Building a Skilled Workforce

The Tucson Region's Aerospace and Defense Cluster – Workforce Needs and Opportunities in Aviation Technology – Issue White Paper

– Final – December 7, 2017

Pima Association of Governments

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EXECUTIVE SUMMARY

The Pima Association of Governments (PAG) Economic Vitality Advisory Committee (EVAC) supported development of this issues white paper, which examines the aviation maintenance industry, its increasing need for skilled workers and the Aviation Technology Program at Pima Community College (PCC). In February 2015, EVAC members came together for a special work session and identified "workforce enhancement" as a priority area. Thus, EVAC understands that a skilled workforce and the economic wellbeing of our region naturally align and EVAC is committed to promoting an educated and career-ready regional workforce. To raise awareness of and better understand this issue, EVAC convened a task force to examine a high-demand career path and determine whether PCC's Aviation Technology Program is meeting the need for an injection of skilled workers in the aviation maintenance industry, a primary component of the larger aerospace and defense industry (A&D), which employs thousands regionally. The information below offers key takeaways from this effort along with policy recommendations developed by task force members.

A skilled workforce, aligned with the needs of industry, helps drive regional economic competitiveness. The supply of talent allows businesses to expand and influences where corporate executives and site selectors decide to locate or relocate businesses and jobs to a new community. When these new jobs offer higher than average wages, families and the region in which they live benefit.

Tucson's concentration of aerospace manufacturing businesses is 8.35 times more than the average of all U.S. statistical areas (ACA, 2015), highlighting the importance of the aerospace and defense (A&D) industry to the region's economy. This industry includes businesses in the greater Tucson region that service aircraft, such as Bombardier and Ascent Aviation Services. Through 2024, local job growth for aircraft mechanics and service technicians, and avionics technicians is expected to grow by 8 percent and 13 percent, respectively (AZ Office of Economic Opportunity, 2016). According to the Bureau of Labor Statistics, aviation maintenance technicians in the Tucson metropolitan statistical area (MSA) earn a median salary of $56,170 annually, 40 percent greater than the median annual salary ($33,966) across all occupations.

The continued expansion of the aviation maintenance sector in our region depends on the availability of highly skilled, technically trained workers with industry-relevant qualifications. The PCC Aviation Technology Program currently produces approximately 28 graduates each semester (Roark, 2017). However, to meet the current and future needs of employers, the program needs to double the output of students and trainees in Airframe and Powerplant, Aviation Structural Repair and Avionics.

Skills learned in the PCC Aviation Technology Program are transferrable, helping to support the overall workforce needs of the region's A&D industry. In this industry, overlapping skill sets and capabilities are attractive to employers, temper job disruption and create a more resilient workforce. Given the high standards to which aircraft maintenance professionals are held, along with their advanced knowledge in science and technology, many are well-prepared to perform work across a variety of specialized, highly technical fields.

Based upon research for this white paper and input from EVAC members, the following recommendations address career and technical education, including the PCC Aviation Technology Program.

As appropriate, support:

- *Efforts by educators, workforce development programs and economic development organizations to align education and workforce training programs with employer needs.*

- *Sustainable state funding for community college career and technical education programs that support student success and meet the diverse needs of students and the community.*

- *PCC's efforts to (1) improve the visibility and positive awareness of its Aviation Technology Program as a regional workforce development asset, and (2) secure funding to expand the Aviation Technology Center and Aviation Technology Program.*

- *Greater participation in career and technical education dual-enrollment programs, such as those between Joint Technical Education Districts (JTEDs) and community colleges.*

INTRODUCTION

In 2014, PAG established EVAC to identify opportunities and solutions to challenges that impact the economic vitality of the Tucson region* and beyond. An available and skilled workforce is one such challenge, ranking as the second most important site selection factor among executives in a recent survey (Moss and Miller, 2017). This also was underscored in the 2015 EVAC Strategic Planning Work Session summary report, where workforce enhancement was listed as one of the top four priority areas of the committee.

> *"A globally competitive, talented workforce and superior P-20 education institutions to educate and prepare this workforce are paramount to the region's future." (PAG EVAC, 2015).*

Several EVAC member organizations have economic development strategies focused on strengthening existing industry clusters, such as aerospace and defense (A&D), which employs thousands regionally. According to the Harvard Business School, industry clusters are regional concentrations of related industries consisting of companies, suppliers and service providers, as well as government agencies and other institutions that provide specialized training and education, information, research and technical support. Regional economies are comprised of two types of clusters: traded and local. Local clusters consist of related industries that serve the local market. Traded clusters, on the other hand, are groups of related industries that serve external markets beyond regional boundaries (U.S. Cluster Mapping, 2014). Harvard Professor Michael Porter makes clear why emphasis on traded clusters, such as A&D, is critical to a regional economy.

> *"While local clusters account for roughly two-thirds of employment in an average region,* ***traded clusters heavily drive the prosperity and growth of a region*** *(emphasis added); average wages in traded clusters are roughly $13,000 a year higher than wages in local clusters. This is because traded clusters can achieve higher productivity, their growth is unconstrained by the size of the local markets, and their success creates much of the demand for local clusters." (Porter, 2001)*

Aviation maintenance is a component of the larger A&D industry. In recent years, local maintenance, repair and overhaul (MRO) facilities have periodically increased hiring, signaling an economic resurgence for the region's aviation maintenance sector. In turn, increased demand has been placed on training programs in traded sectors, such as PCC's Aviation Technology Program, to produce qualified workers for good paying, in-demand jobs.

This white paper explores the region's workforce development needs and opportunities in aviation, providing information about occupational outlooks and career pathways in MRO occupations. It also includes discussion of funding mechanisms that could help increase support for PCC's program, its students and industry partners.

**PAG serves the Tucson region and its member jurisdictions, which include: the Cities of South Tucson and Tucson, Pima County, the Towns of Marana, Oro Valley and Sahuarita, the Pascua Yaqui Tribe and the Tohono O'odham Nation, which are represented by their chief elected*

officials. The governor-appointed Pima County representative on the Arizona State Transportation Board also serves on PAG's Regional Council.

BACKGROUND

AEROSPACE AND DEFENSE

In Pima County, the A&D industry is a pillar of the economy. Dating back to the early 1900s, the region has been a hub for A&D companies looking for a business-friendly location with an ideal climate and motivated workforce. Today, the region is host to a relatively large number of leading direct and indirect A&D companies, including Raytheon Missile Systems, Honeywell Aerospace and Bombardier Aerospace. Geographically, many of these companies are clustered near the Tucson International Airport.

Numerous economic and workforce development groups in the region have identified A&D as a key target industry for the region's economic growth. According to the Arizona Commerce Authority (ACA), the A&D industry accounts for over 50,000 jobs and annual payroll of $5.5 billion statewide (ACA, 2015). In Tucson, the highly concentrated aerospace manufacturing sector has an 8.35 location quotient, a ratio calculated to compare a region's industrial activity level to that of the rest of the United States. In other words, Tucson's concentration of aerospace manufacturing businesses is 8.35 times more than the average of all U.S. statistical areas (ACA, 2015). With more businesses choosing and benefiting from Arizona's ideal business and desert climates, the region is well positioned as a highly competitive center for the A&D industry.

AEROSPACE & DEFENSE – AVIATION SECTOR – MAINTENANCE, REPAIR AND OVERHAUL

The Federal Aviation Administration (FAA) reports that, nationally, the aviation sector accounts for more than 5 percent of the U.S. gross domestic product, contributes $1.6 trillion in total economic activity and supports nearly 11 million jobs. Moreover, aviation manufacturing continues to be the nation's top net export (FAA, 2016).

In Arizona, aviation is a significant economic catalyst. Over 470,000 jobs are directly or indirectly related to the sector, and it contributes more than $38 billion to the state's economy (ACA, 2017). As such, the aviation sector plays a key role in supporting and building on Arizona's economic strengths, and possesses strong potential for bringing high-wage, high-demand jobs and increased business to the state and region.

Supporting this vibrant sector takes a qualified workforce of highly trained technicians and specialized MRO facilities that maintain and rehabilitate commercial and military aircraft fleets. According to the Aeronautical Repair Station Association (ARSA) 2017 report titled *U.S. Employment and Economic Impact by State*, aviation maintenance employs more than 277,000 people and generates over $44 billion in economic activity nationally. In Arizona, total aviation maintenance employment is approximately 16,000, the sixth highest in the nation, and Arizona's MRO operations have a total economic activity of $4 billion, the third highest in the nation, behind only California and Washington (ARSA, 2017).

The Tucson region is host to significant MROs, including Bombardier Aerospace and Ascent Aviation. These regional companies employ thousands of skilled aviation maintenance professionals, contributing greatly to the region's economic wellbeing.

INDUSTRY NEEDS AND JOB GROWTH

Careers in aviation maintenance have continued to increase as global economies expand and airlines fly thousands of jetliners to meet air transportation demand. According to Boeing, by 2035, 118,000 maintenance technicians will be needed in North America alone (Boeing, 2016).

Nationally, the U.S. Bureau of Labor Statistics (BLS) predicts that, by 2024, employment growth in aircraft mechanic positions will be relatively flat at 1 percent (BLS, 2017). The Tucson area, on the other hand, has a location quotient of 3.05 for aircraft mechanics and service technicians, an indication of a robust and healthy aviation maintenance sector. Over the next seven years, local job growth for aircraft mechanics and service technicians, and avionics technicians is expected to grow by 8 percent and 13 percent, respectively (AZ Office of Economic Opportunity, 2016).

The aviation sector and demand for air travel, both highly sensitive to the state of the regional economy, have experienced times of substantial distress over the past decade. Even so, according to a recent analysis by PCC, some of the region's major aerospace and MRO employers are experiencing gains. For example, in 2016, Bombardier Aerospace, the region's largest aerospace-only employer (Raytheon is counted in defense), reported a nearly 14 percent increase in its jet-maintenance workforce at Tucson International Airport over the previous year. The facility now employs nearly 1,000 people locally.

Unfortunately, when market conditions in the industry are healthy, many of these employers struggle to hire enough skilled workers to sustain this growth, and the current regional pool of skilled workers cannot offset vacancies due to attrition. Regional employment data indicates that demand for aviation maintenance technicians is rising; however, continued expansion of

the aviation maintenance sector depends on the availability of highly skilled, technically trained workers with industry-relevant qualifications. Growing evidence has shown that worker education and training are struggling to keep pace with the increasing demand for higher-skilled laborers in technical fields. The PCC Aviation Technology Program currently produces approximately 28 graduates each semester, which does not meet the current need of regional MRO employers (Roark, 2017).

Adding to this concern are the high attrition rates within the aviation maintenance sector and a large percentage of workers aging out of the workforce. Over the next decade, a record number of maintenance technicians eligible to retire are expected to outpace the total of new mechanics entering the market. Executives from MRO businesses are worried about an anticipated shortfall in the number of adequately trained mechanics at a time when the global airline fleet is expanding and modernizing (Oliver Wyman, 2017). The shortfall is expected to create expertise gaps as the sector finds itself having to service a fleet that, by 2027, will be almost equally divided between older and newer technology aircraft. Already, a majority of MRO businesses report that it is getting harder to hire mechanics, and the tightening labor market is pushing them to rely on overtime and other stop-gap efforts to keep up with market demand.

SUPPORTING A SECTOR STRATEGY APPROACH

Numerous economic and workforce development groups in the region, including the Pima County Workforce Investment Board, Pima County Economic Development, Arizona Commerce Authority, Sun Corridor Inc., City of Tucson Office of Economic Initiatives and others have identified A&D as a vital target sector for the region's economic growth. Locally, PCC's Aviation Technology Program is working with industry, workforce and economic development partners to support and strengthen this sector through targeted training and career pathways programs in key supporting occupations for the A&D industry. Economic development experts agree on this collaborative approach. According to Amy Liu of the Brookings Institution:

> *"On the workforce systems side, the most promising practices involve approaches very much like what's required to craft effective cluster and export strategies: understanding the needs of firms and industries and building relationships and partnerships that are effective at aligning employers' needs with the needs of workers seeking opportunity." (Liu, 2016)*

The aforementioned agencies have reiterated that supporting the A&D industry requires talent, which necessitates a strategic alignment of workforce development agencies and employers. As a program that partners with and directly supports the needs of pillar industries, PCC's Aviation Technology Program plays a crucial role in this alignment by leveraging and expanding talent resources to meet industry needs and reinforcing regional economic strengths. PCC's Aviation Technology Program provides the technical training, which creates and attracts talent to fill high-wage, high-skill positions in the region's expanding aviation maintenance sector and the broader A&D industry. Furthermore, it supports economic goals for increased wages and employment opportunities for regional workers by providing talent pipelines for key industry sectors.

ALIGNING THE TALENT POOL WITH EMPLOYER NEEDS

Across the region, business leaders and educators consistently rate the quality and availability of a skilled workforce as one of the most important factors influencing their location decisions and ability to succeed in this fast-paced, global economy.

> *"A highly educated and experienced workforce results in greater productivity and business development opportunities in any region."*
> *2014 Sun Corridor Inc. Economic Blueprint Update*

Both now and in the future, it is imperative that the region's workforce be equipped with the necessary skills to meet the talent needs of companies. Aligning the needs of companies with regional workforce assets requires partnership, communication and collaboration among all interested parties. Improving regional education and workforce systems will have numerous economic benefits, including higher levels of educational attainment, which correspond with higher workplace skills and increased earning power. In turn, employers will find the human capital they seek to meet their growing needs.

MEETING INDUSTRY NEEDS THROUGH EDUCATION

Supporting the expanding aviation maintenance sector requires providing high-quality, industry-relevant training to not only meet demand but also provide the skill levels required by businesses. According to *Aviation International News* (Adams, 2014), a monthly aviation trade publication:

> *"The shortage is not only in numbers but also in quality. Some operators complain that the graduates of maintenance schools don't reach the skill levels of their predecessors. One industry veteran estimated only 30 percent of new grads had the requisite skills. Many schools lack the funds to purchase new-generation aircraft that can be dedicated for maintenance training, so there's a disconnect between the older aircraft and components students learn on and the modern models and avionics systems they're expected to service on the job."*

With rapidly changing technology and increasingly sophisticated systems, the aviation sector requires a workforce well-versed in the latest technologies. To address this need, regional economic and workforce development organizations have begun working together to develop targeted training programs to help support the needs of the region's aviation sector and educational institutions. Within the aviation maintenance sector, such partnerships may provide a powerful aid, not only in connecting workers to high-wage, high-demand employment opportunities but also in strengthening regional economic vitality and increasing global competitiveness of the region's MRO facilities.

Regional training programs, such as PCC's Aviation Technology Program, are working to stay up to date with new and emerging technologies and to align their curriculum with the requirements of businesses in the aviation sector. Moving forward, strengthening education and industry partnerships and supporting this program will help ensure that the region can anticipate and adapt to changing technologies and skills requirements within the field.

CAREER PATHWAY - AIRCRAFT MAINTENANCE TECHNICIAN

Aviation provides a multitude of exciting career opportunities for individuals who understand, appreciate and enjoy technically intense occupations. It is also a highly regulated industry overseen by the FAA, which controls the design, production, operation and maintenance of civil aviation products (aircraft, aircraft engines and propellers). Given the inherent complexities of the regulations, the FAA allows only persons holding certain certificates and persons supervised by certificate holders to perform work. These jobs are highly technical and require a strong background in mathematics, engineering and other related fields. Almost all aviation professionals need to have at least some post-secondary education to enter this field, and completing an FAA-approved training program is mandatory for certain positions.

As advances in technology continue to reshape the aviation sector, there is increased need for programs that can produce technically skilled workers with industry-relevant qualifications to

meet its rigorous demands and standards. One way of working in this sector is as an aviation maintenance technician (AMT), a dynamic career field offering a number of highly technical specialty occupations that help keep aircraft operating safely and efficiently. Within the field there are several career options, which are outlined below:

AIRCRAFT MECHANICS

Aircraft mechanics inspect, service and repair aircraft bodies (airframe) and engines (powerplant). Aircraft mechanics can earn a mechanic certificate from the FAA with either an airframe (A) rating, powerplant (P) rating, or combined airframe and powerplant (A&P) ratings, and are referred to as certificated mechanics. According to FAA data, almost all certificated mechanics (92 percent) hold A&P ratings.

AVIONICS TECHNICIANS

Avionics technicians test and troubleshoot aircraft instruments and components, install electronic components and assemble switches or electrical controls. Avionics technicians receive training through school, on the job or in the military. There is currently no FAA exam or certification specific to avionics technicians; however, the National Center for Aerospace & Transportation Technology (NCATT), a nonprofit organization in Fort Worth, Texas, has worked with aerospace industry experts to develop its Aircraft Electronics Technician (AET) standard. The AET certification identifies the core knowledge of an Aircraft Electronics/Avionics technician that is common across the industry. PCC is an NCATT Accredited Training Provider and teaches an NCATT-approved curriculum to prepare its students for the AET certification test.

CERTIFICATION

The U.S. Code of Federal Regulations 14 CFR 65 (Part 65) is the primary body of regulations directly relating to the certification of aircraft mechanics and repairmen. The FAA certifies aviation maintenance personnel in two ways: a mechanic certificate and a repairman certificate. Individuals must meet the requirements outlined below in order to receive a certificate from the FAA. The vast majority of technicians are certified as AMTs. Repairmen get certificates with ratings to perform only specific tasks, and they must be associated with FAA-approved repair stations, commercial operators or air carriers holding authority to perform these tasks.

A non-certified mechanic can work only under the supervision of a certificated person. Non-certified mechanics work in manufacturing and FAA repair stations, and for air carriers and fixed-base operators. Because these mechanics are not certified by the FAA, there are no

federal certification requirements to meet. However, a job applicant must still meet the employer's requirements.

Given the high-risk, highly technical nature of aviation-related occupations, most AMTs learn their trade through one of the 170-plus, FAA-approved schools around the country before taking their certification exams. PCC is the only FAA-approved school in southern Arizona, and one of only three such schools in the entire state. These educational institutions are issued a certificate from the FAA according to strict standards and provide training that allows a passing student to take the required oral and practical exams to become certified.

The FAA also recognizes practical on-the-job experience as a way of demonstrating the needed knowledge and skills. Applicants who did not attend an FAA-approved school must instead provide documented evidence of a minimum of 18 months practical experience related to either airframe or powerplant maintenance (30 months if applying for certification for both airframe and powerplant).

SALARY INFORMATION

For those looking to work in a well-compensated field, aviation maintenance is an attractive option. According to the Bureau of Labor Statistics' May 2016 Metropolitan and Nonmetropolitan Area Occupational Employment and Wage Estimates, AMTs in the Tucson metropolitan statistical area (MSA) earn a median salary of $56,170 annually. According to the same dataset, the median annual salary across all occupations in the same MSA is $33,966, a difference of almost 40 percent. These statistics are important because occupational wage data tell workers which occupations provide the largest payoff where workers choose to live, as well as which educational choices have the best return on investment. Additionally, wage data provides companies with information regarding labor costs, which can influence firm location choices as well as decisions regarding workflow and organization (UA Eller College, 2017).

TRANSFERABLE SKILLS

The traditional linear career path is becoming less common. Today's innovation-driven, science-based economy presents a clear opportunity to promote career pathways providing core competencies that are transferrable from one industry sector to the next, particularly in the STEM fields. In the A&D industry, clusters of overlapping skill sets and capabilities are attractive to employers, temper job disruption and create a more resilient workforce. Given the high standards to which aircraft maintenance professionals are held, along with their advanced knowledge in science and technology, many are well-prepared to perform work across a variety of specialized, highly technical fields.

Training requirements for a career in aviation maintenance vary across a number of unique occupations and specializations; however, students typically gain core competencies in physics, mathematics, engineering and communication, which support advanced knowledge of numerous technological formats and applications including, but not limited to, the following areas:

- Materials and advanced manufacturing, including machining and metalwork;
- Power and energy systems and technology, including electrical, fluid and other systems;
- Structures and construction technology;
- Risk management, including standard operation procedures, regulatory controls and inspection;
- Communication and navigational technologies, including GPS and other satellite-based systems; and
- Computer science, including advanced operating systems.

Many of these competencies, paired with highly valuable technical skills, translate well to other applications throughout the A&D industry and also the region's growing high-tech industries overall.

PIMA COMMUNITY COLLEGE'S AVIATION TECHNOLOGY PROGRAM

The FAA-certified Aviation Technology Program at PCC provides students in the region, state and beyond with the opportunity to study a variety of aircraft in a hands-on learning environment at the Aviation Technology Center, a state-of-the art training facility located on the grounds of the Tucson International Airport. The program currently offers an Associate of Applied Science degree in Aviation Technology and accompanying certificates for direct employment in the core skill areas of Airframe and Powerplant, Aviation Structural Repair and Avionics. Aviation Structural Repair has been offered as specialty training and does not fall under FAA Part 147 guidelines. Instead, it is an industry-directed curriculum preparing students to perform heavy structural repairs that exceed the requirements of Part 147 Airframe and Powerplant training. Additionally, PCC offers a Part 65 training regimen, which prepares students for their Part 65 certification exams. Student scholarships from companies such as Bombardier and other partners are another part of the program's success. These are just a few examples of why the program is a destination for those seeking to enter the field.

PCC's Aviation Technology Program plays an important role in filling labor-market gaps in technical fields in the aviation sector. The PCC Aviation Technology Program currently graduates an average of 28 students per semester and places nearly 90 percent of its graduates

in high-demand jobs with the A&D industry soon after graduation. The program also has boosted the percentage of graduates that take the FAA license tests from around 30 percent in 2009 to about 80 percent currently.

PCC has been the fortunate recipient of two donated FedEx Boeing 727s, which allow it to provide valuable hands-on training on transport category aircraft. As a result, PCC can produce skilled workers for high-wage jobs in an important and growing sector of the state's economy. Despite this competitive advantage, PCC must continuously update its equipment to remain relevant. In the very near future, new-generation platforms and fleet mixes—and their associated systems, training and programs—will necessitate updating existing training apparatus. Therefore, acquiring newer generation airframes so that PCC is equipped to provide the latest training will be beneficial to both students and industry partners alike both now and in the future. The program has expanded in recent years and is seeking to continue growing rapidly to meet the needs of the aviation sector in Pima County and southern Arizona.

LOOKING FORWARD – THE SKY'S THE LIMIT

The development of a skilled labor force requires strategic investment in education and workforce development that meets the needs of employers. PCC is seeking to expand the capacity of its Aviation Technology Program by increasing the number of program completers in each of the core skill areas to meet growing industry demand as quickly as possible. The program currently has six full-time instructors and eight adjunct instructors. About 125 students are in the program's Structural Repair, Avionics, and Airframe and Powerplant courses at any given time. In addition, the program has launched a high school early college program with the Pima County JTED and has served 35, mostly military veterans, in the Part 65 regimen, a special program aimed at upgrading their skills to fit commercial industry needs.

There are significant obstacles to achieving this goal. According to staff at PCC, recruitment of quality personnel can be a challenge due to low industry turnover and competitive salaries in the private sector. Working as an instructor for PCC does, however, offer the advantage of a consistent, predictable schedule that doesn't typically involve shift work. In recent years, the significant decline or elimination of funding at all levels—local, state and national—has become a significant challenge. According to the Center on Budget and Policy Priorities (CBPP), funding for higher education in Arizona is down almost 56 percent compared to pre-recession levels. Arizona's standing for higher education ranks last in the country (CBPP, 2017). In response, PCC seeks to address the need for expansion of its program through targeted funding support to ensure economic development opportunities in southern Arizona are met and increased.

To meet the current and future needs of employers, the PCC Aviation Technology Program needs to double the output of students and trainees in Airframe and Powerplant, Aviation Structural Repair and Avionics. To accomplish this goal, the program will need to increase the facilities' capacity, instructional staff and relevant equipment. Initial plans for such an expansion include:

- Approximately 34,000 sq. feet of additional facilities, including: one new hangar space, five lab spaces, five classrooms, a tool room and faculty/staff office space.
- 13 additional full-time equivalent staff (FTEs) are needed, including seven (7) full-time instructional faculty members, two (2) Part 65 instructors, one (1) Student Services Specialist (to service both facilities), three (3) lab specialists including one stationed during the evening to support Part 65/JTED, and one (1) General Clerical.
- Additional aircraft to replace the aging aircraft and to keep pace with newer technologies: Rotary wing aircraft (e.g., a Bell JetRanger), GA aircraft (e.g., Cessna 152, 172), Regional Jet (e.g., CRJ 200, 700; or ERJ 135, 145).
- Various equipment including, but not limited to: glass cockpit avionics and other aircraft systems trainers (electrical, hydraulic, pneumatic, etc.), maintenance support ground equipment (power units, maintenance stands/ladders, aircraft jacks, etc.), overhaul engines (reciprocating and turbine), and miscellaneous test equipment and tooling. For example, the cost to replace dated analog cockpit trainers with a single glass cockpit avionics trainer would cost approximately $45,000. Moreover, having a modern aircraft cockpit, not just a trainer, with digital displays would provide broader application to the current curriculum and keep the program from lagging even further behind current technology.

CURRENT PROGRAM FUNDING

The annual operational budget for the Aviation Technology program is just over $1.1 million. This total includes an average annual salary cost for faculty and staff of $979,600, annual adjunct faculty costs of $94,000, and average annual supplies and materials costs of $35,000. There are no costs associated with the facility lease since it is already paid in full. Additional funding at an annual average of $363,000 has been secured through capital requests ($293,000) and Strategic Initiative funding ($70,900). The program is generally funded through PCC, which means the sources of funding are property taxes as levied by the college district and tuition and fees for operations, and Proposition 301 funds are used in addition to college funds for capital purchases.

In September 2014, PCC received a $2.5 million grant under the fourth round of the U.S. Department of Labor's Trade Adjustment Assistance Community College and Career Training grant program, a major investment that enables community colleges to work with industry to develop training and education programs that will lead to high-skill, high-wage jobs. These funds were put toward PCC's Arizona Aviation, Mining and Manufacturing Program (AAMMP Up), which offers a comprehensive preparation and hands-on practical skills review for the FAA Part 65 oral and practical knowledge exams. However, more funding will be needed to expand capacity of the program.

FINANCIAL ASSISTANCE

PCC students are afforded multiple opportunities for financial assistance for the Aviation Technology programs, including: Federal financial aid for qualifying students (e.g., Pell grants, Stafford Loans), Workforce Innovation and Opportunity Act (WIOA) funding for eligible candidates through the Arizona@Work Pima County One Stop system, veteran's benefits, scholarships, and non-profit assistance such as is provided by Job Path of Tucson.

COST COMPARISON

The full program cost to students for tuition and fees is $10,000 to complete the 19-month Airframe & Powerplant certification.

This total compares favorably to peer institutions such as:

- Chandler-Gilbert Community College (20-month program): $11,000 for in-county residents and $35,000 for out-of-county residents
- West-MEC (adult program, 24 months): $14,700
- Wichita Area Technical College (WATC – 18 months): $30,607
- Spartan College of Aeronautics and Technology (18 months): $39,200
- Aviation Institute of Maintenance (AIM - 21 months): $47,000

RECOMMENDATIONS

This white paper has examined the workforce needs of the aviation maintenance sector and discussed how PCC's Aviation Technology Program, which has a national reputation as a leader in the field, has the potential to address them. The following EVAC recommendations address

workforce development in general, as well as specific needs for career technical education, including the PCC Aviation Technology Program.

As appropriate, support:

- *Efforts by educators, workforce development programs and economic development organizations to align education and workforce training programs with employer needs.*

- *Sustainable state funding for community college career and technical education programs that support student success and meet the diverse needs of students and the community.*

- *PCC's efforts to (1) improve the visibility and positive awareness of its Aviation Technology Program as a regional workforce development asset, and (2) secure funding to expand the Aviation Technology Center and Aviation Technology Program.*

- *Greater participation in career and technical education dual-enrollment programs, such as those between JTEDs and community colleges.*

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