



PIPELINE REPORT

DECEMBER 2018

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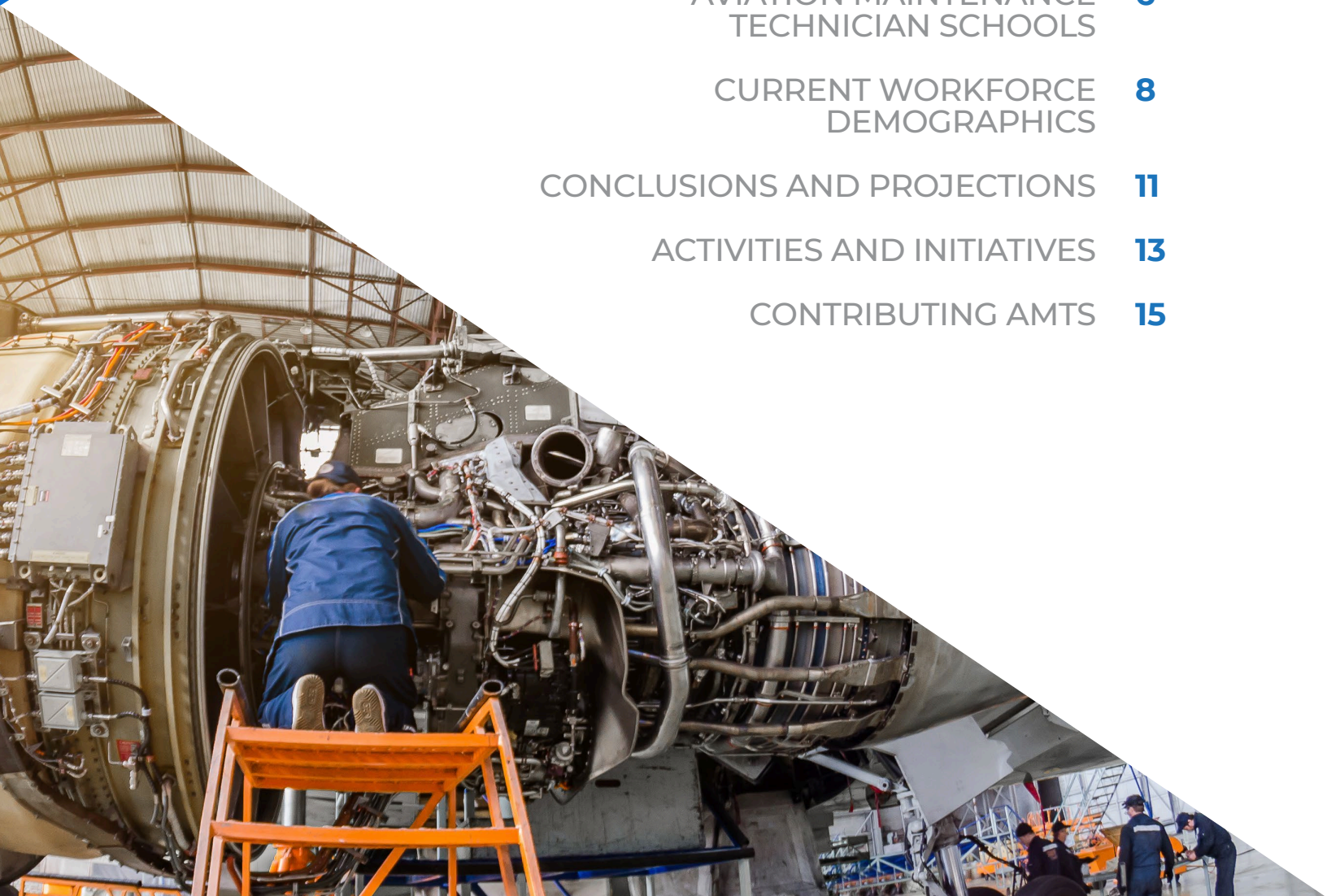
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OVERVIEW

Each year the Aviation Technician Education Council (ATEC) compiles information about Federal Aviation Administration (FAA) airframe and powerplant (A&P) mechanic certificate holders, the aviation maintenance technician schools (AMTS) that prepare the majority of those individuals for careers in aviation maintenance, and the companies that employ maintenance professionals. These compilations are published annually as The Pipeline Report.

The purpose of the report is to identify workforce trends and propose some solutions to help meet the growing workforce demand. The report's key conclusions:

- Mechanics continue to retire faster than they are being replaced. ATEC's model projects that the mechanic population will decrease 5% in the next 15 years. New entrants make up 2% of the population annually, while 30% of the workforce is at or near retirement age. Meanwhile, forecasts by the U.S. government and Boeing project a need for thousands of additional mechanics in the next 10-20 years.
- Schools have the capacity to help close this gap. Right now, only 1 in 2 seats in technical schools are taken, meaning that today, an additional 17,000 students can be accommodated without any school expansion. While institutions are ramping up recruitment activities and expect enrollment to increase, there is significant opportunity for industry employers to help define career paths and attract more students into the pipeline.
- In 2017, the number of students choosing non-aviation jobs over their aviation counterpart dropped by nearly half over the previous year. More good news: seventy percent of A&P students are taking the FAA mechanic exam upon graduation, a 10-point increase over the previous two years.
- AMTS are facing their own workforce challenges. Hiring and maintaining qualified instructors is the number one threat to increased enrollments. Negative perceptions and a lack of career awareness is also adversely impacting student recruitment efforts, suggesting the time is ripe for development of a national campaign to increase knowledge and understanding of aviation technical careers.



SOURCE: AVIATION INSTITUTE
OF MAINTENANCE

DATA SOURCES

AMTS data was gathered through an ATEC-conducted survey of educational institutions holding an FAA certificate, issued under Title 14 Code of Federal Regulations part 147.

While all schools with technical programs were eligible to participate in the AMTS survey, most questions focused on A&P program and graduate demographics.

In total, 57% of all FAA-certificated AMTS participated in the questionnaire; a list of contributing institutions is included in Appendix 1. Ninety-four percent of respondents submitted complete answers used to compile this report. (Data gathered also populates ATEC's [online maintenance school directory](#).)

Additional data was gathered from the [National Center for Education Statistics](#) and FAA sources including airmen certification branch personnel, the [maintenance school database](#), [US Civil Airmen Statistics](#), [Regional Active Airman Tables](#), [FAA data downloads](#), and the [airman certification database](#).

The information in this report is based on data available as of Nov. 15, 2018.



SOURCE: TULSATECH



SOURCE: SOUTHERN UTAH UNIVERSITY

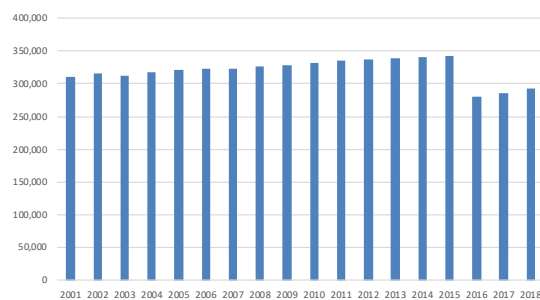
CURRENT AND PROJECTED WORKFORCE

Mechanic Population

The FAA airman database includes 292,730 certificated mechanics. **Females make up 2.4% of the population, a statistic that has barely moved in the last 15 years.**

The FAA does not track whether mechanic certificate holders are working within the U.S. or actively performing maintenance. Certificated mechanics are removed from the airman database only when the agency receives notification of death, the certificate is suspended or revoked, or the mechanic turns 90 years of age. Therefore, the number of active mechanics is likely significantly lower than the number derived from the data source.

Figure 1: Active FAA Mechanic Certificates



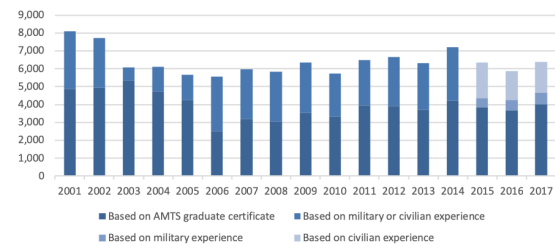
SOURCE: FAA US CIVIL AIRMAN STATISTICS

Factoring out administrative adjustments made in 2016¹, the number of certificated mechanics has steadily increased 1-2% a year since 2001 (see Figure 1). The trend is not expected to continue with an anticipated exodus of seasoned maintenance professionals fast approaching.

Of the 6,401 mechanics certificated in 2017, 63% obtained certification based on completion of an AMTS program, 10% based on mil-

itary experience, and 27% based on civilian experience. That distribution has been fairly consistent since the FAA started tracking the breakdown in 2015.

Figure 2: New Mechanic Certificates



SOURCE: FAA AIRMAN CERTIFICATION BRANCH

Employer Personnel Demographics

While the airman database is an important source of information for identifying and analyzing mechanic population and pipeline trends, a more accurate representation of the current workforce may be derived from analysis of air agency employee reports.

Forty-one percent of all FAA mechanic certificate holders—121,290 individuals—are accounted for in FAA databases² reporting employees that work in general aviation³, or for repair stations, air carriers⁴, or AMTS.

¹In 2016, the number of certificated mechanics dropped nearly 20% after the agency removed all mechanics that had not applied for the required plastic certificate (see § 65.15(d)).

²The dataset does not include certificated employees of design approval holders, those that work as maintenance contractors, or those employed elsewhere in the supply chain.

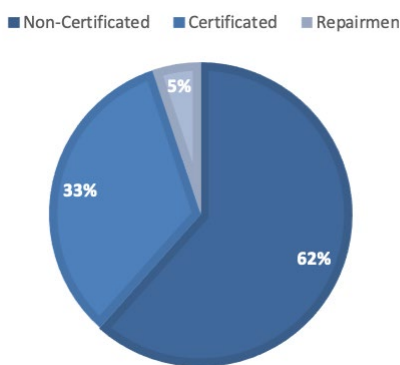
³Includes entities certificated under 14 CFR parts 91, 133 and 137.

⁴Includes entities certificated under 14 CFR parts 121, 125, 129 and 135.

CURRENT AND PROJECTED WORKFORCE

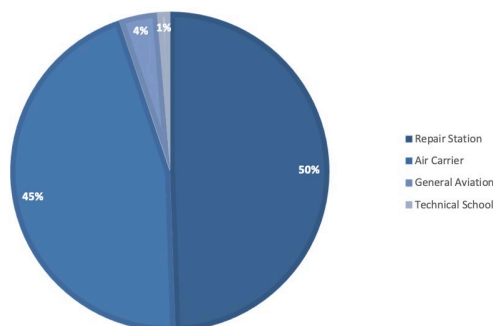
Certificated mechanics make up 33% of the aviation technical personnel working in these segments (see Figure 3). Of the certificated mechanic subset, half are employed by repair stations (see Figure 4).

Figure 3: Reporting Segment Personnel Demographics



SOURCE: FAA DATA DOWNLOAD FOR REPAIR STATIONS AND AIR OPERATORS

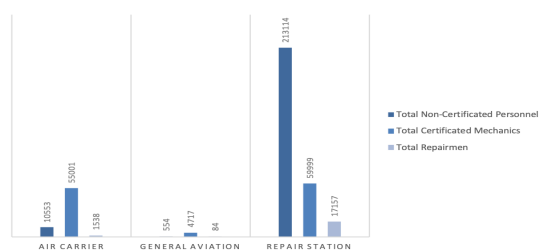
Figure 4: Certificated Mechanic Employers



SOURCE: FAA DATA DOWNLOAD FOR REPAIR STATIONS AND AIR OPERATORS

Certificated mechanics make up 82% of the air operator maintenance workforce, 21% of the repair station workforce, and 88% of the general aviation workforce.

Figure 5: Personnel Demographics by Industry Segment



SOURCE: FAA DATA DOWNLOAD FOR REPAIR STATIONS AND AIR OPERATORS



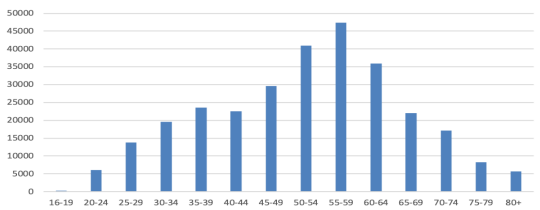
SOURCE: AVIATION INSTITUTE OF MAINTENANCE

CURRENT AND PROJECTED WORKFORCE

The Gray Wave

The average age of an FAA mechanic is 51, nine years older than the median age for a U.S. worker as reported by the Bureau of Labor Statistics. Thirty percent of the mechanic population is age 60 or above—up 3% from a year ago.

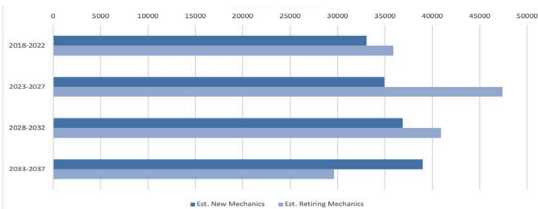
Figure 6: Mechanic Age Distribution



SOURCE: FAA AIRMEN CERTIFICATION BRANCH

New entrants are not keeping pace with retiring personnel. Year-over-year, newly-certificated mechanics make up only 2% of the entire population. Using the ten-year average rate of change for new mechanics (1.1%), and assuming an average retirement age of 65, departing mechanics are expected to outpace entering mechanics 4:3 through 2037 (see Figure 7).

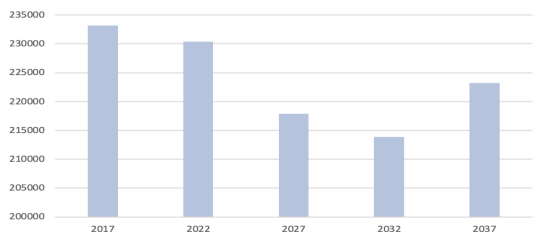
Figure 7: Estimated New vs. Retiring Mechanics



SOURCE: FAA AIRMEN CERTIFICATION BRANCH AGE DISTRIBUTION DATA SET AND FAA US CIVIL AIRMEN STATISTICS

Using this model, the mechanic population is expected to decrease 4.25% by the year 2037.

Figure 8: Estimated Mechanic Population (Age < 65)



SOURCE: FAA AIRMEN CERTIFICATION BRANCH AGE DISTRIBUTION DATA SET AND FAA US CIVIL AIRMEN STATISTICS



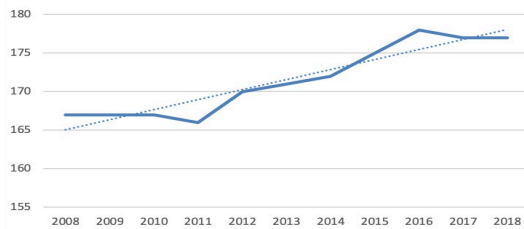
SOURCE: TULSATECH

AVIATION MAINTENANCE TECHNICIAN SCHOOLS

Population and enrollment

FAA-certificated AMTS produce the majority of new mechanics. There are 177 active part 147 certificates listed in the FAA maintenance school database; of those, approximately 172 schools are enrolling students. The number of certificated schools has generally trended up, increasing 6% over the last ten years (see Figure 9).

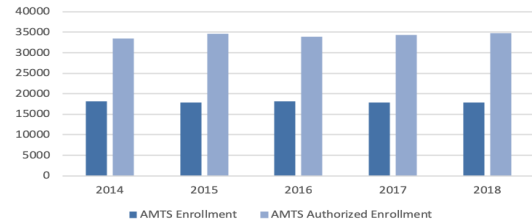
Figure 9: Aviation Maintenance Technician Schools



SOURCE: FAA MECHANIC SCHOOL DATA DOWNLOAD

According to FAA data, total AMTS enrollment capacity is 34,769, up 4% since 2014. The agency reports total current enrollment for all A&P programs at 17,872, a decline of nearly 2% since 2014. Using FAA numbers, the AMTS student enrollment load factor is 51%.

Figure 10: AMTS Enrollment



SOURCE: FAA MECHANIC SCHOOL DATA DOWNLOAD

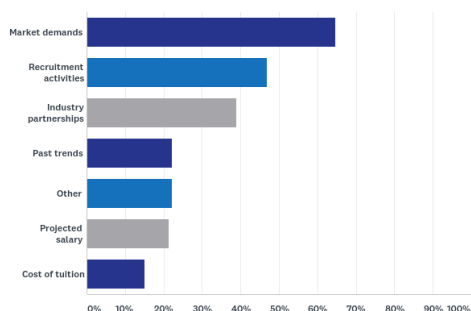
Schools responding to the ATEC survey reported 7% higher enrollment than what is reflected in agency databases, suggesting the actual **AMTS load factor is closer to 55%**. Even with the adjustment, enrollment and capacity has remained relatively flat over the last five years.

The majority of respondents anticipate 2018 graduate output to increase 10% over the previous year, and another 11% in 2019. Anticipated enrollment is also expected to grow—87% of participating schools said as much, estimating new entrants will increase by an average of 40%.

AVIATION MAINTENANCE TECHNICIAN SCHOOLS

When asked about the driver for enrollment predictions, the majority of respondents pointed to changing market demands and increases in student-recruitment activities. Those that selected “other” cited program capacity limitations.

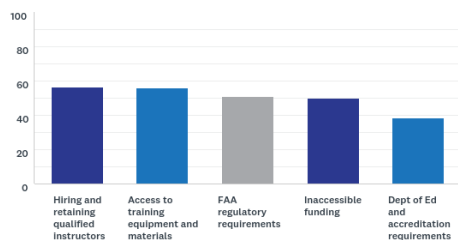
Figure 11: What drives the predicted change in A&P enrollment?



SOURCE: ATEC SURVEY

When asked about the most concerning threat to their technical programs, AMTS pointed first to hiring and retaining qualified instructors, then to limited access to training equipment. What was historically the top threat—inaccessible program funding—came in fourth.

Figure 12: How concerning are the following threats to your institution?

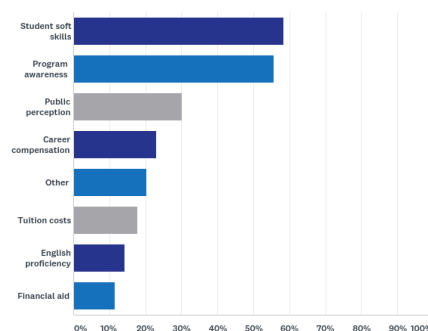


SOURCE: ATEC SURVEY (REPORTED AS RESPONSE WEIGHTED AVERAGE)

The number one reported challenge to recruit, accept, retain or graduate technical program students is insufficient student soft skills (i.e., attitude, communication, work ethic, time management, etc.).

Second on the list of recruitment challenges: more than half of respondents cited pro-program awareness, and nearly a third pointed to negative public perception about aviation maintenance careers.

Figure 13: Top Barriers to Recruit, Retain and Graduate Technical Program Students



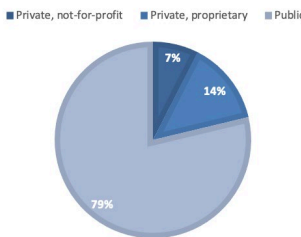
SOURCE: ATEC SURVEY

CURRENT WORKFORCE DEMOGRAPHICS

Demographics

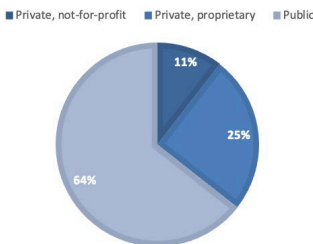
The vast majority of educational institutions with A&P programs—nearly 80%—are public institutions. While private schools make up only 21% of the population, they enroll 36% of all A&P students.

Figure 14: AMTS Type



SOURCE: NATIONAL CENTER FOR EDUCATION STATISTICS.

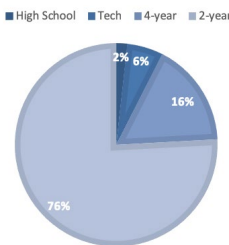
Figure 15: Enrollment by Type



SOURCE: NATIONAL CENTER FOR EDUCATION STATISTICS

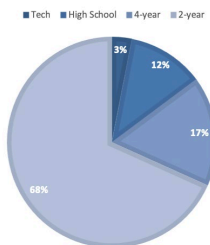
The vast majority of A&P programs and their enrollees reside in two-year institutions. High school certificated programs make up 6% of the AMTS population and produce 12% of the students.

Figure 16: AMTS Type



SOURCE: NATIONAL CENTER FOR EDUCATION STATISTICS.

Figure 17: Enrollment By Type

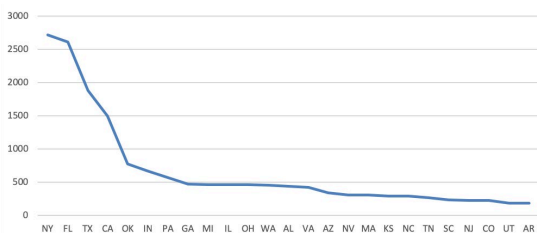


SOURCE: NATIONAL CENTER FOR EDUCATION STATISTICS.

A few schools dominate overall enrollment. Thirty-four percent of all A&P students are enrolled at the 10 largest institutions. The AMTS community is therefore composed mostly of smaller institutions, with half of AMTS reporting 50 or fewer enrollments.

Forty-eight percent of A&P students reside in New York, Florida, Texas or California.

Figure 18: Enrollment by State (Top 25)



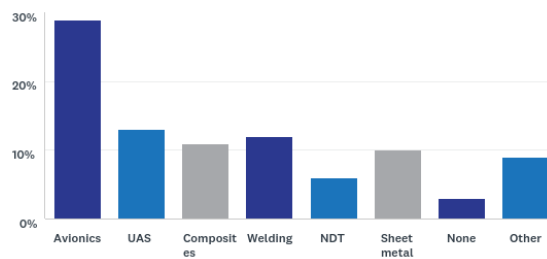
SOURCE: FAA MAINTENANCE SCHOOL DATABASE AND ATEC SURVEY

CURRENT WORKFORCE DEMOGRAPHICS

Programs and Degrees Offered

To meet the growing demand for specialized services, more than a third of AMTS provide stand-alone, aviation-related programs outside its A&P program, including avionics, unmanned aircraft systems, composites, welding, non-destructive testing, and sheet metal.⁵

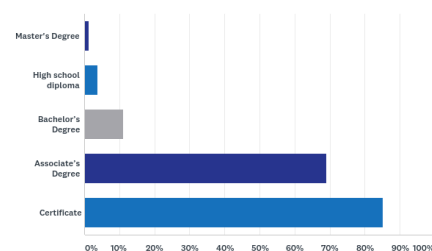
Figure 19: Specialty Program Offerings



SOURCE: ATEC SURVEY

While almost all schools offer graduating AMTS students a diploma or certificate, nearly 70% of institutions couple the program with an Associate's degree.

Figure 20: A&P Program Awards and Degrees Offered



SOURCE: ATEC SURVEY

Graduates

Survey respondents reported an average graduation rate of 73% for A&P students. The average age of an A&P graduate is 25. Twenty-

two percent of graduates are veterans and 8% are female.

Of those eligible for placement, 63% of graduates had a job offer upon graduation.

New AMTs are willing to relocate for their careers. Of those with a job offer upon graduation, nearly 35% moved outside the school's geographic location.

The number of students securing employment in other industries continues to decrease, AMTS respondents estimate that only 13% of 2017 graduates took jobs outside aviation.

AMTS also report that **70% of 2017 graduates took the FAA test for A&P mechanic certification**, up from a reported 60% in 2017 and 2016.

When asked what the most significant barrier was for a graduating student to obtain a mechanic certificate, 50% of respondents cited testing costs (see Figure 20).

Another testing deterrent was the lure of opportunities that do not require a mechanic certificate as a condition of employment. Respondent comments suggested that in many instances, jobs not requiring an A&P had more competitive compensation packages.

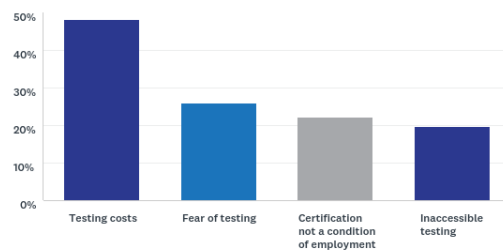
Twenty percent of respondents cited unavailable or inaccessible Designated Mechanic Examiners (DME), a recurring theme for many schools that do not have enough

⁵The ATEC online school directory includes certificate programs offered for each school that responded to the ATEC survey. For more information visit <https://www.atec-amt.org/schools.html>.

CURRENT WORKFORCE DEMOGRAPHICS

examiners to handle the demand, or for schools that do not have a DME in the local geographic area.

Figure 21: What are the most significant barriers for mechanic testing?

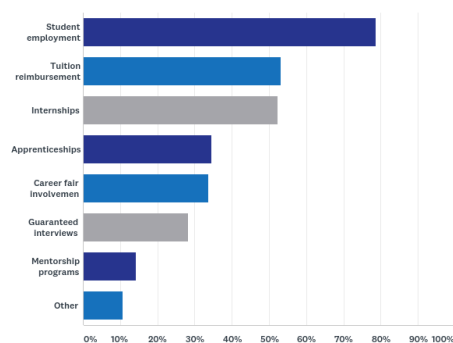


SOURCE: ATEC SURVEY

Student Employers

When asked what type of corporate involvement proves most successful for recruitment purposes, schools overwhelmingly pointed to student employment opportunities while enrolled in a technical aviation program.

Figure 22: What best entices a student to seek out a particular employer?

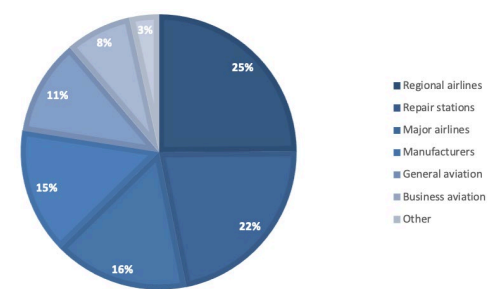


SOURCE: ATEC SURVEY

For entry-level positions, AMTS report that regional airlines employed the most graduates in 2017, followed closely by repair stations. Employment of new graduates by major airlines saw the largest jump, up 10% over

2017 estimates. Repair station employment dropped 10% compared to last year's figures.

Figure 23: AMTS Graduate Placement



SOURCE: ATEC SURVEY

Survey respondents report an **average starting hourly rate for AMTS alumni at \$19.70** per hour, up 40¢ (2%) from last year. The Bureau of Labor Statistics reports median pay for all aircraft mechanics and technicians—both certificated and non-certificated—at \$29.45 per hour.⁶

⁶Bureau of Labor Statistics Occupational Outlook Handbook, Aircraft and Avionics Equipment Mechanics and Technicians, available at <https://www.bls.gov/ooh/installation-maintenance-and-repair/aircraft-and-avionics-equipment-mechanics-and-technicians.htm>.

CONCLUSIONS AND PROJECTIONS

The overall mechanic population is expected to drop over the next two decades. Even if an anticipated increase in enrollments comes to fruition, supply will not meet projected demand.

The Bureau of Labor Statistics estimates aviation maintenance career opportunities will grow 5% in the next decade, amounting to 12,400 new job openings. The Boeing Company estimates are more drastic; the company predicts that the commercial, helicopter and business aviation industries combined will require 189,000 new technicians by 2037 in North America alone⁷.

Demand estimates intensified by the anticipated replacement deficit suggest AMTS will need to increase production by 30% in the next 20 years⁸.

AMTS are facing their own workforce challenges, hiring and maintaining qualified instructors is a threat to increasing enrollments.

Eighty-seven percent of participating schools said they expect enrollment to increase next year, by an aggressive 40%. The optimism has markedly increased since the 2015 survey, when only 55% of respondents shared that same expectation. In 2017, 83% of respondents said they expect enrollment to increase.

While it appears, based on FAA authorized enrollment numbers, that A&P programs have the capacity to almost double enrollment, that possibility is largely dependent on the community's ability to overcome limiting factors, such as keeping pace with an anticipated increase in demand for instructors.

Partnership programs are successfully combating the loss of mechanic students to other industries.

The workforce bleed appears to be clotting. For the last two years, the number of A&P students taking jobs outside aviation has dropped. This year, schools report that of those with offers upon graduation, only 13% took a job outside aviation. The percentage is much improved over the 25% reported in 2015 and 2016, and 20% in 2017.

Partnership programs between AMTS and industry are on the rise, suggesting that the community is doing a better job of defining career paths for students, and consequently, retaining future aviators already in the pipeline.



SOURCE: WAYNE COMMUNITY COLLEGE

⁷Includes certificated and non-certificated personnel needs for commercial, rotorcraft and business aviation. It does not include workforce need projections for manufacturing or any entity in the supply chain.

⁸ATEC's model used current employer demographics to adjust demand projections for certificated personnel needs in the U.S. It assumes that the majority of North American estimated demand derives from the U.S., that the average distribution of certificated vs. non-certificated personnel holds constant across all sectors of aviation, and that new certificates issued on the basis of military and civilian experience will stay constant through 2037.

CONCLUSIONS AND PROJECTIONS

While more students are taking the mechanic exam; testing costs and accessibility are top deterrents.

One of the biggest takeaways from previous reports was the mind-boggling stat that only 60% of A&P candidates—those already in the aviation career pipeline—pursue a mechanic certificate. That number was consistent in 2016 and 2017, but in 2018, schools reported an uptick: 70% of A&P grads elected to take the FAA test for mechanic certification.

Combatting top deterrents—including testing costs and access to mechanic examiners—should be the focus of industry-education partnerships looking to capitalize on the momentum.

Negative perceptions and a lack of awareness about maintenance careers is adversely impacting AMTS student recruitment.

When asked about challenges impacting a school's ability to recruit students into its program, more than half of respondents cited program awareness, and nearly a third pointed to negative public perception about aviation maintenance careers.

Smaller schools—which make up the majority of AMTS—are less likely to implement their own marketing campaign to sell aviation technical programs and post-graduation career opportunities. A national campaign to support local recruitment efforts could alleviate some of these barriers.



SOURCE: NATIONAL AVIATION ACADEMY

ACTIVITIES AND INITIATIVES

ATEC survey results support the common assertion that industry-education partnerships are one of the best recruitment tools for careers in maintenance. The trade association will therefore continue to support development of strategic partnerships.

In 2019, ATEC will hold its third employer-educator networking event in conjunction with the annual conference. The [Employer Link](#) provides an opportunity for recruiters and workforce development personnel to network with instructors and administrators and forge new relationships. The reception (which follows ATEC's first ever student career fair) supplements an annual conference agenda chock-full of best practices, tools and resources to support industry-education partnerships.

ATEC is also facilitating a new industry-led initiative, Choose Aerospace. The campaign is a partnership of aerospace stakeholders joined together to address one of the biggest threats to continued industry growth: the availability of a diverse, qualified technical workforce.

The initiative aims to unite companies, associations, labor unions, and educational institutions; to spur interest in aerospace careers; and to identify and implement solutions to the aerospace workforce shortage. To get involved, visit www.chooseaerospace.org.

For more information about ATEC activities and initiatives addressing several other issues identified in this report, visit our website and sign up to receive our monthly newsletter at www.atec-amt.org.

ABOUT ATEC

ATEC is a partnership of aviation maintenance training schools and employers. The council is dedicated to promoting and supporting technician education through its communications, advocacy programs and networking events.

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GET INVOLVED, OR GET GROUNDED.

While the aviation industry is poised for continuous growth, a massive shortage of a qualified technical workforce threatens to clip our wings.

30% OF AVIATION TECHS
ARE NEAR OR AT
RETIREMENT¹



ONLY 2% OF THE
WORKFORCE
REPLACED ANNUALLY¹

754,000 NEW TECHS
ARE NEEDED WORLDWIDE
TO MAINTAIN FLEETS
OVER THE NEXT TWO DECADES²



2022 IS THE PROJECTED
**YEAR OF CRITICAL
SHORTFALL**³



CHOOSE **AEROSPACE.**

Now is the time to act. Choose Aerospace is a partnership of aviation stakeholders, joined together to address this threat. We are preparing to deploy a thoughtful, measurable recruitment campaign that targets likely candidates and refills our pipelines—to ensure we stay in the air for decades to come.

CHOOSEAEROSPACE.ORG

CONTRIBUTING AMTS

Alabama Aviation College - Mobile

Antelope Valley College

Aviation High School

Aviation Institute of Maintenance - Atlanta

Aviation Institute of Maintenance - Houston

Aviation Institute of Maintenance - Orlando

Baton Rouge Community College

Big Bend Community College

Boynton Beach Community High School

Broward College

Burlington Technical Center

Central New Mexico Community College

Chaffey College

Cincinnati State Technical and Community College

Clover Park Technical College

College of Alameda

Colorado Northwestern Community College

Columbus State Community College

Del Mar College

Des Moines Public Schools - Aviation Technology

Embry-Riddle Aeronautical University

Florida State College at Jacksonville

Fox Valley Technical College

Gavilan College

George Stone Technical Center

George T. Baker Aviation Technical College

Georgia Northwestern Technical College

Gordon Cooper Technology Center

Greenville Technical College

Guilford Technical Community College

Hinds Community College

Idaho State University

Indian Hills Community College

Iowa Western Community College

Ivy Tech Community College

Kansas State University Polytechnic Campus

Lake Area Technical Institute

Lane Community College

Lansing Community College

Lewis University

Lewis Wilson Technology Center

Liberty University

Lorenzo Walker Technical College

Metro Technology Center

Miami Valley Career Technology Center

MIAT College of Technology - Canton

Middle Georgia State University

Midland College

Minneapolis Community and Technical College

Mohawk Valley Community College

MT San Antonio College

CONTRIBUTING AMTS

Nashua Community College	Spartan College of Aeronautics and Technology - Denver
National Aviation Academy Inc - New England	Spartan College of Aeronautics and Technology - Tulsa
North Central Institute	St. Philips College
North Idaho College	Tarrant County College
North Valley Occupational Center	Tennessee College of Applied Technology - Morristown
Northland Community and Technical College	Teterboro School of Aeronautics
Northwest Mississippi Community College	Texas State Technical College - Harlingen
Pima Community College	Toledo Public Schools - Aerospace Center
Pittsburgh Institute of Aeronautics - Hagerstown	Tulsa Technology Center
Pittsburgh Institute of Aeronautics - Myrtle Beach	University of Alaska Anchorage
Pittsburgh Institute of Aeronautics - Pittsburgh	University of the District of Columbia Community College
Pittsburgh Institute of Aeronautics - Youngstown	Utah State University
Portland Community College	Wayne Community College
Sacramento City College	Western Maricopa Education Center
Salt Lake Community College	Western Michigan University - College of Aviation
San Diego Miramar College	Wichita State University Campus of Applied Sciences and Technology
School of Missionary Aviation Technology	
Sinclair Community College	
South Georgia Technical College	
South Seattle College	
Southern Illinois University Carbondale	
Southern University	
Southwestern Illinois College	
Sowela Technical Community College	

THANK YOU

The following aviation employers support technician education through ATEC membership.

JOIN THEIR RANKS.

