally, University Aviation Association data on pilot students in 4-year schools indicate that 17 and 29 percent of the 30,088 enrolled students in 2021 identify as female or minority, respectively. Women make up 2.6 percent of the aviation maintenance workforce, according to the aviation industry workforce study.

While these non-governmental data offer some insight into the diversity of the workforce, we and others have identified opportunities for FAA to address aviation maintenance workforce challenges through its use of relevant data. In February 2020, we recommended that FAA use its existing data—which includes demographic information for mechanic

[25]GAO-22-105020.

[26]Rebecca Lutte, *Women in Aviation: A Workforce Report, 2021 Edition* (Omaha, Nebraska: The University of Nebraska at Omaha Aviation Institute, December 2021).

certificate holders, such as gender—and coordinate with other federal agencies to identify and gather information needed to measure progress and target resources toward diversifying the talent pool for aviation maintenance careers.[27] As of April 2023, this recommendation remains open.

Aviation Businesses and FAA Actions to Address Workforce Supply Concerns

Our draft report identifies a number of actions U.S. airlines and repair stations are taking to help bolster the supply of pilots, including the following illustrative examples.

- Offering higher pay and bonuses: Certain regional airlines have raised pay substantially to respond to increased pilot attrition to mainline airlines. For example, in August 2022, CommuteAir, a regional airline that is partially owned by United Airlines, announced that it is increasing starting pay for first officers from $51 an hour to $72 an hour, and for captains from $84 per hour to $100 per hour. Mesa Airlines also announced in August 2022 that it would begin offering starting wages of $100 an hour for first-year first officers, and $150 an hour for first-year captains, increases of 118 percent and 172 percent, respectively. Regional airlines are also offering signing bonuses, captain upgrade bonuses, and retention bonuses.

Mainline airlines have also increased pilot pay. For example, in October 2022, Alaska Airlines announced that it had ratified an agreement with the Air Line Pilots Association that offers pilot pay increases ranging from 8 percent to 23 percent, based on seniority. By 2024, captains will be earning $300 to $330 per hour and first officers $108 to $228 per hour, depending on years of service.

According to several sources, employers have modestly increased mechanic wages in the last 2 years, but consumer price inflation may have counteracted more recent pay increases. According to a 2022 industry report, the hourly wage for an entry-level certificated mechanic rose from $21.54 in 2020 to $25.49 in 2022, a nearly 20 percent increase.[28] Additionally, officials from two repair stations we interviewed told us they had increased their wages for entry-level mechanics.

[27]GAO-20-206.

[28]Aviation Technician Education Council, *2022 Pipeline Report*.

- Recruiting foreign pilots: According to FAA data, the number of foreign-licensed pilots seeking ATP certificates remained steady from 2017-2020 before increasing 191 percent from 2020 through 2022. However, foreign pilots remain a small portion of the pilot workforce. Several regional and low-cost U.S. airlines—including Breeze Airways, SkyWest Airlines, ExpressJet Airlines, CommuteAir, Spirit Airlines, and Frontier Airlines—have recruited and hired Australian pilots to address workforce concerns during the pandemic recovery.
- Developing training schools and programs: Airlines, including United Airlines (Aviate Academy) and Republic Airways (LIFT Academy), launched flight schools in recent years to directly train their pilots and supplement their hiring pipelines. In addition, some airlines and repair stations use pathway programs with maintenance schools and universities to attract and retain entry-level mechanics, offer them employment upon graduation, and advance them throughout their career. To attract entry-level maintenance workers, two of the three repair stations we interviewed indicated that they had recently established apprenticeship programs, in which employers hire workers without, or with limited, aviation maintenance experience and provide on-the-job training to prepare them to pass the FAA certification tests. These programs often provide a condition of employment once apprentices have achieved their certification.

As described in our draft report, FAA has also undertaken several efforts to enhance aviation educational outreach and to attract more youth and greater diversity to aviation careers. For example, in response to mandates in the 2018 FAA reauthorization, FAA has established two organizational bodies that have undertaken studies and developed reports and recommendations to encourage youth and women's involvement in aviation careers.[29] These reports direct recommendations to Congress, FAA, and the aviation industry. According to officials, FAA is determining how the recommendations from these efforts could be implemented. The agency also plans to provide updates annually on the status of those recommendations for each effort on FAA's webpage.

[29]In addition to responding to mandates in sections 602 and 612 of the 2018 reauthorization by establishing the Youth Access to American Jobs in Aviation Task Force and the Women in Aviation Advisory Board, FAA also wrote the Youth in Aviation Outreach Report summarizing its existing outreach efforts to students who are interested in science, technology, engineering, and math (STEM) careers, as required in Section 601 of the FAA Reauthorization Act of 2018. Pub. L. No.115-254, 132 Stat. 3185, 3400.

In addition, FAA is awarding grants to programs geared toward attracting young people to aviation careers. The Aviation Workforce Development Grant Program was mandated by section 625 of the 2018 FAA reauthorization and is aimed at investing in the aviation workforce by helping to support the education and recruitment of the next generation of aviation professionals. The law established separate grant programs for pilots and aviation maintenance workers.[30] The law also outlined dollar amount limits, eligibility requirements, and the authorization period for grant projects.[31]

In its initial round of funding in fiscal year 2022, FAA received more than 300 applications in total for the two programs. The agency awarded $5 million in funding to 16 recipients under the grant program for pilots. Additionally, FAA awarded $5 million to 15 recipients under the aviation maintenance grant program.[32] FAA announced $10 million in grant awards under the two programs in January 2022, and the period of performance for each recipient is 18 months, ending in July 2023. Upon project conclusion, recipients are required to submit grant closeout reports that document all progress and performance metrics.[33] FAA announced a second round of grant funding in April 2022, for which applications were accepted until June 2022.

Several stakeholders we interviewed for our draft report—including officials from a labor union, a repair station, and an airline—indicated support for the Aviation Workforce Development Grant Program.

[30]According to FAA, the intent of the grant program for pilots is to support meaningful education designed to help students become aircraft pilots, aerospace engineers, or drone operators. The intent of the aviation maintenance grant program is to expand the aviation maintenance workforce, establish education and apprenticeship opportunities, and support activities to facilitate the transition to careers in aviation maintenance, including members of the Armed Forces.

[31]According to section 625 of the FAA Reauthorization Act of 2018, each grant program is permitted to spend $5,000,000 each fiscal year, from 2019 to 2023. Each grant project is eligible to receive up to $500,000. The Aviation Workforce Development grant program has been authorized through fiscal year 2023.

[32]Eligible applicants include holders of a certificate issued under parts 21, 121, 135, or 145 of Title 14 C.F.R., or labor organizations representing aviation maintenance workers, accredited higher education or high schools, and state or local government entities.

[33]Recipients are required to submit several indicators semi-annually to allow FAA to track the performance of grant projects, including: (1) a detailed description of program activities and recruitment events; (2) the number of individuals who enrolled in the program; (3) the number of individuals who successfully completed the program; and (4) the number of participants who successfully completed application or certification requirements necessary to become a pilot or aviation maintenance technical worker.

However, these stakeholders expressed concerns about the amount of funding provided. For example, officials from one airline told us that the current funding provided for the program was likely not large enough to make a substantial impact.

Chairman Graves, Ranking Member Cohen, and Members of the Subcommittee, this completes my prepared remarks. I would be pleased to respond to any questions that you or other Members of the Subcommittee may have at this time.

GAO Contact and Staff Acknowledgements

If you or your staff have any questions about this statement, please contact me at (202) 512-2834 or krauseh@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this statement.

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