

Advanced Manufacturing and Aerospace Sector Sector Strategy Update: June 2024

Prepared by the AWB Institute, in partnership with the Aerospace Futures Alliance

Please describe the greatest workforce needs facing your sector, with a focus on needs that career connected learning strategies can help to address.

The Washington State Aerospace and Advanced Manufacturing industries continue to face significant technical workforce needs across the following sub-sectors:

1. Machining
2. Mechatronics and Pneumatics
3. Aircraft Manufacturing

Aerospace and Advanced Manufacturing workforce needs are broadly identified in the following list:

1. The placement and retention of mid-level employees and onsite management employees.
(This is important to ensure employers can manage apprenticeship and internship programs)
 - a. There is a need for dedicated funding for incumbent worker training to support mid-level employees and retain current staff.
 - b. With inflation on the rise, high costs of living are continuing to impact job acceptances and retention. Applicants often turn down job offers due to high housing and living costs throughout our state, which in turn leads to recruitment and retention challenges.
2. An increase in education and training programs that inform students of the career pathway opportunities and enable them with the foundational skills to enter the industry.
 - a. The development of soft skills and industry transferable skills particularly in youth.
 - b. Utilizing retiring employees as both instructors and trainers in training and apprenticeship programs to leverage industry experience to train and prepare new employees.
 - c. Informing students, counselors/teachers, and their families of the lucrative occupations and career pathways in both Aerospace and Advanced Manufacturing to correct any preconceived stereotypes of the industries.
3. Grow and expand Career Connected Launch programs.
 - a. Apprenticeship and pre-apprenticeship programs
 - b. Specifically, investing in the expansion of aerospace worker training programs and apprenticeships.
4. More transparency with industry credential needs and skills-based hiring.
5. Better the connections between industry and education to improve the alignment between what's being learned in the classroom and what is expected and/or desired by employers, especially with new and evolving technology within the industry.

6. Childcare affordability and accessibility for the returning, emerging, and current workforce.
 - a. This has impacted predominantly female apprentices when it comes to their ability to successfully complete apprenticeship and pre-apprenticeship programs. The issue of childcare accessibility and affordability has contributed to the lack of female workers within both the Aerospace and Manufacturing industry's workforces.
7. An aging workforce – Anticipated retirements are expected to lead to workforce shortages, especially with a significant portion of the workforce nearing retirement age.
 - a. Could exacerbate current skill and talent shortages.
8. Supporting rural businesses, empowering rural communities, and ensuring efficient and equitable service opportunities across Washington.
9. More support in training programs and industry for underrepresented communities within both Aerospace and Advanced Manufacturing.
 - a. Women, minorities, and immigrants.

Current barriers that affect the problem-solving of the above workforce needs include, but are not limited to:

1. Fierce competition for a technically competent and trained workforce. Many industries are vying for the same small talent pool as the skills needed for most occupations in the Aerospace and Manufacturing industries are also needed in many other high-demand industries within our state (such as Maritime, IT/Technology, Clean Energy, etc.)
2. The continuous fast-paced advancement in technology, machining, and equipment impact education and training requirements for the industry. These quick and constant advancements make it difficult for programs to keep up with the “latest and greatest” technology, trained faculty, and equipment both financially and spatially (the amount of space the program has to house machinery and equipment needed for training).
3. The lack of qualified teachers/educators/faculty available to educational and training programs looking to hire, grow and expand. Additionally, educational and training programs are competing with industry in terms of competitive pay.
4. A lack of access in early grades to explore career pathways in Aerospace and Advanced Manufacturing. As well as the lack of preparation activities in coursework/curriculum to introduce and prepare youth and young adults from all communities.
5. Access barriers in rural communities statewide: transportation, funding, housing, childcare, industry awareness, distance between employers, distance/access to training facilities, industry boom-bust cycles can put local employment at risk etc.
6. Anticipated retirements in organizations are expected to lead to workforce shortages, especially with a significant portion of the workforce nearing retirement age.

Between now and June of 2025, what are your sector’s 3-6 occupations that are highest-priority for building supportive career connected learning pathways? Please focus on occupations that lead to economic self-sufficiency.

- Machinists
- Welders
- Electrical and Electronic Engineering Technologists and Technicians
- Electro-Mechanical and Mechatronics Technologists and Technicians
- Aerospace Engineer Operations Technician

For each of the occupations identified above, please provide the information below to help inform pathway development efforts and investments.

Occupation: Machinists	Sub-sector: CNC Machining
Average wage: \$29.72 / hour - \$61,810 annual	
<p>Which skills/competencies do employers use as a benchmark to hire someone in this occupation?</p> <ul style="list-style-type: none"> ● Knowledge of machining equipment and tools ● Ability to follow blueprints and technical drawings ● Ability to use machining equipment ● Administrative and organizational skills for records and paperwork ● Computer Numerical Control (CNC) Machining (i.e. a manufacturing process in which pre-programmed computer software dictates the movement of factory tools and machinery) ● Eye for detail ● Problem solving ● Manual dexterity ● Effective time management ● Adaptability ● Mathematics and science skills 	<p>Which credentials do employers cite as a valuable benchmark to hire someone in this occupation?</p> <ul style="list-style-type: none"> ● High School diploma or equivalent ● Certificate or diploma in machining, engineering, or equivalent preferred ● Experience in operating precision tools ● CNC Machining Training Program
<p>Please describe possible career progression opportunities for this occupation:</p> <ul style="list-style-type: none"> ● Mentorship Role ● Advancement into a specialization ● Manager Role ● Head Machinist 	

Please share the data, employer feedback, and/or Regional Network feedback that helped you identify this as a high-priority occupation:

Knowledge acquired by employer feedback through meetings at technical colleges that are developing strategies to assist with industry needs.

Data received by survey results through PNAA Workforce Cluster.

The AWB Winter 2024 Washington Manufacturers Survey highlights the barrier employers are facing in terms of hiring mid-level positions. The majority of manufacturing employers surveyed stated that it's taking a long time to fill these mid-level positions, like Aerospace Machinists.

Please describe the top barriers employers have identified to hiring for this occupation:

Employers are having difficulty in getting new hires into intro level and mid-level management Machining roles due to a lack of public knowledge about the role. Their main source for new hires is through referrals from those who have been in the roles previously. Employers are looking at and considering different opportunities to market for Machining roles on social media for younger generations to give a quick explanation for what the role entails. Educating the public on what the Machinist occupation is and the career pathways available through a job in machining is essential to overcoming the barrier of reaching the future workforce and filling intro/mid-level jobs.

Aerospace Machinists are required to have great attention to detail and an interest in precision. CNC Machinists are highly skilled and in-demand in areas beyond aerospace which can further crunch the industry. From employers - "We need the basics in Manufacturing. We need CNC Machinists and we need basic manual machining". CCL can continue to support CTE and CTC programs, which are a major pipeline into the industry. With supporting these programs, this also allows for more knowledge about the meaning of the role through relationships and community. This could bring in even more of a workforce as statistics show that the best way to hire a machinist is through personal references.

An employer in aerospace manufacturing focusing on machining stated that they are having a difficult time retaining employees. If there is a dollar raise in a different sector or a new job that is closer to the employee's home, they are leaving the industry due to convenience. Employers are also very concerned about pending retirements, as many in the industry are near retirement and there is not always a clear path to ensure the next generation is prepared. This is putting stress on the industry due to the training involved in Aerospace Machining.

Please describe the type of programs or approaches employers have found helpful in hiring for this occupation:

Training schools such the WATR Center, AJAC, and the Machinist Institute are great pipelines into aerospace machinist roles. A number of employers specifically mention partnering with these entities on internships and apprenticeships. Employers enjoy hosting tours and becoming active in advisory committees. These organizations work closely with the industry to make sure they are up to date with what machines they are training on and also help their students find roles within the industry. Similar to employers marketing for the roles, these institutions are also working to find

people who do not already have a previous connection to aerospace machining.

Between now and June of 2025, where is there regional momentum to support pathway development in this occupation?

- Region 1 - Capital
 - Key Momentum Factors:
 - Aerospace Machinist
 - Expansion focus on rural K12 space, where established partnerships between post-secondary CTCs and local employers that support CL credential opportunities, already currently exist.
 - High-Potential Opportunities:
 - Developing three career pathways for rural students. Provides access and opportunity.
 - Shared Priority? Yes
- Region 2 - East
 - Key Momentum Factors:
 - Annual growth forecast for occupation in this region is 0.5%
 - Postsecondary linked: Columbia Basin College, Walla Walla Community College
 - “We have programs in multiple schools and are building more. Since Spokane is now a TechHub with aerospace and manufacturing as the focus, there is quite a “drive” to focus on these areas.”
 - High-Potential Opportunities: Potential for cross-sector collaboration to develop necessary training and skill sets for machinists.
 - Shared Priority? Yes
- Region 3 - King & Pierce
 - Key Momentum Factors:
 - Many employers and training programs for Aerospace and Advanced Manufacturing.
 - Anticipated growth by sector based on current WJI projects current/new CL programs: Advanced Manufacturing & Aerospace: 120
 - High-Potential Opportunities:
 - Collaboration with RN to expand pathway development and CCL opportunities.
 - Washington Jobs Initiative Sectoral Partnerships: Aerospace and Manufacturing Sector Partnership (advanced manufacturing & aerospace sector) — a partnership led by Machinists Institute with ANEW in industries like manufacturing and maritime.
 - Manufacturing WORKS (advanced manufacturing & aerospace sector) — a partnership with WorkForce Central, AJAC, and regional community colleges in manufacturing occupations such as machinists and welders.
 - Shared Priority? Yes
- Region 4 - Mid Columbia
 - Key Momentum Factors: Growing interest in Aerospace and strong presence in Advanced Manufacturing in this region.
 - High-Potential Opportunities: Opportunities for cross-sector technical skills development.

- Shared Priority? Yes
- Region 5 - North Central
 - Key Momentum Factors:
 - Expanding apprenticeship opportunities within manufacturing
 - High-Potential Opportunities:
 - Manufacturing
 - Potential with alignment through sustainable aviation and clean energy. Access to more sustainable aviation opportunities as there is more room for growth with access to land.
 - Shared Priority? Yes
- Region 6 - Northwest
 - Key Momentum Factors:
 - CCL involved in helping high school with a CCW program builder grant focused on manufacturing (awarded in round 12)
 - Looking ahead to develop curriculum outcomes that would enable CTE pathways for CTE dual credit opportunities regional with 3 community colleges in the region for manufacturing/engineering
 - Obtained funding in Snohomish County to support manufacturing career exploration programming through EvCC AMTEC and Goodwill, as well as recent grant applications in partnership with Boeing to continue K12 curricular alignment work
 - High-Potential Opportunities:
 - Advancement in CTE dual credit opportunities
 - Strong relationships to build upon with training centers, community colleges, and technical colleges. These relationships can lead to further development of career exploration and career launch programs in the region.
 - Several colleges in the region are also planning to apply for Career Launch Endorsement for programs in priority sectors, such as machining at Everett Community College.
 - Shared Priority? Yes
- Region 7 - South Central
 - Key Momentum Factors:
 - Cross sector technical workforce needs.
 - High-Potential Opportunities:
 - Potential for cross-sector pathway development and essential skills.
 - Aerospace and manufacturing are in-demand.
 - Shared Priority? Yes
- Region 8 - Southwest
 - Key Momentum Factors:
 - RN has identified Aerospace Machinists as a high-priority occupation in this region
 - High-Potential Opportunities:
 - Need to educate the public; machinists include those who process metals, plastics, electronics, composites, etc.
 - Various learning pathways with high potential
 - Aligning K-12 pathways with a new manufacturing career launch
 - Shared Priority? Yes
- Region 9 - West Sound
 - Key Momentum Factors: Regional location places a great barrier when it comes to

accessibility of training programs, however there is a need to retain skilled workers for occupations in the area.

- High-Potential Opportunities: Train and retain workers to further grow the West Sound region and increase the pool of skilled workers across multiple sectors.
- Shared Priority? Yes

Occupation: Welders	Sub-sector: Manufacturing
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Average wage: \$29.04 /hour - \$60,410 annual

Which skills/competencies do employers use as a benchmark to hire someone in this occupation?

- Ability to read blueprints and use spatial recognition to apply to 3D diagram
- Physical strength/hand-eye coordination
- Administrative skills
- Detail oriented, manual dexterity, physical strength, spatial-orientation skills
- Mathematics and Technology

Which credentials do employers cite as a valuable benchmark to hire someone in this occupation?

- American Welding Society - Certified Welder Designation and Certification
- High School diploma/GED - technical and on the job training
- The American Society of Mechanical Engineers offers certification in practical welding technology for workers who are looking to enhance core competencies.
- Institute for Printed Circuits offers certification and training in soldering
- OSHA requires that welders complete training on electrical safety

Please describe possible career progression opportunities for this occupation:

1. Vocational Training or Apprenticeship
2. Entry-Level Welder
3. Certification
4. Experienced Welder
5. Senior Welder or Supervisor
6. Continued Education and Specialization

Please share the data, employer feedback, and/or Regional Network feedback that helped you identify this as a high-priority occupation:

Employer feedback within the aerospace and space sector.

See 2023 data - <https://esd.wa.gov/labormarketinfo/LAAO>

Please describe the top barriers employers have identified to hiring for this occupation:

High difficulty in current hiring for skilled trade workers, including welders, stems from several significant barriers identified by employers:

Aging Workforce- Over half of the skilled tradespeople in welding and related fields are over the age of 45 years old. This demographic trend indicates a looming shortage of experienced welders as older workers retire, exacerbating the difficulty in finding qualified candidates to fill vacant positions. A number of employers have mentioned a willingness to pay more for quality welders than entry-level accounting/office staff. 95% of Welders from several educational programs have job offers well before graduation.

Welding is especially important for the industry because it is an entry-level skill that can be built upon with other skills and industry-specific knowledge and can be seen across sectors.

Negative Misconceptions- There exists a negative misconception among the younger population regarding welding and trade roles. This perception may stem from outdated stereotypes or a lack of awareness about the lucrative career opportunities and advancements available in the welding industry. Addressing these misconceptions is crucial to attracting younger individuals to pursue careers in welding.

Preference for Four-Year Degrees- There is a higher percentage of the younger generation opting to pursue four-year degrees over vocational training or apprenticeships in skilled trades like welding. This preference may be influenced by societal pressure or a perception that white-collar professions offer greater prestige and financial stability. Consequently, there's a smaller pool of candidates entering the welding profession, further exacerbating the skills gap.

Please describe the type of programs or approaches employers have found helpful in hiring for this occupation:

Technical colleges are a great way to combat a negative association with welding. Using apprenticeship programs help to get a profession in welding kickstarted, then later welders can add degrees on top of their technical skills for management and supervisor roles.

Employers have spoken positively about Perry Technical College in Yakima. A number of employers have set up apprenticeships and hire graduates. Currently the school is at capacity with a new satellite campus. They host an annual employer expo in April (capped at 110 employers) - the expo has been full since February.

One notable program in Washington State that is successfully hiring and training welders is the Welding Technology program offered by Renton Technical College (RTC). RTC offers a Welding Technology program designed to prepare students for entry-level positions in the welding industry. The program covers various welding processes, including shielded metal arc welding, gas metal arc welding, flux-cored arc welding, gas tungsten arc welding, and oxy-fuel cutting

Between now and June of 2025, where is there regional momentum to support pathway development in this occupation?

- Region 1 - Capital
 - Key Momentum Factors:
 - RN has identified Welders as a high-priority occupation for this region
 - In the maritime sector, aluminum welders are in high demand. Several emerging occupations in the region require welding. Highly transferable skill between several sectors, need is running high
 - Expansion focus on rural K12 space where established partnerships between post-secondary CTCs and local employers that support CL credential opportunities, already currently exist.
 - Developing curriculum that allows students the option of transferring course credits between CTE pathways for skills they acquire in the K-12 setting (such as welding, which currently is only available as part of the Core Plus Construction and Aerospace curriculums, preventing students from transferring course credit towards another CTE pathway like Maritime).
 - High-Potential Opportunities:
 - Developing three career pathways for rural students. Provides access and opportunity.
 - *2025 goal to introduce at least 3-5 new CL credentials in occupations such as machining and welding*
 - Shared Priority? Yes
- Region 2 - East
 - Key Momentum Factors:
 - Annual growth forecast for occupation in this region 0.6%
 - Postsecondary linked: Big Bend Community College, Columbia Basin College, Walla Walla Community College
 - “We have programs in multiple schools and are building more. Since Spokane is now a TechHub with aerospace and manufacturing as the focus, there is quite a “drive” to focus on these areas.”
 - High-Potential Opportunities: Further development of training programs for welders. Opportunity for collaboration with regional partners on developing cross sector pathways for welding and fabrication.
 - Shared Priority? Yes
- Region 3 - King & Pierce
 - Key Momentum Factors: Need for highly skilled welders to continue fabricating and updating materials needed for evolving equipment.
 - High-Potential Opportunities: Training and educating teachers and students on career pathway opportunities for those with welding skills. Continuing to engage training programs in conversation with industry to ensure that they are able to train students on equipment so that they are versed in the necessary skills required by industry.
 - Shared Priority? Yes
- Region 4 - Mid Columbia
 - Key Momentum Factors: Cross sector technical skills needed to support workforce retention and expansion.
 - High-Potential Opportunities:
 - Advanced Manufacturing
 - Shared Priority? Yes

- Region 5 - North Central
 - Key Momentum Factors:
 - Expanding apprenticeship opportunities within manufacturing
 - High-Potential Opportunities:
 - Manufacturing
 - Shared Priority? Yes
- Region 6 - Northwest
 - Key Momentum Factors:
 - CCL involved in helping high school with a CCW program builder grant focused on manufacturing (awarded in round 12)
 - Looking ahead to develop curriculum outcomes that would enable CTE pathways for CTE dual credit opportunities regional with 3 community colleges in the region for manufacturing/engineering
 - Obtained funding in Snohomish County to support manufacturing career exploration programming through EvCC AMTEC and Goodwill, as well as recent grant applications in partnership with Boeing to continue K12 curricular alignment work
 - High-Potential Opportunities:
 - Advancement in CTE dual credit opportunities
 - Strong relationships to build upon with training centers, community colleges, and technical colleges. These relationships can lead to further development of career exploration and career launch programs in the region.
 - Several colleges in the region are also planning to apply for Career Launch Endorsement for programs in priority sectors, such as welding at Everett Community College.
 - Shared Priority? Yes
- Region 7 - South Central
 - Key Momentum Factors: Cross sector demand for welding skill set.
 - High-Potential Opportunities: Utilization of welding skills in multiple sectors.
 - Shared Priority? Yes
- Region 8 - Southwest
 - Key Momentum Factors:
 - RN has identified Welders as a high-priority occupation in this region
 - Career Launch at Clark College and potential at Lower Columbia Basin College.
 - High-Potential Opportunities: Need to provide more marketing and/or education on the versatility of welding as a skill.
 - Shared Priority? Yes
- Region 9 – West Sound
 - Key Momentum Factors: Cross sector workforce needs
 - High-Potential Opportunities: Informing the area's workforce of the opportunities and versatility of technical skills, such as welding, for employment.
 - Shared Priority? Yes

Occupation: Electrical and Electronic Engineering Technologists and Technicians	Sub-sector:
Average wage: \$37.34 / hour - \$77,660 annual	
Which skills/competencies do employers use as a benchmark to hire someone in this occupation? <ul style="list-style-type: none"> ● Communication skills - must be able to follow instructions from engineers and others. They also need to clearly convey problems to engineers. ● Detail oriented - must pay attention to detail when assembling, troubleshooting, and repairing electronic and electrical mechanical systems. ● Math skills - use of mathematics for analysis, design, and troubleshooting tasks. ● Mechanical skills - use hand tools and soldering irons on small circuitry and electronic parts to build components by hand. ● Problem-solving skills- identify and fix problems that arise in assembling and inspecting electrical engineers' designs and prototypes. ● Writing skills - write reports about onsite construction, design problems, or testing results 	Which credentials do employers cite as a valuable benchmark to hire someone in this occupation? <ul style="list-style-type: none"> ● Associates Degree ● Certification for electrical and electronic technologists and technicians (NICET) ● Certifications such as the Certified electronics Technician (CET) can help to show dedication to improving skills
Please describe possible career progression opportunities for this occupation: <ul style="list-style-type: none"> ● Electricians ● Supervisors ● Project Superintendents ● Production Managers in Manufacturing ● Warehouse Managers ● Maintenance Managers 	
Please share the data, employer feedback, and/or Regional Network feedback that helped you identify this as a high-priority occupation: Discussion among leaders in the industry as well as Washington State data.	

See 2023 data - <https://esd.wa.gov/labormarketinfo/LAAO>

Please describe the top barriers employers have identified to hiring for this occupation:

There is a high need for workers to replace current electronic and electrical engineering technologists and technicians to replace current aging and retiring workforce.

In addition, there is an upkeep needed for technological advancements. Top barriers include:

Skills Gap- One of the primary barriers is the disconnect between the skills possessed by job seekers and the skills demanded by employers. Many candidates may lack the specific technical skills or hands-on experience required for the job, leading to difficulties in finding suitable candidates.

Technological Advancements- The rapid pace of technological advancements in the field of electrical and electronic engineering can create challenges for both job seekers and employers. Employers may struggle to find candidates with up-to-date knowledge and expertise in emerging technologies such as renewable energy systems and automation.

Experience Requirements- Employers often seek candidates with relevant work experience in the field. However, entry-level positions may require experience that recent graduates or individuals transitioning from other careers may not have. This experience barrier can make it challenging for employers to fill positions with qualified candidates.

Soft Skills- In addition to technical skills, employers also value soft skills such as communication, teamwork, problem-solving, and adaptability. Employers have also commented that electronics manufacturing is detailed in a way that often does not align with CTE stereotypical understanding of manufacturing. Electronics Manufacturers are looking for creative detail-oriented individuals able to work with very small parts - sometimes under a magnifying glass.

Employers increasingly recognize the importance of building diverse and inclusive workforces. However, achieving diversity goals in technical fields such as electrical and electronic engineering can be challenging due to historical underrepresentation of certain demographics, such as women and minorities, in the field.

Please describe the type of programs or approaches employers have found helpful in hiring for this occupation:

Apprenticeship and Internship Programs are helping employers hire electronic and electrical engineering technologists and technicians. Some programs to note are WSU- Electrical Engineering and Technology Program, Bellevue College - Electronics Engineering Technology Program, Renton Technical College (RTC) - Electronics Technology Program, Green River College - Electrical Engineering Technology Program.

Employers report electronic manufacturing can benefit from Youth Apprenticeships, part-time scheduling for junior and senior students to experience on the job training and hosting a "TON of Tours" focused on advanced robotics for local middle schools. Many employers also donate to

schools and sports programs to attract the attention of CTE programs. There is a great need for expansion of pathways for this occupation now in our state and in the future as with the advancement of AI and the growth/development of electrical grids. We will need skilled and knowledgeable workers to maintain and facilitate this work. Expertise of electrical grids is critical as technology advances and there is an increase in use. All of this in turn impacts the Aerospace industry as many Aerospace employers rely on these electrical grids.

The Industry requires IPC certificates in Manufacturing every 2 years <https://www.ipc.org/ipc-certifications>. IPC Certification and Apprenticeships for Electronics Assemblers are nationally recognized credentials with extreme value to employers.

Between now and June of 2025, where is there regional momentum to support pathway development in this occupation?

- Region 1 - Capital
 - Key Momentum Factors: The need to keep up with evolving technology
 - Expansion focus on rural K12 space where established partnerships between post-secondary CTCs and local employers that support CL credential opportunities, already currently exist.
 - High-Potential Opportunities:
 - Developing three career pathways for rural students. Provides access and opportunity.
 - *2025 goal to introduce at least 3-5 new CL credentials in occupations such as machining and welding*
 - Shared Priority? Yes
- Region 2 - East
 - Key Momentum Factors:
 - Forecast annual growth for this occupation in this region is 0.6%
 - Postsecondary programs linked: CWU, Columbia basin college
 - “We have programs in multiple schools and are building more. Since Spokane is now a TechHub with aerospace and manufacturing as the focus, there is quite a “drive” to focus on these areas.”
 - High-Potential Opportunities: Expanded programing for electrical technicians
 - Shared Priority? Yes
- Region 3 - King & Pierce
 - Key Momentum Factors:
 - Anticipated growth by sector based on current WJI projects current/new CL programs: Advanced Manufacturing & Aerospace: 120
 - High-Potential Opportunities:
 - Washington Jobs Initiative Sectoral Partnerships: Aerospace and Manufacturing Sector Partnership (advanced manufacturing & aerospace sector) — a partnership led by Machinists Institute with ANEW in industries like manufacturing and maritime.
 - Manufacturing WORKS (advanced manufacturing & aerospace sector) — a partnership with WorkForce Central, AJAC, and regional community colleges in manufacturing occupations such as machinists and welders.
 - Shared Priority? Yes
- Region 4 - Mid Columbia

- Key Momentum Factors: Cross sector workforce needs
- High-Potential Opportunities:
 - Food Processing and Advanced Manufacturing
 - Continuing to keep up with evolving technology
- Shared Priority? Yes
- Region 5 - North Central
 - Key Momentum Factors: Cross sector workforce needs. Access and expansion to training programs.
 - High-Potential Opportunities:
 - Continuing to keep up with evolving technology
 - Promoting the need for electrical technicians in the area
 - Shared Priority? Yes
- Region 6 - Northwest
 - Key Momentum Factors:
 - CCL involved in helping high school with a CCW program builder grant focused on manufacturing (awarded in round 12)
 - Looking ahead to develop curriculum outcomes that would enable CTE pathways for CTE dual credit opportunities regional with 3 community colleges in the region for manufacturing/engineering
 - Obtained funding in Snohomish County to support manufacturing career exploration programming through EvCC AMTEC and Goodwill, as well as recent grant applications in partnership with Boeing to continue K12 curricular alignment work
 - High-Potential Opportunities:
 - Advancement in CTE dual credit opportunities
 - Strong relationships to build upon with training centers, community colleges, and technical colleges. These relationships can lead to further development of career exploration and career launch programs in the region
 - Shared Priority? Yes
- Region 7 - South Central
 - Key Momentum Factors:
 - Cross sector workforce needs. Access and expansion to training programs.
 - High-Potential Opportunities:
 - Continuing to keep up with evolving technology
 - Promoting the needs for electrical technicians in the area
 - Aerospace and manufacturing are in-demand.
 - Shared Priority? Yes
- Region 8 - Southwest
 - Key Momentum Factors:
 - RN has identified Electrical and Electronic Engineering Technologists and Technicians as a high-priority occupation for this region
 - Internships contribute positively as momentum factors
 - Local employers have expressed prioritization
 - Region has a huge center for electronics manufacturing
 - High-Potential Opportunities:
 - High tech council center of excellence opportunity for development
 - Aligning K-12 pathways with a new manufacturing career launch
 - Shared Priority? Yes
- Region 9 – West Sound

- Key Momentum Factors: High demand for skilled electrical technicians in this region. Not meeting skill needs.
- High-Potential Opportunities: Promotion of the occupations accessible through proficiency in electrical skill sets. Opportunity for more training programs in this region.
- Shared Priority? Yes

Occupation: Electro-Mechanical and Mechatronics Technologists and Technicians	Sub-sector: Fiber Optics Controller
Average wage: \$35.84 / hour - \$74,550 annual Seattle-Tacoma-Bellevue: \$44.46 / hour - \$92,470	
<p>Which skills/competencies do employers use as a benchmark to hire someone in this occupation?</p> <ul style="list-style-type: none"> ● Communication skills - must be able to follow instructions from engineers. They also need to clearly convey problems to engineers. ● Detail oriented - take and record the precise measurements that engineers need. ● Logical-thinking skills - to carry out engineers' designs, inspect designs for quality control, and assemble prototypes, electro-mechanical and mechatronics technologists and technicians must follow a specific sequence or a set of rules. ● Math skills. - use of mathematics for analysis, design, and troubleshooting in their tasks. ● Mechanical skills. They must be able to operate equipment such as drill presses, grinders, and engine lathes. ● Problem-solving skills. Ability to identify and fix problems that arise with engineering designs and prototypes. ● Writing skills. Electro-mechanical and mechatronics technologists and technicians must write clear, well-organized reports that describe onsite construction, testing results, 	<p>Which credentials do employers cite as a valuable benchmark to hire someone in this occupation?</p> <ul style="list-style-type: none"> ● Electro-mechanical and mechatronics technologists and technicians may earn optional certification to demonstrate professional competence. ● Certified Control Systems Technician (CCST) and Certified Automation Professional (CAP) a plus ● Training in vocational schools, related on-the-job training experience, or an associate's degree

and problems they found in carrying out designs.

Please describe possible career progression opportunities for this occupation:

Wages depend on industry. The highest paying industries include:

- Utilities
- Transportation and warehousing
- Management of Companies and enterprises
- Mining, quarrying, and oil and gas extraction
- Professional, scientific, and technical services
- Administrative, support and waste management services

Please share the data, employer feedback, and/or Regional Network feedback that helped you identify this as a high-priority occupation:

Visited Spokane Community College and met with Professor John Norman, Hydraulic and Pneumatic Automation Instructor. He expressed the demand for Electro-Mechanical and Mechatronics Technologists within our state. According to the U.S. Bureau of Labor and Statistics, approximately 1,300 job openings for Electro-Mechanical and Mechatronics Technologist are projected each year, on average. Furthermore, Washington State is among the top paying states for Electro-Mechanical and Mechatronics Technologists and Technicians.

Please describe the top barriers employers have identified to hiring for this occupation:

These openings are a result from the need to replace workers who transfer to other occupations or exit the labor force (i.e. retirement). Therefore, employers have expressed that there are not enough trained individuals with the necessary skillsets to fill these positions. The machining and equipment that is needed to train students for this occupation is also very expensive and schools have difficulties finding funding to purchase and maintain the needed equipment to train students.

Please describe the type of programs or approaches employers have found helpful in hiring for this occupation:

According to the U.S. Bureau of Labor and Statistics, employers may prefer to hire graduates from accredited programs (accredited by an organization such as ABET). Associate's degree programs that include subjects such as algebra, trigonometry, and sciences are particularly helpful and necessary.

Between now and June of 2025, where is there regional momentum to support pathway development in this occupation?

- Region 1 - Capital
 - Key Momentum Factors:

- alignment work
- High-Potential Opportunities:
 - Advancement in CTE dual credit opportunities
 - Strong relationships to build upon with training centers, community colleges, and technical colleges. These relationships can lead to further development of career exploration and career launch programs in the region
 - Several colleges in the region are also planning to apply for Career Launch Endorsement for programs in priority sectors such as Everett Community College in mechatronics.
 - Shared Priority? Yes
 - Region 7 - South Central
 - Key Momentum Factors: Growth in demand
 - High-Potential Opportunities:
 - Shared Priority? Yes
 - Region 8 - Southwest
 - Key Momentum Factors:
 - RN has identified Electro-Mechanical and Mechatronics Technologists and Technicians as a high-priority occupation for this region
 - Internships contribute positively as momentum factors
 - Clark college career launch and employer internal certification programs in place
 - High-Potential Opportunities:
 - Opportunity to support development is paying short term interns
 - Shared Priority? Yes

Occupation: Aerospace Engineering Operations Technician	Sub-sector:
Average wage: \$42.77 / hour - annual \$88,960 \$93,152 / year - (Seattle Area)	
Which skills/competencies do employers use as a benchmark to hire someone in this occupation? <ul style="list-style-type: none"> ● Communication skills. Ability to follow instructions from aerospace engineers. They also need to clearly convey problems to their supervisors. ● Detail oriented. Precision with measurements and keep accurate records of these measurements. ● Interpersonal skills. Must be able to work well with others. They interact with people from other divisions, businesses, and 	Which credentials do employers cite as a valuable benchmark to hire someone in this occupation? <ul style="list-style-type: none"> ● Associate's degree in engineering technology or related field ● Certificate program ● Experienced engineers and technicians may obtain Professional Engineering (PE) License

governments.

- **Math skills.** Use of mathematics for measurement, analysis, design, and troubleshooting tasks.
- **Mechanical skills.** Assist aerospace engineers by building what the engineers design. They need technical skills to guide processes from design to production.
- **Problem-solving skills.** Must be able to help evaluate system capabilities, formulate questions, and then find the answers.

Please describe possible career progression opportunities for this occupation:

- First-Line Supervisors of Mechanics, Installers, Repairers
- General and Operations Managers
- Project Management Specialists and Business Operations Specialists
- Chief Executives
- Software Developers and Software Quality Assurance Analysts and Testers
- Computer User Support Specialists

Please share the data, employer feedback, and/or Regional Network feedback that helped you identify this as a high-priority occupation:

Employers have been discussing hiring difficulty for these roles.

Please describe the top barriers employers have identified to hiring for this occupation:

Specialized Skills and Education: Finding candidates with the necessary qualifications can be challenging, particularly in regions with limited access to relevant educational programs.

Competition: It is difficult for some organizations to attract and specifically retain skilled aerospace engineers and technicians.

Economy and Global Supply Chain Challenges: Hiring qualified engineers and technicians may be impacted by disruptions in the supply chain, such as shortages of critical components or geopolitical tensions.

Aging Workforce & Retention Strategies: Companies need effective retention strategies to ensure that employees remain engaged and motivated, particularly as they may be susceptible to being lured away by competitors offering attractive opportunities.

Please describe the type of programs or approaches employers have found helpful in hiring

for this occupation:

Training programs are the best pipeline in hiring for Aerospace Engineer and Operations Technicians. The WATR Center (Washington Aerospace Training & Research Center) with Edmonds Community College and AMTEC with Everett Community College trains and tailors their work based on current industry needs. The WATR Center is also hired out to businesses that need specialized or specific training in certain roles. This partnership with businesses is helpful to highlight specific skills within the operations technicians to hone in on. AJAC (Aerospace Joint Apprenticeship Committee) combines classroom instruction with on-the-job training.

Between now and June of 2025, where is there regional momentum to support pathway development in this occupation?

- Region 1 - Capital
 - Key Momentum Factors:
 - Expansion focuses on rural K12 space where established partnerships between post-secondary CTCs and local employers that support CL credential opportunities already exist.
 - High-Potential Opportunities:
 - Developing three career pathways for rural students. Provides access and opportunity.
 - *2025 goal to introduce at least 3-5 new CL credentials in occupations such as machining and welding*
 - Shared Priority? Yes
- Region 2 - East
 - Key Momentum Factors:
 - Annual growth forecast for occupation in this region is 1.5%
 - Postsecondary Programs related: Central Washington university, Columbia basin college
 - “We have programs in multiple schools and are building more. Since Spokane is now a TechHub with aerospace and manufacturing as the focus, there is quite a “drive” to focus on these areas.”
 - High-Potential Opportunities: Potential for aerospace training program expansion.
 - Shared Priority? Yes
- Region 3 - King & Pierce
 - Key Momentum Factors:
 - Anticipated growth by sector based on current WJI projects current/new CL programs: Advanced Manufacturing & Aerospace: 120
 - High-Potential Opportunities:
 - Washington Jobs Initiative Sectoral Partnerships: Aerospace and Manufacturing Sector Partnership (advanced manufacturing & aerospace sector) — a partnership led by Machinists Institute with ANEW in industries like manufacturing and maritime.
 - Manufacturing WORKS (advanced manufacturing & aerospace sector) — a partnership with WorkForce Central, AJAC, and regional community colleges in manufacturing occupations such as machinists and welders.
 - Shared Priority? Yes
- Region 4 - Mid Columbia

- Key Momentum Factors: Growing interest in aerospace programming.
- High-Potential Opportunities: Opportunity with growing aerospace training programs.
- Shared Priority? Yes
- Region 5 - North Central
 - Key Momentum Factors:
 - Expanding apprenticeship opportunities within manufacturing
 - High-Potential Opportunities:
 - Manufacturing
 - Shared Priority? Yes
- Region 6 - Northwest
 - Key Momentum Factors:
 - CCL involved in helping high school with a CCW program builder grant focused on manufacturing (awarded in round 12)
 - Looking ahead to develop curriculum outcomes that would enable CTE pathways for CTE dual credit opportunities regional with 3 community colleges in the region for manufacturing/engineering
 - Obtained funding in Snohomish County to support manufacturing career exploration programming through EvCC AMTEC and Goodwill, as well as recent grant applications in partnership with Boeing to continue K12 curricular alignment work
 - Skagit Valley College has had both their Automotive Technology and Manufacturing Engineering Technology programs approved. This will increase Career Launch enrollment immediately for 2023-24.
 - High-Potential Opportunities:
 - Advancement in CTE dual credit opportunities
 - Strong relationships to build upon with training centers, community colleges, and technical colleges. These relationships can lead to further development of career exploration and career launch programs in the region
 - Shared Priority? Yes
- Region 7 - South Central
 - Key Momentum Factors:
 - Aerospace and manufacturing are in-demand.
 - High-Potential Opportunities: Promoting the opportunities within the aerospace manufacturing sector to increase awareness of career pathways.
 - Shared Priority? Yes
- Region 8 - Southwest
 - Key Momentum Factors: Big interest in aerospace. Growth in training programs.
 - High-Potential Opportunities:
 - Aligning K-12 pathways with a new manufacturing career launch
 - Cross sector workforce training and needs
 - Shared Priority? Yes
- Region 9 – West Sound
 - Key Momentum Factors: Need to maintain equipment and sustain aircraft.
 - High-Potential Opportunities: Demand due to interest in aviation in the area.
 - Shared Priority? Yes

For each region below, which workforce education & training programs are *effectively* meeting employer needs, or could effectively meet their needs with adjustment or expanded capacity? Where relevant, please color code responses to reflect their relevance to specific occupations.

Please provide your color-coding key below:

(M) = Machinists

(W) = Welders

(EE) = Electrical and Electronic Engineering Technologists and Technicians

(EM) = Electro-Mechanical and Mechatronics Technologists and Technicians

(AE) = Aerospace Engineering Operations Technician

Note to Consider

As you read through the below workforce education & training programs, please consider the following information about Aerospace related job growth in Washington State.

There are 1,209 open jobs in space companies in Washington State as of May 31, 2024. This is up more than 30% since the start of the year. 15 Washington space companies are actively hiring and at least 60% of the open positions are engineering-related. That means there are hundreds of non-engineering roles as well.

This tells us that career opportunities in Aerospace are continuing to grow and you do not have to have a background in engineering to work in Aerospace. The 5 identified high-priority occupations in both the Aerospace and Advanced Manufacturing sectors showcase both career pathways in both engineering and non-engineering roles and there are plenty of opportunities for people with or without a background in engineering in these sectors.

Capital

- The Machinists Institute Career Accelerator (Machinists Institute) (M)
- Business2Youth Advanced Manufacturing Career Prep (Thurston County Chamber of Commerce Foundation) (M)
- Welding Technologies CTC (Centralia College) (W)
- STEAM into Tech (Big Brother Big Sisters of Southwest Washington) (EE) (EM) (AE)
- Centralia College (W) (EE) (EM) (AE)
 - Engineering
 - Mechanical/Aerospace Engineering (AS-MRP or AS-T2)
 - Electrical Engineering (AS-MRP or AS-T2)
 - Technology, Trades, & Manufacturing
 - Associate in Applied Science: Electronics, Robotics & Automation
 - Mechatronics (AS - MRP)
 - Certificate of Proficiency: Industrial Trades
 - Associate in Applied Science: Welding
 - Certificate of Proficiency: Welding
 - (Evening Program) Certificate of Completion: Welding

	<ul style="list-style-type: none"> ● Grays Harbor College (W) <ul style="list-style-type: none"> ○ Associate in Technology: Welding
East	<ul style="list-style-type: none"> ● Manufacturing Connections (Greater Spokane Valley Chamber of Commerce) (M) (AE) (EM) ● The Academy Builder Program (East Valley School District) (M) ● Aerospace Career Launch (North Central WDC/SkillSource) (M) (AE) ● Youth Academy/Career Accelerator Career Launch (Machinists Institute) (M) ● Manufacturing w/ AJAC Registered Apprenticeship (Spokane Workforce Council) (M) ● Machinists Institute - Youth Academy/Career Accelerator Career Launch - Spokane Workforce Council (M)
King & Pierce	<ul style="list-style-type: none"> ● Renton Technical College (RTC) (W) ● Manufacturing Engineering Technologies CTC (Clover Park Technical College) (AE) (EE) (EM) ● STEM + Manufacturing Career Explore (Seattle Goodwill Industries) (M) ● Bates Technical College (M) (AE) (EM) (W) (EE) <ul style="list-style-type: none"> ○ Advanced Manufacturing <ul style="list-style-type: none"> ■ Associate of Applied Science: Machinist ■ Certificate of Training: CNC Operator ■ Certificate of Training: Toolmaking Technology ○ Science, Technology, Engineering and Math (STEM) <ul style="list-style-type: none"> ■ Associate of Applied Science: Electronic Equipment Service Technician ■ Associate of Applied Science: Automation and Mechatronics ■ Certificate of Training: Robotics Specialist ■ Associate of Applied Science: Electrical Engineering Technology ■ Certificate of Training: Engineering Technology ■ Associate of Applied Science: Mechanical Engineering Technology ■ Certificate of Training: Engineering Technology ○ Transportation and Trades <ul style="list-style-type: none"> ■ Associate of Applied Science: Sheet Metal Technology ■ Certificate of Training: Sheet Metal Production Support ■ Associate of Applied Science: Welding ■ Certificate of Training: Welder ● Clover Park Technical College (M) (AE) (EM) (W) (EE) <ul style="list-style-type: none"> ○ Aerospace and Aviation <ul style="list-style-type: none"> ■ Associate of Applied Technology/Associate in Applied Science: Aviation Maintenance Technician ■ Certificate: Avionics Technician ■ Bachelor of Applied Science: Operations Management ○ Advanced Manufacturing <ul style="list-style-type: none"> ■ Bachelor of Applied Science: Operations Management ■ Bachelor of Applied Science: Mechatronics Engineering Technology & Automation (BAS-META) ■ Mechatronics

- AAS - T
 - AAT
 - Certificate
 - Nondestructive Testing
 - AAT or AAS-T
 - Certificate
- Welding Technology
 - Associate of Applied Technology or AAS-T: Welding Technology
 - Certificate: Basic Welding
 - Certificate: Gas Tungsten Arc Welding
 - Certificate: Layout & Fabrication Welding
 - Certificate: Shielded Metal Arc Welding
 - Certificate: Shielded Metal Arc Welding Pipe
 - Certificate: Wire Feed Welding
- Green River College (W) (M) (EM)
 - Associate in Applied Science: Mechanical Computer - Aided Design
 - Associate in Applied Science: Maintenance Mechatronics
 - Certificate: Maintenance Mechatronics
 - Associate in Applied Science -Transfer: Maintenance Mechatronics
 - Associate in Applied Science: Welding Technology
 - Certificate: Welding Technology
- Highline College (EE)
 - Associate of Sciences: Computer & Electrical Engineering (AS-T Track II MRP)
- Machinist Institute Training Programs - Tukwila (M)
 - Machinist Training Programs
 - Exact Aerospace
 - Machinists Inc.
 - Beckwith & Kuffel
- Aerospace Joint Apprenticeship Council (AJAC) - Manufacturing Career Launch - Seattle/King County WDC (M)
- Lake Washington Institute of Technology (M) (W) (EE) (EM)
 - Engineering & Manufacturing
 - Electronics Technology
 - Certificate: PCB Design Technician
 - Certificate: Aerospace Assembly Specialist
 - Certificate: Aerospace Manufacturing
 - Machining Technology
 - Associate in Applied Science: Machining Technology
 - Bachelor of Applied Science: Design
 - Certificate of Completion: CNC Production and Inspection
 - Certificate of Proficiency: Machining Technology
 - Certificate of Completion: Milling Setup and Operation
 - Certificate of Completion: Multi-Axis Programming, Setup, and Operation
 - Certificate of Completion: Turing Setup and Operation
 - Mechanical Design

	<ul style="list-style-type: none"> ● AAS-T: Mechanical Design Technology ● Certificate of Completion: AutoCAD ● Certificate of Proficiency: Mechanical Design Technology ● Certificate of Completion: SolidWorks ■ Welding Technology <ul style="list-style-type: none"> ● Associate in Applied Science: Welding Technology ● Certificate of Completion: Welding Introduction ● Certificate of Proficiency: Welding Technology
<p>Mid-Columbia</p>	<ul style="list-style-type: none"> ● SEATech - AJAC Production Technician Registered Youth Apprenticeship Program - Advanced Manufacturing and Welding Technology Program (Walla Walla Public Schools) (M) (W) (EE) ● Columbia Basin College (M) (W) (EE) <ul style="list-style-type: none"> ○ Career and Technical Education <ul style="list-style-type: none"> ■ Manufacturing Technology <ul style="list-style-type: none"> ● Associate of Applied Science: Precision Machining ● Supplemental Type Certificate: Solid Modeling for Manufacturing ■ Welding Technology <ul style="list-style-type: none"> ● Associate of Applied Science: Welding Technology ● Certificate: Welding Technology ■ Engineering <ul style="list-style-type: none"> ● Associate of Applied Science: Engineering Technology ■ Machining <ul style="list-style-type: none"> ● Supplemental Type Certificate: Basic Machining ● Supplemental Type Certificate: Introduction to CNC ● Certificate: Manual Machining
<p>North Central</p>	<ul style="list-style-type: none"> ● Aerospace Career Launch (North Central WDC/SkillSource) (M) (AE) ● Machining Technology CTC (Wenatchee Valley College) (M) ● Engineering Career Launch (Wenatchee Valley College) (EE) (AE) ● Industrial Technology Electronics CTC (Wenatchee Valley College) (EE) (EM) ● Big Bend Community College (EM) (AE) (W) (EE) <ul style="list-style-type: none"> ○ Aviation <ul style="list-style-type: none"> ■ Associate of Applied Science: Aviation Maintenance Technology ○ Manufacturing and Process Technology <ul style="list-style-type: none"> ■ Associate of Applied Science - T : Manufacturing & Process Technology: Maintenance Emphasis ■ Associate of Applied Science - T : Manufacturing & Process Technology: Mission Critical Operations Emphasis ■ Associate of Applied Science - T : Manufacturing & Process Technology: Robotics & Automation Emphasis ○ Welding <ul style="list-style-type: none"> ■ Associate of Applied Science: Welding Technology ■ Welding Certificate of Achievement

	<ul style="list-style-type: none"> ■ Welding Certificate of Accomplishment ○ Engineering <ul style="list-style-type: none"> ■ AS - T Pre-Engineering: ME/CE/MS&E/AERO (OTRE) <ul style="list-style-type: none"> ● mechanical/civil/aeronautical/material science engineering (OTRE) or in electrical/computer hardware engineering (CEE)
<p>Northwest</p>	<ul style="list-style-type: none"> ● Manufacturing Technology Career Launch (Skagit Valley College) (EE) (AE) ● Manufacturing Engineering Technologies CTC (Skagit Valley College) (AE) ● AMTEC - Advanced Manufacturing Training & Education Center (Everett Community College) (M) (W) (EE) (EM) (AE) <ul style="list-style-type: none"> ○ Associate in Technical Arts Degree in Advanced Manufacturing Tech - Precision Machining ○ Principles of Precision Machining Certificate ○ Manufacturing Pre-Employment Certificate ○ Associate in Technical Arts Degree in Advanced Manufacturing Technology - Mechatronics ○ Mechatronics Systems Certificate ○ Robotics Foundation Certificate ○ Associate in Technical Arts in Advanced Manufacturing Technology in Technical Design, CAD ○ Auto CAD Certificate ○ CAD Certificate ○ CATIA 3D Experience Certificate ○ Mastercam Machining Certificate ○ NC Programming Mastercam and Vericut Certificate ○ Numerical Control Programming Foundation Certificate ○ Solid Works Certificate ○ Associate in Technical Arts Degree in Advanced Manufacturing Technology - Composites ○ Aerospace Composites Foundations Certificate ○ Aerospace Composites Technician Certificate ○ Associate in Technical Arts Degree in Welding and Fabrication ○ Certificate in Welding ○ TIG Welding Certificate ○ Entry Level Welding Certificate ○ Advanced Manufacturing Technology - Welding and Fabrication Certificate ● Bellingham Technical College (M) (AE) (EM) (W) (EE) <ul style="list-style-type: none"> ○ Advanced Manufacturing <ul style="list-style-type: none"> ■ Associate of Applied Science: Industrial Maintenance & Mechatronics ■ Associate of Applied Science: Instrumentation & Control Technology ■ Associate of Applied Science: Machining ■ Certificate of Training: Machining - Principles of Machining & CNC Operation ■ Certificate of Training: Machining - Quality Assurance ■ Bachelor of Applied Science: Operations Management

- Associate of Applied Science: Process Technology
 - Certificate of Training: Process Technology
 - Associate of Applied Science: Welding & Fabrication Technology
 - Certificate of Training: Basic Welding Skills
 - Engineering Technology
 - Associate of Applied Science: Composites Specialization
 - Associate of Applied Science: Mechanical Design Specialization
 - Certificate of Training: Mechanical Design Specialization - AutoCAD and/or SolidWorks
 - Bachelor of Applied Science: Engineering Technology
 - Industrial Technology
 - Associate of Applied Science: Electrician
 - Associate of Applied Science: Welding & Fabrication Technology
 - Certificate of Training: Welding & Fabrication Technology - Basic Welding Skills
- Edmonds College & Washington Aerospace Training & Research (WATR) Center & Advanced Manufacturing Skills Center (AMSC) (M) (AE) (EM) (EE)
 - Engineering & Manufacturing
 - Aerospace
 - Certificate from WATR Center (12 Week Program)
 - Advanced Manufacturing & Materials Engineering Technology
 - Bachelor of Applied Science: Manufacturing and Materials Engineering Technology (BAS-AMMET)
 - Engineering
 - AS-Track 2 for Mechanical, Civil, Aeronautical, Industrial, Materials Science Engineering
 - AS-Track 2 for Computer and Electrical Engineering
 - Engineering Technology
 - AAS-T Robotics and Automation
 - ATA Manufacturing and Materials Science
 - ATA Mechatronics and Automation Technology
 - Certificate of Completion: Manufacturing and Quality Assurance
 - Certificate of Completion: CAD with 3D Printing
 - Skagit Valley College (EM) (W) (EE) (M)
 - Industrial Technology and Transportation
 - Bachelor of Applied Science: Advanced Manufacturing
 - AAS-T Engineering Technology
 - Associate in Applied Science: Engineering Technology
 - Certificate: Manufacturing Technology
 - Micro-Certificate: Composites Repair Technician
 - Micro-Certificate: Manufacturing Automated Systems Technology
 - Micro-Certificate: Manufacturing Computer Numeric Control (CNC) Operator
 - Associate in Applied Science: Welding Technology

	<ul style="list-style-type: none"> ■ Certificate: Welding Technology ■ Specialty Certificate: Welding Technology - Aluminum ■ Specialty Certificate: Welding Technology - Flux Cored Arc ■ Specialty Certificate: Welding Technology - Shielded Metal Arc Welding ■ WABO Certification: Welding Technology ■ Micro-Certificate: Automotive Engine Machinist
<p>South Central</p>	<ul style="list-style-type: none"> ● Aerospace Career Launch (North Central WDC/SkillSource), Aerospace Career Launch (North Central WDC/SkillSource) (M) (AE) ● Big Bend Community College (EM) (AE) (W) (EE) <ul style="list-style-type: none"> ○ Aviation <ul style="list-style-type: none"> ■ Associate of Applied Science: Aviation Maintenance Technology ○ Manufacturing and Process Technology <ul style="list-style-type: none"> ■ Associate of Applied Science - T : Manufacturing & Process Technology: Maintenance Emphasis ■ Associate of Applied Science - T : Manufacturing & Process Technology: Mission Critical Operations Emphasis ■ Associate of Applied Science - T : Manufacturing & Process Technology: Robotics & Automation Emphasis ○ Welding <ul style="list-style-type: none"> ■ Associate of Applied Science: Welding Technology ■ Welding Certificate of Achievement ■ Welding Certificate of Accomplishment ○ Engineering <ul style="list-style-type: none"> ■ AS - T Pre-Engineering: ME/CE/MS&E/AERO (OTRE) <ul style="list-style-type: none"> ● mechanical/civil/aeronautical/material science engineering (OTRE) or in electrical/computer hardware engineering (CEE) ● Aerospace Joint Apprenticeship Council (AJAC) - Manufacturing Career Launch - South Central Washington WDC (M)
<p>Southwest</p>	<ul style="list-style-type: none"> ● Wahkiakum County Career Explore (Washington State University) (M) (AE) ● The Machinists Institute Career Accelerator (Machinists Institute) (M) ● Semiconductor Career Launch (Workforce Southwest) (EE) (AE) ● Clark College (EM) (AE) (W) (EE) <ul style="list-style-type: none"> ○ Advanced Manufacturing and Mechanical <ul style="list-style-type: none"> ■ Mechatronics <ul style="list-style-type: none"> ● Associate in Applied Technology: Mechanical & Instrumentation Automation ● Certificate of Achievement: Mechanical Automation ● Certificate of Completion: Mechatronics Fundamentals ■ Welding <ul style="list-style-type: none"> ● Associate in Applied Technology: Welding Technologies ● Certificate of Proficiency: Welding Technician ● Certificate of Achievement: Gas Tungsten Arc Welding ● Certificate of Achievement: Shielded Metal Arc

	<ul style="list-style-type: none"> Welding <ul style="list-style-type: none"> ● Certificate of Achievement: Flux Core Arc Welding ● Certificate of Achievement: Gas Metal Arc Welding ■ Mechanical, Civil & Aeronautical Engineering <ul style="list-style-type: none"> ● Associate in Science (AST2) ■ Electrical and Computer Engineering <ul style="list-style-type: none"> ● Associate in Science (AST2) ● Machinists Institute Training Programs - Southwest Washington (M) <ul style="list-style-type: none"> ○ Machinist Training Program <ul style="list-style-type: none"> ■ Innovative Composite Engineering ■ Kyocera ■ USNR
<p>West Sound</p>	<ul style="list-style-type: none"> ● Seattle Goodwill Industries - Evergreen Goodwill - STEM + Manufacturing Career Explore - Olympic Consortium WDC (M) (EM) (AE) (W) (EE) ● Olympic College (M) (EM) (AE) (W) (EE) <ul style="list-style-type: none"> ○ Manufacturing & Engineering Technology <ul style="list-style-type: none"> ■ Associate in Applied Science: Engineering Technology- Manufacturing Technology ■ Associate in Applied Science: Engineering Technology - Manufacturing Machining ■ Certificate: Manufacturing Technology - Computer Numerical Control ■ Certificate of Completion: Manufacturing Technology ■ Associate Controls Specialist Apprenticeship ■ Associate in Technical Arts: Industrial Trades Technician ■ Associate in Technical Arts: Technical Design ■ Certificate of Completion: Mechanical Technician ■ Certificate: Technical Design ■ Associate in Technical Arts: Welding ■ Certificate of Proficiency: Welding Technology ■ Certificate: Aluminum Welding ■ Certificate: Precision Metal Cutting ○ Engineering <ul style="list-style-type: none"> ■ AS-T: Mechanical, Civil, Aeronautical, Industrial, Materials Science Engineering ■ AS-T: Electrical and Computer Engineering ● Skills Center Bremerton and Grays Harbor ● Jefferson County

What is needed to increase participation of BIPOC students in your sector’s high priority occupations? To increase participation of students from rural areas? Which programs are doing this well?

Sector Leader Role in Advancing Equity
 The manufacturing and aerospace industry has embraced BIPOC communities and looks for direct ways to engage both BIPOC communities and the parents of these students. Employers report the

need to showcase work that goes beyond entry-level employment and the connection to engineering careers. Within rural areas, there is additional need and has been strong employer engagement - however, the jobs can vary based on local/regional employer needs.

AWB is working alongside the state Manufacturing Council to support the development of a sub-committee explicitly looking to advance BIPOC students and women's participation in the sector. This is in support of the state legislator's goal to double manufacturing in the state by 2031. Original legislation called out the importance of explicitly supporting BIPOC and Women in pursuing careers and ownership of business. This sub-committee is looking at strategies aimed at developing supportive peer groups, implementing quick industry-led certification/upskilling and getting at the issue of larger exposure to the industry earlier.

<https://www.awb.org/washington-takes-first-step-toward-goal-of-doubling-manufacturing/#:~:text=The%20state's%20new%20council%20is,and%20minority%20Downed%20manufacturing%20businesses>

AWB has also taken the opportunity to profile students, employers, and employees that reflect BIPOC communities through storytelling, industry communication vehicles and other avenues to showcase the industry as much more diverse than perhaps people assume. This includes looking at Manufacturing magazine profiles, the manufacturing videos prepared for students, and identifying student speakers able to speak to industry about their experience and their hopes to engage in the industry as a career.

Within urban communities - the manufacturing industry has made significant in-roads in hiring "non-traditional students" (those with criminal records, recent immigrants, and those with disabilities); however, more work can be done to connect schools/apprenticeship programs and BIPOC organizations. One connection that has been made for 2024 is the involvement and interest of the International Rescue Committee (IRC), which helps refugees within the United States, and trade schools in Washington State. The Seattle-based chapter is looking to connect their secondary program with the WATR Center in Everett. This will begin with a tour, followed by possible students in the program.

Employers report a critical need for high level marketing and education to middle school/high school counselors and parents of students so there is an understanding of aerospace and manufacturing sector roles. Employers report a general apathy and 1950's understanding of the industry that leaves them fighting over a limited number of prepared students/graduates. This can be compounded within certain communities when the industry needs are set in contrast to highly educated engineering roles. Ideally, the industry would be presented as a pathway - an opportunity for individuals - who want to make things - and can start as a high school student and continue along with their curiosity to become a graduate level engineer or a highly technical mechatronics lead.

We have seen positive steps in this direction in the following communities: Moses Lake: Prioritizing Aerospace and Manufacturing; Elma: Good examples of youth apprenticeship programs in manufacturing; Yakima: Positive programming but continued shortages of training programs to meet expanding employer needs. Each of these communities are reflective of the increasing diversity found throughout Washington and the growing rural opportunities in our industry.

Examples of how this competition for workers and a diversified workforce play out can be seen in the following stories here:

During an employer roundtable discussion, employers mentioned that there are very few welders in the Tri Cities region. There are also only a few female welders and they can name their price because employers will compete for them.

Language and working with immigrant populations has been a critical workforce consideration for numerous employers. [At Kass Tailored \(Mukilteo\)](#): the manufacturing space and floor are set-up so that work can be communicated regardless of language capacity. Workflows set up for strength and capabilities and skills and don't have to rely on language as much.

Other employers speak of the need for short-term upskilling to help seasoned individuals gain the computer/language skills to become managers. Other states have been successful in providing manufacturing "Bootcamps" in a variety of languages that enable immigrants educated abroad (often with Engineering degrees) to garner a foothold in the manufacturing industry.

What overarching strategies do you recommend to support pathway development for the highest-priority occupations in your sector?

Collaboration between educational institutions, industry stakeholders, and government bodies is important. This collaboration can involve the design and implementation of specialized training programs tailored to the needs of the aerospace sector, ensuring that curricula are up-to-date and relevant to industry standards. Additionally, apprenticeship programs can provide valuable hands-on experience and mentorship opportunities, allowing individuals to gain practical skills while earning a living wage. By fostering strong partnerships between academia and industry, more individuals can pursue careers in aerospace-related fields, from entry-level positions to advanced roles.

Technology infrastructure is vital to support the training and development of future aerospace professionals. By providing access to cutting-edge equipment, laboratories, and simulation tools, educational institutions can ensure that students receive a comprehensive and practical education that prepares them for the demands of the aerospace industry. There is also a possibility of a shared resource or machine "library." This would allow smaller companies to stay up to date with the ever-evolving technology without spending all their money on consistently updating.

We must continue to work to demystify the Aerospace industry and transform the common misconception that a career in Aerospace is elusive. It is important to show those who do not have a connection to the industry what it truly means to work in Aerospace and the career pathways that lead there. One way to achieve this is through connecting with the younger generation and emerging workforce through marketing with short video explanations on social media that provide true insight into the Aerospace industry and career pathways. This will speak to the interest of the future workforce through a format that's familiar to them and also show different post high school opportunities. Transportation funding for schools and students remains a significant barrier to the development of Career Explore opportunities including Workplace Visits. Dedicated funding for school districts to support these early exposure opportunities is critical for industries that do not readily interact with the public.

Between now and June of 2025, how will you prioritize your time, attention, and resources as a sector leader to support regional pathway development and advance the recommendations above? What specific actions will you take?

Workforce needs are a top concern amongst employers and feedback from the business community is crucial in the development and implementation of career connected learning strategies for the Aerospace and Manufacturing Sector Strategy. As the Sector Leader for Aerospace and Manufacturing, we will prioritize the needs and concerns of the business community and ensure that their voice is heard as we work to support career pathway development and advance our sector's recommendations. Our time, attention, efforts, and resources will be leveraged to ensure that the input of a wide range of businesses are involved in our continued efforts to enhance Washington's workforce system. Specifically, some areas of prioritization are, but not limited to:

- Work with CTE and CTC programs to connect them with leaders within industry to help refine curriculum for graduates to directly enter the workforce.
- Represent the voice and needs of industry and the business community through employer engagement.
- Reduce barriers from labor and industry with youth employment.
- Development of teacher/counselor externships.
- Continue to bridge the education and industry together to keep education and training partners up to date on what industry needs as well as new technologies.
- Building relationships with Regional Networks, Career Connected Learning Coordinators, and Sector Leaders who share areas of alignment in strategy and pathway development.

Furthermore, the collaboration and continued relationship building with CCW Regional Networks (RNs), Career Connected Learning (CCL) Coordinators, and Sector Leaders (SLs) will also be prioritized as we move forward with our strategy and supporting pathway development. Currently, we have begun working closely with the King & Pierce RN, Northwest RN & CCL Coordinator, and Mid-Columbia CCL Coordinator. We have also begun to prioritize further collaboration among the Maritime SL and Information Technology & Cybersecurity SL. The Clean Technology & Energy SL as well as the Agriculture & Natural Resources SL are both sectors we would like to explore collaboration with, as there is overlap with the Aerospace and Clean Technology & Energy Sectors as well as overlap in the Advanced Manufacturing and Agriculture & Natural Resources Sectors.

As the aerospace sector leads, we plan to present at the Aerospace Futures Alliance Summit in September 2024. There will be a breakout room focused on CTC and CTE programs to help inform and connect industry with their educational partners. We will also focus on a case study for a successful apprenticeship program for other industry leaders to understand and possibly utilize parts of the plan in the future. This could align with the work that the King & Pierce Regional Network is doing to interest industry leaders and more apprenticeship programs within aerospace manufacturing.

Our sector continues to collaborate with our regional partners with tours and visits of industry educational partners. We are working closely with the Career Connect Northwest, King-Pierce County, East, and are projecting close partnership in South Central and Southwest. A survey was



sent out to align with regional networks on specific opportunities and career projections in their area.

The aerospace sector is also working with different sectors to partner in overlapping, cross-sector roles. This includes maritime, specifically welding, and the teacher externship program. There could be possibilities with IT with the current upcoming work in aerospace with fiber optics. Clean Tech is also an industry that overlaps with sustainable aviation and the evolving industry.

The annual AWB Manufacturing Week Bus Tour is an opportunity for K12 and college students to engage with employers and see first-hand what a career in manufacturing entails. Not only are students able to tour manufacturers in the area, but teachers and counselors can also engage with industry on site tours to further see what career possibilities there are in the industry. Tour stops include manufacturers across the state and educational/training programs that are training students with the skills needed to enter the workforce in both the Manufacturing and Aerospace industries.

Our long-term goal is to see manufacturing and aerospace continue to thrive in Washington as a source of high-quality jobs. Towards that end, we are committed to helping Washington achieve the goal set by the 2020 Legislature to double the number of manufacturers in Washington with an explicit focus on equity. This work starts with connecting business with CCW programs to increase the number of Career Launch experiences within the industry. We also work to support a tighter correlation between educational systems and employers to better address current and future workforce gaps. A critical step in this process is to convene manufacturers from across Washington in order to determine the industry's status and what its current needs are: generational shifts, workforce participation, and expectations regarding the workplace.

For both the Aerospace and Manufacturing industries, we want to continue contributing to the changing perception of industry jobs in Washington communities through Career Explore Programs. This can be done by continually exposing students, parents, educators, and guidance counselors to industry workplaces and workers. We will work to support opportunities that educate students, parents, educators, and guidance counselors on aerospace and advanced manufacturing workplaces and career pathways.

ADDENDUM

Based on AWB Institute's Washington in the Making Vitals, we have identified regional momentum for the manufacturing aerospace industries throughout our state. We are focusing on two of the Manufacturing Vitals which are **the percentage of employees in the manufacturing/aerospace industry** and **the number of manufacturing jobs** in a county or CCW Region.

#1 Percentage of Employees in the Manufacturing Industry in Washington State by County or CCW Region

Percentage of Employees in the Manufacturing/Aerospace Industry

The data from the Vitals shows that the following counties have manufacturing/aerospace **listed as one of their top 5 employing sectors or industries** and the **percentage of employees in the**



county who are employed by the manufacturing/aerospace industry.

***Data is from 2022**



County	CCW Region	% Of Employees
Adams	East	13%
Clark	Southwest	8.20%
Cowlitz	Southwest	16.90%
Franklin	Mid-Columbia	10.90%
Grant	North & South Central	10.50%
Grays Harbor	Capital	11.40%
Klickitat	South Central	17.70%
Lewis	Capital	11.20%
Mason	Capital	6.30%
Pacific	Capital	9.10%
Pend Oreille	East	3.40%
Skagit	Northwest	11.60%
Skamania	Southwest	15.30%
Snohomish	Northwest	18%
Spokane	East	6.80%
Stevens	East	10.50%

Wahkiakum	Southwest	8.50%
Walla Walla	Mid-Columbia	15.20%
Whatcom	Northwest	9.80%
Yakima	South Central	7.20%

From this data we can see that the following **CCW Regions** have counties with **manufacturing/aerospace in their top 5 employable sectors/industries**.

- Capital (4 counties)
- Southwest (3 counties)
- East (4 counties)
- Northwest (3 counties)
- South Central (3 counties)
- Mid-Columbia (2 counties)
- North Central (1 county)

Of the counties that have manufacturing/aerospace listed as one of their top 5 employing sectors/industries, these are the top 5 in terms of the percentage of employees employed in the manufacturing/aerospace sector/industry.

Rank	County	CCW Region	% Of Employees
1	Klickitat	South Central	17.70%
2	Cowlitz	Southwest	16.90%
3	Skamania	Southwest	15.30%
4	Walla Walla	Mid-Columbia	15.20%
5	Skagit	Northwest	11.60%

Of the counties that have manufacturing/aerospace listed as one of their top 5 employing sectors/industries, these are **the top 5** in terms of **growth in the percentage of employees in the manufacturing/aerospace industry from 2018 to 2022**.

Rank	County	CCW Region	% Of Employees	Rate of Change (Growth)
1	Wahkiakum	Southwest	8.50%	2.5
2	Skamania	Southwest	15.30%	1.6
3	Walla Walla	Mid-Columbia	15.20%	1.1
4	Cowlitz	Southwest	16.90%	0.5
5	Franklin	Mid-Columbia	10.90%	0.4

Of all the **CCW Regions** that have manufacturing/aerospace listed in the top 5 employing sectors/industries, these are **the top 5 in terms of the percentage of employees in that region.**

Rank	County	CCW Region	% Of Employees
1	Klickitat	South Central	17.70%
2	Cowlitz	Southwest	16.90%
3	Walla Walla	Mid-Columbia	15.20%
4	Skagit	Northwest	11.60%
5	Grays Harbor	Capital	11.40%

Of the CCW Regions that have manufacturing/aerospace listed as one of their top 5 employing sectors/industries, these are **the top 4 in terms of growth in the percentage of employees in the manufacturing/aerospace industry from 2018 to 2022.**

Rank	CCW Region	County	% Of Employees	Rate of Change (Growth)
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1	Southwest	Wahkiakum	8.50%	2.5
	Southwest	Skamania	15.30%	1.6
	Southwest	Cowlitz	16.90%	0.5
2	Mid-Columbia	Walla Walla	15.20%	1.1
	Mid-Columbia	Franklin	10.90%	0.4
3	East	Adams	13%	0.2
4	Capital	Mason	6.30%	0.1
	Capital	Grays Harbor	11.40%	0

#2 Number of Manufacturing Jobs in Washington State by County or CCW Region

Number of MFG Jobs

The following counties have an **annual growth rate of 4% or more** for the **number of manufacturing jobs based on data from 2018 to 2022**.

County	CCW Region	% Annual Growth	# Of Jobs 2018	# Of Jobs 2022
Adams	East	4.89%	1,103	1,201
Asotin	Mid-Columbia	10.24%	474	495
Benton	Mid-Columbia	5.21%	4,511	4,764
Chelan	North-Central	5.90%	1,840	2,101
Clallam	West Sound	7.13%	1,079	1,112

Clark	Southwest	5.31%	14,130	14,333
Douglas	North Central	7.59%	564	595
Franklin	Mid-Columbia	15.84%	3,659	3,964
Island	Northwest	4.71%	807	667
Kitsap	West Sound	8.45%	2,744	2,797
Kittitas	South Central	6.96%	538	615
Mason	West Sound	24.69%	888	914
Okanogan	North Central	53.49%	297	462
San Juan	Northwest	5.96%	226	249
Spokane	East	5.08%	15,942	16,146
Stevens	East	5.58%	1,140	1,192
Thurston	Capital	7.43%	3,064	3,325
Wahkiakum	Southwest	8.47%	44	64
Walla Walla	Mid-Columbia	6.38%	3,938	4,383
Yakima	South Central	4.20%	8755	8,356

From the above data, we have been able to identify **the top 5 counties with the highest annual growth rates** when it comes to the **number of jobs in manufacturing from 2018 to 2022**.

Rank	County	CCW Region	% Annual Growth	# Of Jobs 2018	# Of Jobs 2022
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1	Okanogan	North Central	53.49%	297	462
2	Mason	West Sound	24.69%	888	914
3	Franklin	Mid-Columbia	15.84%	3,659	3,964
4	Asotin	Mid-Columbia	10.24%	474	495
5	Wahkiakum	Southwest	8.47%	44	64

Below are the counties with **the highest number of manufacturing jobs as of 2022.**

Rank	County	CCW Region	% Annual Growth	# Of Jobs 2022
1	Spokane	East	5.08%	16,146
2	Clark	Southwest	5.31%	14,333
3	Yakima	South Central	4.20%	8,356
4	Benton	Mid-Columbia	5.21%	4,764
5	Walla Walla	Mid-Columbia	6.38%	4,383

#3 Fall 2023 Washington Manufacturers Survey

The survey reveals trends and on-the-ground realities for manufacturers in Washington.

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