

Congress of the United States
U.S. House of Representatives
Committee on Small Business
2361 Rayburn House Office Building
Washington, DC 20515-6315

MEMORANDUM

TO: Members, Subcommittee on Innovation, Entrepreneurship, and Workforce Development
FROM: Jason Crow, Chairman
DATE: May 12, 2022
RE: Subcommittee Hearing: “Moving Upwards and Onwards: The Workforce and Innovation Needs of the Aviation and Aerospace Industry.”

The Committee on Small Business Subcommittee on Innovation, Entrepreneurship, and Workforce Development will meet for a hybrid hearing titled “Moving Upwards and Onwards: The Workforce and Innovation Needs of the Aviation and Aerospace Industry.” The hearing is scheduled to begin at **10:00 A.M. on Thursday, May 12, 2022, in person in 2360 Rayburn House Office Building and via the Zoom platform.**

The U.S. aviation and aerospace industry is an essential component of both the economy and national defense. Small entities comprise more than 90 percent of businesses in airline transportation, air transport support, and aviation manufacturing. For years, this industry has been struggling with workforce shortages, which were compounded by the COVID-19 pandemic. Moreover, the technological advancement in the sector means continual upskilling is needed to maintain the highly skilled STEM workforce. This hearing will explore innovation in the aviation and aerospace industry, examine workforce needs, and discuss policy solutions that will continue to drive innovation and ease the workforce shortage.

Panel

- The Honorable Eric Fanning, President, Aerospace Industries Association, Arlington, VA.
- Ms. M.L. Mackey, CEO, Beacon Interactive Systems, Division Chair, Small Business Division, National Defense Industries Association, Arlington, VA.
- Mr. Blake Scholl, CEO, Boom Aerospace, Denver, CO.
- Ms. Judy Burns, CEO, Patriot Machine, St. Charles, MO.

Background

The aviation and aerospace industry is a key component of American economic competitiveness and the foundation for billions of dollars in government contracts through the Department of Defense (DoD). It consists of numerous manufacturing companies that supply five markets: military aircraft, missiles, space, commercial airlines, and general aviation.¹ The U.S. aerospace industry is considered the largest in the world and supplies both military and civil aerospace

¹ INVESTOPEDIA, *What is the Aerospace Sector?*, Aug. 7, 2020.

hardware to the rest of the world. In 2020, the industry consisted of 2.09 million workers averaging roughly \$104,577 in wages and benefits and generating \$874 billion in total industry sales revenue.² The industry has a distinct focus on research and development (R&D), with roughly 25 percent of its workforce made up of highly skilled professionals like engineers, scientists, and technicians.³

The Aviation Industry Downturn

Commercial air travel took a significant dive due to the pandemic, with travel declining by 66 percent in 2020.⁴ While domestic air travel has steadily recovered from the pandemic, new variants and continued waves of infections have threatened this recovery. In January 2022, 528,070 flights operated, compared to the 619,099 in January 2019, approximately 85.3 percent of pre-pandemic levels.⁵ On-time arrivals were down to 75.3 percent in January 2022 from 78.4 percent in January 2019, and cancellations were up to 6.3 percent in January 2022, from 3.1 percent in January 2019.⁶

Production and manufacturing were pared back in conjunction with the drop in commercial airline traffic. Exports by the aerospace industry declined by 39 percent from 2019 to 2020, dropping by \$57.5 billion to a total of \$90 billion.⁷ The industry saw a net loss of more than 87,000 employees, which it is now struggling to reboard as demand returns.⁸ Despite the downturn on the commercial side, defense spending prevented the industry from suffering greater losses. Programs like the Paycheck Protection Program provided relief to small manufacturers and prevented commercial airliners from failing.⁹ As a result, the supply chain was largely able to stay intact.

The Small Business Labor Shortage

While roughly 93 percent of jobs lost in the early days of the pandemic have returned, workforce participation has yet to return to pre-pandemic levels for several reasons.¹⁰ A reduction in legal immigration, accompanied by a surge in early retirements among the baby-boomer generation and a lack of childcare to support working parents created a slow return to the workforce. There are roughly two jobs available for every unemployed individual, a situation that Federal Reserve Chairman Jerome Powell has called “tight to an unhealthy level.”¹¹

Small businesses generally face greater workforce issues than do larger businesses. Fundamental barriers include limited financial and staff resources to assist in filling vacancies, retaining

² AEROSPACE INDUSTRIES ASSOCIATION, *2021 Facts & Figures: US Aerospace & Defense*.

³ *Supra* note 1.

⁴ Richard Abouafia, *The Aviation Supply Chain: Challenges and Responses, Testimony Before the U.S. Senate Committee on Commerce, Science, and Transportation* <https://www.commerce.senate.gov/services/files/35E5752F-45D7-47CA-BC09-6E6FF1817913>

⁵ U.S. DEPT. OF TRANSPORTATION, *Air Travel Consumer Report: January 2021*, April 13, 2022. <https://www.transportation.gov/briefing-room/air-travel-consumer-report-january-2022-numbers>

⁶ *Id.*

⁷ *Supra* note 2.

⁸ *Id.*

⁹ *Supra* note 4.

¹⁰ Talmon Joseph Smith, *Strong Job Gains in March Keep a Flame Under the Recovery*, NEW YORK TIMES, April 1, 2022. <https://www.nytimes.com/2022/04/01/business/economy/jobs-report-march-2022.html>

¹¹ CNBC, *The Labor Market Is Tight to an Unhealthy Level, Says Fed Chair Powell*, March 16, 2022. <https://www.cnbc.com/video/2022/03/16/the-labor-market-is-tight-to-an-unhealthy-level-says-fed-chair-powell.html>

employees, and developing advanced skills. In addition, previous studies have found that small firms may lack the resources, such as information, understanding, and financial resources, necessary to benefit from federal, state, and local workforce development programs. Small enterprises tend to focus on more immediate, bottom-line, issues, not recognizing the impact of staffing training, or employee retention. Small firms have not been spared from the most recent labor shortage and are continuing to struggle with attracting and retaining a qualified workforce.

The Workforce in the Aviation and Aerospace Industry

Many of the problems faced by the aviation and aerospace workforce today are issues that predate the pandemic. An aging workforce and a rapidly changing nature of work are causing the industry to face a retirement cliff in the coming years. Advances in innovation in the industry are creating a need for constant upskilling among the workforce to keep up. Moreover, businesses in this industry are often forced to compete for a highly skilled STEM workforce with Silicon Valley startups that are innovating in the tech sector.

In response to continued shortages in their labor pool, the Aerospace Industry Association (AIA) commissioned a workforce study in partnership with Ernst and Young (EY).¹² The report contains insightful data into areas in which the industry can improve to expand their labor pool. First, the industry is largely dominated by white males. Currently, only 25 percent of workers in the Aerospace and Defense (A&D) industry are women.¹³ While 30 percent of the A&D workforce is minority, only 5.3 percent of the workforce is black, 3.6 percent Hispanic, and 5.6 percent Asian. In response, the industry is focusing on increasing diversity, equity, and inclusion (DEI) to increase the pool of available labor.¹⁴ While these numbers are low, they have been moving in the right direction over the past few years and are part of the industry's core mission to increase the workforce moving forward.

Moreover, the industry is also experiencing the changing preferences of younger workers in the face of the COVID-19 pandemic, such as the value those companies provide to society, and the flexibility and benefits those companies provide. For instance, many workers are interested in working at a company that provides flexibility in working hours and the ability to work from home if possible. Workers who can work off-site often prefer having a hybrid work environment, where they can interact with others, but also enjoy the benefits of working from home.

Pilot Shortage

The aviation industry is facing a growing shortage of qualified pilots. In fact, this problem has been growing for years. According to the Federal Aviation Administration, there were about 827,000 pilots in America in 1987, but this number has decreased to only 720,605 in 2021.¹⁵ In a 2019 Oliver Wyman poll of flight operations leaders, 62 percent listed a shortage of qualified pilots

¹² AEROSPACE INDUSTRIES ASSN. AND ERNST AND YOUNG, *2021 Aerospace and Defense (A&D) Workforce Study*, 2021.

¹³ *Id.*

¹⁴ *Id.*

¹⁵ U.S. FEDERAL AVIATION ADMINISTRATION, *U.S. Civil Airmen Statistics*, 2021.

https://www.faa.gov/data_research/aviation_data_statistics/civil_airmen_statistics/#:~:text=An%20active%20airman%20is%20one,flight%20navigators%2C%20and%20flight%20engineers.

as a key risk.¹⁶ Boeing projected a need to hire 804,000 new civil aviation pilots by 2038.¹⁷ The reasons for the pilot shortage differ by region, however they largely reflect both the wave of retirements and cost of training new pilots. Staffing shortages for both pilots and support staff are causing headaches for travelers, who have faced record flight cancellations throughout early 2022.¹⁸

Similarly, a study conducted by the University of North Dakota (UND) in collaboration with the Helicopter Association International (HAI), forecasts a shortage of 7,649 helicopter pilots between 2018 and 2036 in the United States: approximately half of the respondents surveyed reported increasing difficulty finding qualified pilots and believe this pilot shortage will curtail business growth plans.¹⁹ A comprehensive airline transport pilot study conducted by the RAND organization in 2015 found that low-paying airlines will continue experiencing difficulty recruiting qualified pilots, which may manifest in safety issues, disrupt cargo shipments, and impact the traveling public.²⁰ To underscore the point, the study also notes that “a significant pilot shortage would deliver an economic shock to the civil air transport industry. This shock would reverberate throughout the overall U.S. economy.”²¹

The military is not immune to this shortage – the RAND study estimates a loss in military pilots as major airline hiring increases, which will impact the United States Navy and Air Force pilot population.²² The study predicted a 10 percent Navy pilot shortfall by 2020 and a shortage of 1,000 Air Force pilots by 2022.²³ This dearth of pilots is felt acutely by small airline companies, including those operating at the regional airline level. Regional airlines are smaller subcontractors flying under the identities of the major carrier²⁴ they align with and operate a significant portion of domestic flights on behalf of the major carrier.

Mechanic Shortage

Compounding the negative impact of the pilot shortage is the looming threat of a shortage of aviation mechanics, undermining the inevitable expansion and modernization of United States airline fleets given innovation in this field. The UND-HAI study previously mentioned warns of large-scale deficits in the number of certified mechanics, projecting “a shortage of 40,613 certified aviation [helicopter] mechanics in the United States between 2018 and 2036.”²⁵ The Boeing study also stresses the need to grow the airline technician workforce, estimating a global need of 769,000

¹⁶ Geoff Murray, *After COVID-19, Aviation Faces A Pilot Shortage*, OliverWyman, March 2021.

<https://www.oliverwyman.com/our-expertise/insights/2021/mar/after-covid-19-aviation-faces-a-pilot-shortage.html>

¹⁷ BOEING, *Pilot and Technician Outlook 2019-2038*, 2019. https://flightsafety.org/wp-content/uploads/2019/07/2019_pto_infographic.pdf

¹⁸ Megan Schaltegger, *Mass U.S. Flight Cancellations Could Continue into the Summer*, THRILLIST, April 12, 2022. <https://www.thrillist.com/news/nation/flight-cancellations-continue-summer-staffing-shortages>

¹⁹ UNIVERSITY OF NORTH DAKOTA & HELICOPTER ASSOCIATION INTERNATIONAL, EXECUTIVE SUMMARY, (on file with the Committee).

²⁰ Michael McGee, *Air Transport Pilot Supply and Demand: Current State and Effects of Recent Legislation*, RAND ORG. xiii (March 2015).

²¹ *Id.*

²² *Id.*

²³ *Id.*

²⁴ Major carriers are those most familiar: i.e., American Airlines, United, Delta, Southwest, JetBlue, etc.

²⁵ AVIATION PROS, IT'S OFFICIAL: ROTORCRAFT PILOT AND MECHANIC SHORTAGE VERIFIED, (Mar. 1, 2018).

new technicians by 2038. While the Asia-Pacific region faces the largest shortfall, North America comes in second place for workforce needs.

While the industry was expecting this shortage long before COVID-19, the pandemic exacerbated existing issues. Downsizing of the maintenance worker labor force happened as demand for airlines diminished in early 2020, but those initial layoffs are now negatively impacting the industry's ability to meet demand. Oliver Wyman projected in 2017 that a growing gap between supply of mechanics and demand for them would develop in the United States throughout this year and reach a peak of 9 percent by 2022.²⁶ In the U.S., the median age of aviation mechanics is 51 years old, 9 years older than the median age of the broader U.S. workforce.²⁷

Workforce Development in Aviation and Aerospace

Due to its importance not only to the economy but also national security, the federal government currently has two grant programs for aviation workforce development through fiscal year 2023. The FAA Reauthorization Act of 2018 and the National Defense Authorization Act for Fiscal Year 2020 both added training grants for the pilot workforce alongside aviation maintenance technical workers.²⁸ These grants go to both academia and the aviation community to help prepare a more inclusive pool of pilots and aviation maintenance technicians.

Apprenticeships

One training model continuing to be embraced by the aerospace industry is the apprenticeship training model, which embraces both work-based training alongside classroom education. The EY report cited above recommended the need for the aerospace and aviation industry to establish and maintain educational partners to engage with young people and facilitate apprenticeship programs.

Innovation, Competition, and Supply Chains

As demand continues to return for the goods and services provided by the aviation and aerospace industry, supply chain disruptions continue to be a significant challenge in its recovery. The aviation industry paid 27 to 44 percent more for raw materials in the first half of 2021 compared to 2020.²⁹ Because of the complexity of aircrafts and specialized needs of each individual part, large manufacturers are often dependent on a large number of sole source suppliers. While this can leave the large companies liable to disruptions in the supply chain, it also emphasizes the importance of all the small firms that add the bulk of value in a commercial jet, helicopter, or any other type of aircraft. Moreover, most of the innovation that happens in the aerospace industry takes place among the suppliers.³⁰ While the shells of many aircrafts appear the same as they did

²⁶ OLIVER WYMAN, *Aviation Growth is Outpacing Labor Supply*, 2017. <https://www.oliverwyman.com/our-expertise/insights/2017/sep/oliver-wyman-transport-and-logistics-2017/operations/aviation-growth-is-outpacing-labor-capacity.html>

²⁷ Id.

²⁸ U.S. FEDERAL AVIATION ADMINISTRATION, *Aviation workforce Development Grants*. https://www.faa.gov/about/office_org/headquarters_offices/ang/grants/awd

²⁹ Allison Lampert and Rajesh Kumar Singh, *Aviation Supply Chain Faces mounting Strain as Demand Picks Up*, REUTERS, Oct. 15, 2021. <https://www.reuters.com/business/aerospace-defense/aviation-supply-chain-faces-mounting-strain-demand-picks-up-2021-10-15/>

³⁰ *Supra* note 4.

when they were introduced, the internal components have undergone drastic innovation, often leading to increased reliability and fuel efficiency.

Because commercializing new technology is so capital intensive in the aviation and aerospace industry, major firms in the industry have consolidated over the past several decades. According to the DoD, the defense sector has consolidated substantially since the 1990s, transitioning from 51 to 5 aerospace and defense prime contractors.³¹ Over these three decades, the number of suppliers for fixed wing aircraft has declined from 8 to 3, and the satellite suppliers have halved from 8 to 4.³² While the amount of money the DoD has spent with small businesses reached an all-time high of \$80.3 billion in 2021, with 45 percent of awards going to disadvantaged or women-owned businesses, the number of small businesses in the defense industrial base has shrunk by over 40 percent in the past 10 years.³³

Competition within the defense industrial base is critical to national and economic security, contributing to innovation, lower prices, and better quality. Programs like the Small Business Innovation Research (SBIR), Small Business Technology Transfer (STTR), and the Mentor Protégé Programs are crucial to providing innovative businesses with access to startup capital and helping them to win awards with the DoD. A recent study of SBIR/STTR programs found that the DoD achieved a 22-to-1 return on investment in small business R&D over the last 23 years and generated \$347 billion in total economic output nationwide.³⁴ The House-passed American COMPETES Act would extend the SBIR/STTR programs, which currently expire September 30, 2022, for five years.

Conclusion

The aviation and aerospace industry is a crucial aspect of the American economy and national security. It faced a severe economic impact because of the pandemic, particularly in commercial aviation which experienced significant drops in consumer demand. As the industry has worked to recover, consumer demand has now outstripped supply, and airlines are struggling to hire back pilots and maintenance workers after initial layoffs throughout 2020. Moreover, the industry is experiencing shortages among its highly skilled STEM workforce, for which it must compete with other industries, like tech, who were not as severely impacted by the pandemic. The industry also faces many of the same supply chain issues and cost increases that are hurting American businesses across the board. This hearing will examine issues of innovation and workforce shortages experienced by the aviation and aerospace industry and discuss potential solutions and legislative fixes that can aid its recovery.

³¹ U.S. DEPT. OF DEFENSE, *State of Competition within the Defense Industrial Base*, February 2022.
<https://media.defense.gov/2022/Feb/15/2002939087/-1/-1/1/STATE-OF-COMPETITION-WITHIN-THE-DEFENSE-INDUSTRIAL-BASE.PDF>

³² *Id.*

³³ *Id.*

³⁴ *Id.*