Red Rocks Community Opportunity Now Aerospace Manufacturing Grant:
Regional Talent and Employee Training Needs Assessment
December 2025

Summary

In March 2025, Red Rocks Community College (RRCC) launched the Opportunity Now Aerospace Manufacturing Grant initiative to strengthen and expand the region's aerospace manufacturing talent pipeline. Using the Talent Pipeline Management (TPM) framework, RRCC convened an Aerospace Manufacturing Pathways Steering Committee (SC) and Advisory Board (AB) to align employers, education providers, workforce partners, and regional organizations around shared data, shared priorities, and shared solutions. The goal: build clear, employer-validated pathways and micro-credentials that connect more learners—especially those from underrepresented groups—to high-wage, high-opportunity aerospace manufacturing careers.

These objectives will be delivered through three major outputs:

- A **Regional Talent and Employee Training Needs Assessment** (this report)
- An **Aerospace Manufacturing Career Pathways and Micro-Credential Framework**
- A **Collaborative Funding and Aerospace Manufacturing Facility Plan**

The work is designed to produce **tangible outcomes for learners** (150 participants served, 105 completers, 98 employed at or above the MIT Living Wage, and 67 retained after one year) and is powered by a **broad coalition of partners**, including: RRCC and RRCC Foundation, Education Design Lab (EDL), Greater Arvada Chamber of Commerce, Jeffco EDC, Jefferson County Business & Workforce Center, Manufacturer's Edge, and Jeffco Public Schools, each bringing critical capacity from fiscal management and pathway design to employer engagement, workforce representation, and K–12 alignment.

Through an employer-driven process, Barber-Nichols, CoorsTek, EPOCS, Faustson, Kratos, Lockheed Martin, and Sundyne joined together to ensure the outcomes meet their needs. They identified several critical pain points:

- An **aging workforce** and shrinking local talent pool, driving urgency around knowledge transfer and succession.
- A **skills mismatch** between rapidly evolving technologies and traditional training programs.
- **Persistent talent shortages** in key roles, making retention, career progression, and upskilling essential.
- **Workforce diversity gaps**, especially among women, minorities, and veterans in technical roles.

- **Political and economic volatility** that complicates long-term workforce planning.
- **Security clearance bottlenecks** that significantly narrow the eligible applicant pool.

To focus the work, the employer collaborative identified **six critical roles** aligned with the five pathways, based on difficulty of hiring, cost of vacancy, and strategic importance:

- CNC Machinist
- Precision Machinist
- Quality Inspector
- Miscellaneous Assemblers & Fabricators (Precision, Composite, Mechanical)
- Electrical Technician
- Industrial Maintenance Technician

Using Lightcast Labor Market Information (LMI) for Jefferson, Adams, and Denver counties (Sept 2024–Aug 2025) and employer projections for 2025–2027, the group examined **demand, hiring requirements, and program completions** (supply) for each role. Key findings include:

- **High, sustained demand** across all critical roles. The cohort alone projects these openings:
    - 113 CNC Machinist
    - 55 Precision Machinist
    - 69 Quality Inspector
    - 89 Assembler & Fabricator
    - 85 Electrical Technician
    - 39 Industrial Maintenance Technician
- **Strong competition for talent**, evidenced by high posting intensity (e.g., 1,226 postings for 474 unique Quality Inspector postings; 561 postings for 222 unique Industrial Maintenance Technician postings).
- **Limited and uneven supply**, with program completions often falling short of employer demand, especially for quality, electrical, and maintenance roles. In some cases—like Industrial Maintenance—there were zero completions from the most directly aligned CIP code.
- For **Assemblers & Fabricators**, the removal of the “Miscellaneous Assemblers & Fabricators” SOC code from O*NET and lack of aligned CIP codes mean no reliable program completion data, further complicating planning.
- **Quantum Technology**, while identified as an emerging pathway, lacks an O*NET code and thus cannot be analyzed with the same fidelity; that role has been intentionally excluded from this report and will continue to be developed with Elevate Quantum in parallel to avoid duplication and over-burdening employers.

Employers also aligned on a shared set of **day-one technical competencies and durable skills** across the six roles, moving away from “time on machine” as a proxy for readiness and toward competency- and proficiency-based hiring and advancement. This alignment will help:

- Communicate needs more clearly to education and training partners.
- Reduce redundant or misaligned training.
- Create clearer entry points and targeted upskilling opportunities for learners.
- Support cross-training and mobility across roles (e.g., between machining, quality, assembly, electrical, and maintenance).

The first segment of the work culminated in an in-person convening at RRCC on November 13, 2025 to review demand data, skills alignment, and training program gaps. **Early results from the employer-validated process** include an estimated 40 additional training seats per year for CNC Machinists beginning 2026 and a Mechatronics pathway program for Warren Tech students launching in 2027. As a core element of the TPM framework, these offerings (and others to come) will be part of a pilot of a **Verified Talent Provider (VTP) program**, which will strengthen the employer-provider feedback loop and expand the regional talent pipeline. VTP status recognizes training providers that deliver high-quality preparation for Jefferson County’s most in-demand jobs, based on employer-validated skills, hiring requirements, and projected demand.

Looking ahead, Education Design Lab (EDL) will lead the next phase, designing the Aerospace Manufacturing Career Pathways and Micro-Credential Framework. This will feature a “core first, specialize second” model in which learners gain broad, foundational skills before choosing a specific pathway, allowing them to:

- Enter at the level appropriate to their existing skills.
- Explore options with better information about the work.
- Move more fluidly across roles within the sector.

In 2026, the SC and AB will convene in Arizona to visit aerospace manufacturers, learn from national best practices, and co-design innovative workforce solutions. The project will culminate in May 2026 with a share-out of final pathway designs, micro-credential frameworks, and implementation recommendations—positioning the region with a clear, coordinated roadmap to grow and sustain a robust aerospace manufacturing workforce that meets employer needs and creates meaningful, living-wage opportunities for learners.

Introduction

In March 2025, Red Rocks Community College (RRCC) launched a regional initiative designed to **strengthen and expand the aerospace manufacturing talent pipeline** through coordinated employer engagement, pathway design, and high-impact training solutions. Funded by an Opportunity Now Grant, RRCC established an Aerospace Manufacturing Pathways Steering Committee (SC) to facilitate the work and an Advisory Board (AB) composed of subject-matter experts from industry, education, and workforce partners to guide program development and ensure alignment with employer needs.

This initiative intentionally minimizes duplication of effort by leveraging existing data and insights from a recent Advanced Manufacturing TPM effort. Consolidating this work under the RRCC Aerospace Manufacturing grant umbrella allows deeper research, shared data, and a unified approach to solving regional workforce gaps.

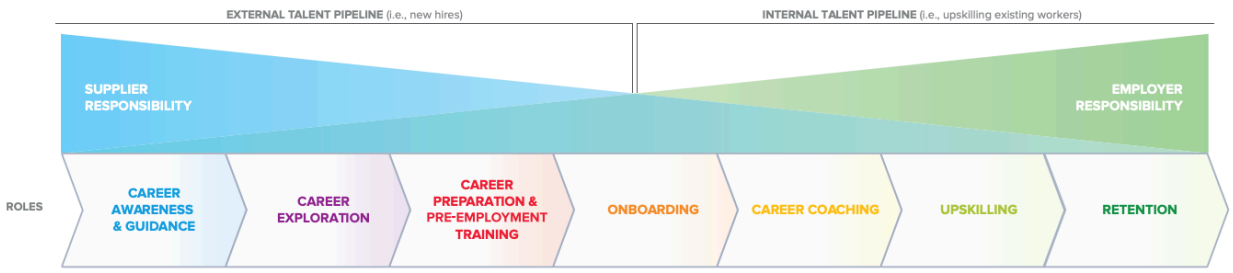
Grant Objectives, Framework, Deliverables, and Outcomes

To achieve the grant's overall goal, **three objectives** were identified:

1. Surveying the regional talent landscape, validating existing assets, and aligning work to ongoing initiatives to reduce duplication of efforts.
2. Designing occupational maps, career pathways, and stackable micro-credentials across five critical focus areas:
    a. Engineering Technology
    b. Mechatronics
    c. Composite Materials
    d. Precision Machining
    e. Quantum Technology
3. Expanding work-based learning and training opportunities, with a focus on increasing access for underrepresented populations entering the aerospace workforce.

The SC agreed to use the **Talent Pipeline Management (TPM)** framework to guide and structure the work. TPM enables employers to analyze the full talent supply chain, clarify where employer and education responsibilities intersect, and identify bottlenecks that impede the flow of qualified workers.

Figure 5.1: Basic Value Stream Map



Discussions, discoveries, and recommendations reflecting these objectives will be collected and communicated through **three deliverables**:

1. A regional Talent and Employee Training Needs Assessment
2. A full Aerospace Manufacturing Career Pathways and Micro-Credential Framework
3. A Collaborative Funding and Aerospace Manufacturing Facility Plan

Most importantly, the work must produce the following **meaningful outcomes** for learners to prove the value of the resource investment:

- 150 participants served
- 105 completers
- 98 participants employed at or above the MIT Living Wage
- 67 retained at one year

Regional Partners and Roles

The SC met monthly from March through November 2025, beginning with forming the AB, and is made up of organizations representing the full stakeholder landscape:

- **RRCC Foundation** – Fiscal agent and financial reporting
- **RRCC** – Grant management, outcomes reporting, student connections
- **Education Design Lab (EDL)**– Pathway design and formal deliverables
- **Arvada Chamber of Commerce** – Occupational needs assessment, employer engagement
- **Jeffco EDC** – Leadership visits and employer recruitment
- **Jefferson County Business & Workforce Center** – Jobseeker representation, WBL support
- **Manufacturer's Edge** – Representation of small manufacturers, employer recruitment
- **Jeffco Public Schools** – K–12 alignment and student connections

The AB kicked off monthly meetings in May. Virtual work culminated in an in-person AB meeting at RRCC on November 13. Participants reflected on the work to date, including demand and skills alignment, then moved it forward by evaluating existing training programs addressing these skills and identifying gaps and redundancies. Outcomes from the day included stronger community connections and increased collaboration across employers and partners.

Early progress demonstrates the impact of this coordination. Training capacity has already increased by 40 seats per year, with more gains anticipated as pathways, micro-credentials, and WBL partnerships continue to expand.

Employer Engagement

A subset of the Advisory Board (AB), a group of leading aerospace manufacturing employers, **Barber-Nichols, CoorsTek, EPOCS, Faustson, Kratos, Lockheed Martin, and Sundyne,** have invested significant time and resources in identifying shared talent gaps, understanding their root causes, and brainstorming creative solutions. Through Steering Committee (SC) and AB meetings, data from a previous advanced manufacturing TPM effort, the in-person convening, and shop floor visits, employers consistently identified the following pain points:

- Workforce skill alignment
- Strong competition for a shallow talent pool
- Hiring process efficiency
- Negative industry perception
- Mismatch between job requirements and worker preferences
- Retention challenges

Colorado's broader manufacturing ecosystem further reinforces the need for a coordinated approach. With approximately 600 small machine shops (fewer than six employees), workers benefit from options of organizational sizes and cultures, but these shops don't always have the resources to recruit in a structured way. The work completed in this project will benefit companies of all sizes.

Detailed Report

Critical Pain Points

Employers across the aerospace and advanced manufacturing sectors share a growing sense of urgency around workforce sustainability. Several systemic challenges are converging, making it increasingly difficult to meet production demands, maintain institutional knowledge, and remain competitive in a rapidly changing market.

- **Aging Workforce & Shrinking Talent Pool:** A significant portion of the current workforce is approaching retirement, raising concerns about knowledge transfer, leadership continuity, and long-term capacity. At the same time, Colorado's declining birth rates since 2005 signal fewer local workers entering the pipeline.

- **Skills Mismatch:** Technological advances in manufacturing, automation, and digital tooling are outpacing updates to traditional training programs leaving employees and graduates underprepared for modern shop-floor requirements.

- **Persistent Talent Shortages in Critical Roles:** Even with the right skill sets, there are not enough workers locally to meet all of the needs, making employee retention, stronger internal career pathways and upskilling critical.

- **Workforce Diversity Gaps:** Women, minorities, and veterans remain underrepresented in technical roles. This limits the industry's talent pool, reduces opportunities for innovation, inclusive problem-solving, and community alignment, and can make it challenging to initially attract those demographics.

- **Political & Economic Volatility:** Ongoing uncertainty around tariffs, national industrial policy, and global supply chain disruptions is creating cost pressures and operational unpredictability, complicating long-term workforce and production planning.

- **Security Clearance Bottlenecks:** Clearance requirements significantly shrink the eligible applicant pool. Lengthy and complex processes discourage candidates and slow down hiring, especially for small and mid-sized firms competing with large primes.

Critical Roles

The employer collaborative identified six key roles aligned with the five pathways as priority areas of focus based on difficulty of hiring, cost of not having someone in the role, and criticality of the role to strategic plans:

- CNC Machinist
- Precision Machinist
- Quality Inspector
- Misc. Assemblers & Fabricators (Precision, Composite, Mechanical)
- Electrical Technicians
- Industrial Maintenance Technicians

	Grant Career Pathways				
Advisory Board Critical Roles/Occupations	Precision Machining	Advanced Composite Materials	Mechatronics	Engineering / Industrial Technology	Quantum
CNC Machinist	X	X	X		*As an emerging market, the role of Quantum Technician is still being defined*
Precision Machinist	X	X			
Quality Inspector	X	X	X	X	
Misc. Assemblers & Fabricators	X	X	X	X	
Electrical Technician			X	X	
Industrial Maintenance Technician			X	X	

Detailed Critical Role Information

To most effectively address talent pipeline obstacles in a critical pathway, it's important to understand not just the symptoms - a shortage of talent - but the root causes. Three areas of data can highlight areas of opportunity that require further digging to understand and remedy:

1. **Quantity (Demand): How many roles will need to be filled, and what are the specifics of those roles (level, new/replacement, part-time/full-time)?** Regional demand projections clarify the size and cost of workforce gaps, reinforcing the business case for focusing on these specific roles. Clear demand data helps employers recognize the value of working together and encourages training providers to build programs that prepare students for high-demand, well-paid jobs with immediate availability.

2. **Quality (Hiring Requirements): What are the hiring requirements for these roles?** Accurately communicating required skills, certifications, experience, and expectations helps attract the right applicants, supports hiring managers in selecting strong candidates, and enables training providers to tailor programs to employer needs. Drawing from job descriptions, cohort discussions, and direct shop-floor observations, employers identified a shared set of day-one skills for the critical roles. Even with their unique processes and tools, employers agreed that establishing a unified core skill set creates real value. This alignment also supports a shift away from measuring readiness by "time on machine" and toward competency and proficiency, a change that can lower costs, increase productivity, provide clearer entry points for learners, reduce redundant training, and allow individuals to target specific skill gaps rather than completing full programs unnecessarily.

3. **Supply (Program Completions): What is the capacity of existing talent providers to supply the required talent?** Completion data and employers' current talent sources help complete the supply–demand picture, revealing opportunities to strengthen existing training pipelines and, if needed, develop new ones. Lightcast™ research identifies which educational programs in the Denver Metro Area currently train for the critical roles. This was done by role name and SOC Codes found in Lightcast™. Detailed Job > SOC Code > CIP Code mapping can be found here.

   Note: During the process, employers viewed 2023 program completion data, which is used in this report. Since work on the report began, 2024 program data became available. Data for most of the roles did not change meaningfully, however it appears changes in SOC Code > CIP Code

mapping has changed for CNC Machinists and Industrial Maintenance Techs, which impact the numbers for those roles. Total number of completions does not appear to change significantly, but the same completions are being mapped to more pathways, impacting competition for graduates.

The sections below cover projected demand (quantity), skills and certification requirements (quality), and program completions (supply) at the aggregate and role-specific levels.

A Note On Quantum Technology

Quantum technology is an emerging field. The Quantum Technician role surfaced during the pathway design work, but because it does not yet have an assigned O*NET occupational code, a reliable talent gap analysis cannot be performed with the same level of fidelity as the other roles in this report. Partners are continuing to explore its definition and requirements in collaboration with Elevate Quantum. To avoid duplicating efforts, ensure alignment, and minimize additional asks of employers, the Quantum Technician role has been excluded from this report and will be developed further through the ongoing pathway work.

Projected Demand for All Critical Roles

The employers first examined Labor Market Information (LMI) from Lightcast for each critical role in Jefferson, Adams, and Denver counties for the 12 months from September 2024 to August 2025. This provided a baseline look at the need and potential indicators of pipeline challenges like salary and level of competition.

		Lightcast Data Sep 2024 - Aug 2025			
Role	**SOC Code**	**Unique Job Postings (UJP)**	**Employers Competing (EC)**	**Median Posting Duration (Days)**	**Comp. Avg. (CA)**
CNC Machinist (CNC Tool Operator)	51-9161	108	49	22	$55,093
Precision Machinist (Machinist)	51-4041	132	52	22	$66,587
Quality Inspector (Inspectors, Testers, Sorters, Samplers, and Weighers)	51-9061	1,226	474	25	$55,581
Misc. Assembler & Fabricator (Adhesive Bonding Machine Operators and Tenders - Miscellaneous Assembler & Fabricator has been removed from O*Net)	51-9191	**No Data Available (Misc Assemblers has been removed - 51-2098)**			

Electrical Technician (Electrical and Electronic Engineering Technologists and Technicians)	17-3023	309	153	26	$78,052
Industrial Maintenance Technicians (Industrial Machinery Mechanics)	49-9041	561	222	24	$77,378

However, LMI does not include levels or the breakdown of new/replacement or full-time/part-time, so the seven participating companies shared their projections for 2025-2027 roles. The table below shows the number of companies in the cohort hiring for the role, total number of projected open roles for the next two years, and a breakdown of full-time vs. part-time and new vs. replacement.

Role	***# Cohort Employers Hiring this Role***	***# Projected Open Roles (All levels, '26-'27)***	***% FT (vs. PT)***	***% New (vs. Replacement)***
CNC Machinist	7/7	113	80% FT	54% New
Precision Machinist	5/7	56	84% FT	23% New
Quality Inspector	7/7	69	93% FT	52% New
Misc. Assemblers & Fabricators	5/7	88	100% FT	75% New
Electrical Tech	4/7	85	98% FT	61% New
Industrial Maintenance Tech	4/7	41	87% FT	15% New

Key takeaways from this table begin to dive into the differences among the roles, which employers weighed in on:

- Though the CNC Machinist role seems to offer the most opportunity for part-time work, employers shared that the inflexibility of all manufacturing floor roles is a challenge in attracting and retaining employees.
- Replacement numbers for CNC and Precision Machinists and Quality Inspectors are related to retirement, with promotions as a secondary factor, while employers shared that industrial maintenance techs tend to bounce around for higher wages.
- Some smaller shops contract out their maintenance work to specialized maintenance firms, giving technicians even more options for where and how they can build their careers.

In the sections below, employer data is broken down by role and level, inclusive of new, replacement (due to promotion, retirement, other turnover), part-time, and full-time roles, and compared to the LMI data.

Projected Demand, Hiring Requirements, and Supply by Role

CNC Machinist Overview

CNC Machinist Demand - All 7 employers hire

	Employer Cohort Actuals						LMI Data		
Role	**New FT**	**New PT**	**Replace FT**	**Replace PT**	**Total Open**	**Open Roles/ Cohort Employ**	**UJP**	**EC**	**Posting /EC**
Entry	27	7	21	3	**55**	**8**	108	49	**2**
Mid	18	5	12	2	**35**	**5**			
Senior	4	11	8	6	**23**	**3**			
					113				

Entry-level CNC Machinists require a combination of technical, mathematical, and analytical skills to effectively translate design specifications into precise manufactured components. Employers also focused heavily on being able to maintain a safe work environment and operate machines safely and the need to be on your feet continuously.

Core competencies include:

- **Math & Measurement:** Apply basic shop math, algebra, and trigonometry to calculate dimensions, tolerances, and tool paths and verbally communicate them effectively.
- **Blueprint Reading & GD&T:** Interpret technical drawings and apply GD&T to ensure parts meet design and tolerance requirements.
- **Machine Operation & Setup:** Operate and set up manual and CNC machines, selecting tools, speeds, and feeds for different materials, and perform preventive maintenance. Manual machining experience isn't required to operate or set up CNC machines, but it greatly helps in diagnosing issues and finding solutions when parts don't meet specifications.
- **Programming & CAM:** Use CAM software and CNC programming to translate digital designs into precise machining instructions.
- **Materials & Processes:** Understand manufacturing processes, metal fabrication, and material properties for efficient, accurate production.
- **Precision & Quality:** Perform precision measurements and apply quality system standards to maintain tight tolerances and continuous improvement.

Together, these skills enable CNC Machinists to produce high-quality, complex parts that meet exact engineering and industry specifications in advanced manufacturing environments. OSHA 10 certification is typically not required upon hire, but gives candidates a leg up. No previous experience is required, and applicants can qualify with a GED or high school diploma, but will most likely start as an Operator and gain the skills to set up machines with experience.

At the mid- and senior levels, the complexity of responsibilities increases and additional experience, training, and certification is required. This includes familiarity with Geometric Dimensioning and Tolerancing (GD&T) standards, completion of a Certified Operation Program, and at the senior levels, an Associate's Degree or Technical Certification is a plus.

Promotions have historically been based on time-in-role. A culture shift to skills-based hiring and career progression will be challenging but necessary to engage and retain younger employees, provide more targeted learning opportunities, and improve time-to-productivity for new hires.

Program Completions (2023)

Role	Education Program Name	Program Completions	Total Pathway Program Completions	Top Programs
CNC Machinist (CNC Tool Operators)	Machine Shop Technology/Assistant	153	272	Red Rocks Community College (148)
	Computer Numerically Controlled (CNC) Machinist	78		Front Range Community College (119)
	Automation Engineer Technology/Technician	41		Community College of Denver (5)

Supply/Demand Analysis

Demand for CNC Machinists is strong across the region, with all seven participating employers actively hiring at the entry, mid, and senior levels, resulting in a combined 113 open roles. Entry-level openings represent the largest share at 55, underscoring the importance of building and maintaining a strong early-career pipeline. Labor Market Information (LMI) reinforces this picture, indicating high posting intensity and competitive pressure for a limited pool of qualified candidates.

On the supply side, regional programs are not producing graduates at a scale that fully meets regional demand. In 2023, institutions produced 272 completions across CNC-related pathways including. When compared to the 113 roles identified by just seven employers, a segment of the broader employer community, it is clear that the available supply does not fully meet employer needs.

Precision Machinist Overview

Precision Machinist Demand - 5 Employers Hire: Barber Nichols, CoorsTek, Kratos, EPOCS, Lockheed

	Employer Cohort Actuals						LMI Data		
Role	**New FT**	**New PT**	**Replace FT**	**Replace PT**	**Total Open**	**Open Roles/ Cohort Employ**	**UJP**	**EC**	**Posting /EC**
Entry	7	0	25	2	**34**	**7**	132	52	**3**
Mid	3	1	8	3	**15**	**3**			
Senior	1	1	3	2	**6**	**2**			
					55				

Precision Machinists produce complex, high-tolerance components that meet rigorous engineering and industry specifications. They combine advanced machining expertise with blueprint interpretation, tool selection, and inspection techniques to achieve exceptional accuracy and surface finishes. Precision Machinists often bridge manual craftsmanship with advanced computer-aided manufacturing.

Core competencies include:

- **Math & Measurement:** Apply basic shop math, algebra, and trigonometry to calculate dimensions, tolerances, and tool paths and verbally communicate them effectively.
- **Blueprint & GD&T:** Read and interpret blueprints and apply GD&T to ensure parts meet design and tolerance requirements.
- **CNC Machining & Programming:** Setup and operate CNC mills and lathes, using Mastercam and CAD/CAM tools to program and optimize machining; perform preventive maintenance.
- **Manual Machining:** Perform precision work on manual lathes and mills for prototypes and production parts.
- **Cutting Tools:** Select appropriate tools, materials, and inserts to improve surface finish, tool life, and efficiency.
- **Surface Finish & Inspection:** Apply surface finish standards and use precision tools to verify tolerances and quality.
- **Process Optimization:** Improve machining workflows, reduce waste, and enhance quality through hands-on problem solving.

The owner of a local machine shop shared that it's common for Precision Machinists to get comfortable with either milling or lathe machines and want to stay in those lanes. Even within lathe machines, people can become committed to either swiss or traditional types, which can also be limiting. The differences among these types of precision machining are not markedly distinct, so a shift in mindset toward working

more broadly can open up more career opportunities for the employee and greater flexibility for the employer.

Precision Machinists are expected to hold or obtain key foundational certifications that reinforce safety, efficiency, and continuous improvement, including OSHA 10 (Workplace Safety) and Lean (Intro to Lean) for process improvement and continuous improvement awareness.

Key Differences Between CNC Machinists and Precision Machinists

While both roles share the core technical foundations of blueprint reading, GD&T, and producing high-tolerance parts, they differ in scope, specialization, and craftsmanship. CNC Machinists are process-driven operators and programmers ensuring consistency and efficiency in automated and manual machining. Precision Machinists are craft technicians who may blend manual and digital techniques to achieve the highest possible levels of dimensional accuracy and surface finish.

Program Completions (2023)

Role	Education Program Name	Program Completions	Total Pathway Program Completions	Top Programs
Precision Machinist (Machinist)	Machine Shop Technology/Assistant	153	231	Red Rocks Community College (148)
	Computer Numerically Controlled (CNC) Machinist	78		Front Range Community College (78)
				Community College of Denver (5)

Supply/Demand Analysis

Only five of the cohort employers hire Precision Machinists, reporting 55 open roles, including 34 entry-level, 15 mid-level, and 6 senior positions, reflecting consistent need and limited available talent. LMI data shows high posting intensity, indicating that employers must frequently re-post openings to attract candidates, a clear sign of competition for a shallow precision talent pool.

On the supply side, the relevant programs according to LMI information are the same ones that feed the CNC Machinist pathway, with the exception of the Automation Engineering Technology/Technician program, making the supply slightly smaller. CNC Machinists work directly with automated equipment, CNC controls, and machine interfaces, so automation coursework supports their job. Precision Machinists rely more heavily on manual machining, fine adjustments, and high-level craftsmanship, making automation coursework less relevant for their daily responsibilities.

Overall, the regional supply of precision-ready machinists does not match the depth of expertise required for these roles, especially at the entry and mid-levels.

Quality Inspector Overview

Quality Inspector Demand - All 7 employers hire for this

	Employer Cohort Actuals						LMI Data		
Role	**New FT**	**New PT**	**Replace FT**	**Replace PT**	**Total Open**	**Open Roles/ Cohort Employ**	**UJP**	**EC**	**Posting /EC**
Entry	19	0	24	2	**45**	**7**	1226	474	**3**
Mid	10	0	3	1	**14**	**2**			
Senior	6	1	2	1	**10**	**2**			
					69				

Quality Inspectors play a critical role in ensuring manufactured parts and products meet precise specifications and industry standards. Their work demands accuracy, documentation, and deep familiarity with inspection tools, processes, and quality systems. In every company, employees performing the job are expected to inspect each part (or a random sample) before sending it to the next step. Most larger companies and those with government contracts have a specific Quality Inspector role and/or career pathway, but this is not true for all shops, which may rely on the production line manager to ensure quality.

Core competencies include:

- **Measurement & Calibration:** Use calipers, micrometers, and other precision tools; perform equipment calibration to maintain accuracy.
- **Inspection Technology:** Operate CMMs and inspection software for precise part verification.
- **Blueprint & GD&T:** Read and interpret technical drawings and GD&T to confirm dimensional accuracy and design intent.
- **Quality Systems & Standards:** Apply QA/QC principles, ISO 9001 standards, and FAI procedures; maintain compliance documentation.
- **Defect Detection & Root Cause:** Identify and document defects; use root cause analysis to prevent recurrence.
- **Process & Product Verification:** Ensure product quality through inspection, documentation, and continuous improvement; strong technical writing skills required to support report-outs.
- **Reproducibility & Investigation:** Conduct reproducibility testing and measurement investigations; trainable on the job.

Quality Inspectors are expected to obtain foundational certifications that support safety, quality, and process improvement. These include OSHA 10 for workplace safety, IPC Operator/Inspection certifications (such as IPC-WHMA-A-620, IPC-J-STD-001, and IPC-7711/7721) covering electronics and wiring standards, Lean (Intro to Lean) for continuous improvement principles, and Intro to Quality Tools to apply data-driven methods for process and product improvement.

Together, these skills and certifications enable Quality Inspectors to uphold rigorous quality benchmarks, support manufacturing excellence, and ensure customer and regulatory compliance in advanced production environments.

Program Completions (2023)

Role	Education Program Name	Program Completions	Total Pathway Program Completions	Top Programs
Quality Inspector (Inspectors, Testers, Sorters, Samplers, and Weighers)	Quality Control Technology/Technician	0	37	Metro State Denver (37)
	Quality Control and Safety Technologies/Technicians, Other	0		
	Mechanical/Mechanical Engineering Technology/Technicians	37		

Supply/Demand Analysis

Demand for Quality Inspectors is high and consistent across the region, with all seven participating employers hiring for this role, highlighting the critical need for quality oversight in aerospace and advanced manufacturing. Employers reported 69 openings, including 45 entry-level, 14 mid-level, and 10 senior roles. LMI shows extremely high posting intensity—1,226 job postings for only 474 unique postings—indicating persistent competition for a limited pool of candidates.

On the supply side, educational completions aligned to Quality Inspector roles are limited, including only 37 in 2023 and falling short of employer demand. Because many Quality Inspectors come from internal production roles rather than directly out of school, training providers and workforce programs play an especially important role in preparing new entrants with foundational quality skills and in providing upskilling options for incumbent workers.

Miscellaneous Assembler and Fabricator Overview

Misc. Assembler & Fabricator Demand - 5 Employers Hire: Barber Nichols, Kratos, EPOCS, Lockheed, Faustson (Information was not provided by level)

	Employer Cohort Actuals						LMI Data		
Role	**New FT**	**New PT**	**Replace FT**	**Replace PT**	**Total Open**	**Open Roles/ Cohort Employ**	**UJP**	**EC**	**Posting /EC**
All	66	0	23	0	**89**	**18**	No Data Available		

Assemblers and Fabricators build and finish components for precision, composite, and mechanical products, following blueprints and quality standards to ensure safety and accuracy in production. This role emphasizes math skills, attention to detail, manual dexterity, and adherence to production processes. During a shop floor visit, a fabricator said math - and being able to read a tape measure - is 80% of his job.

Core competencies include:

- **Blueprint Reading:** Read and follow assembly drawings and work instructions for accurate part placement.
- **Production Processes:** Understand manufacturing workflows, sequencing, and documentation.
- **Tool Use:** Safely operate hand tools, power tools, and basic machinery for assembly and fabrication.
- **Inspection & Measurement:** Perform visual checks and basic measurements to verify part quality.
- **Math & GMP:** Apply basic math and follow Good Manufacturing Practices for consistency and cleanliness.
- **Lean & 5S:** Maintain organized, efficient work areas through 5S and Lean principles.
- **Safety & Hazmat:** Follow OSHA and Hazmat procedures to ensure a safe workplace.
- **Material Handling:** Move and manage materials within production and warehouse environments.

Assemblers and Fabricators typically hold OSHA 10, Lean (Intro to Lean), and IPC Operator/Inspection certifications (IPC-WHMA-A-620, IPC-J-STD-001, IPC-7711/7721) relevant to wiring, soldering, and electronic assembly standards.

Classification and Program Completion Data Note: The “Miscellaneous Assemblers & Fabricators” SOC code has been removed from O*NET. While Adhesive Bonding Machine Operators and Tenders may be a partial replacement (notably for aviation), neither title currently maps to CIP codes in Lightcast,

creating challenges for program alignment. Because of this, Lightcast is not able to provide program completion data.

Supply/Demand Analysis

Five cohort employers reported 89 openings, including 66 new full-time positions and 23 replacement roles. This level of demand signals a sustained need for entry-level production talent capable of supporting precision, composite, and mechanical manufacturing operations. Labor Market Information (LMI) could not be generated for this role due to classification changes, but employers' real-world demand data makes the need clear.

Without aligned program codes, program completion information for assembler- or fabricator-relevant training is not available. The combination of high employer demand, the lack of formal training pipelines, and missing program completion data creates a challenge. Building a stronger, more transparent pipeline for assemblers and fabricators will require:

- Clarifying occupational definitions across employers
- Establishing aligned SOC/CIP mappings
- Creating or updating training programs
- Recruiting learners into entry-level pathways that can lead into machining, inspection, or maintenance roles over time

Electrical Technician Overview

Electrical Technician Demand - 4 Employers Hire: Barber Nichols, CoorsTek, Kratos, Lockheed (Information was not provided by level)

	Employer Cohort Actuals						LMI Data		
Role	**New FT**	**New PT**	**Replace FT**	**Replace PT**	**Total Open**	**Open Roles/ Cohort Employ**	**UJP**	**EC**	**Posting /EC**
Entry	50	1	33	1	**85**	**22**	309	153	**2**

Electrical Technicians install, maintain, troubleshoot, and repair electrical and electronic systems that support advanced manufacturing environments. Their work requires a strong foundation in electrical theory, applied physics, automation, safety, and problem-solving.

Core competencies include:

- **Electrical Theory & Application:** Apply principles of DC and AC electricity, including circuits, sources, loads, RLC circuits, linear amplifiers, steady-state sinusoidal analysis, and power electronics.
- **Safety & Compliance:** Follow electrical safety protocols, Lockout/Tagout (LOTO), and industry standards when working with energized equipment, robotics, and high-voltage systems.

- **Systems & Components:** Work with motors, power supplies, machines, mechanical components, and electromechanical systems used in manufacturing.
- **PLCs & Automation:** Understand the role of PLCs, robotics, mechatronics, and automated systems in manufacturing; use PLC programming and troubleshooting techniques.
- **Electronics & Applied Physics:** Apply concepts of electronics, applied physics, and computer-based systems to diagnose and resolve issues in electrical equipment.
- **Technical Documentation & Troubleshooting:** Read and interpret schematics, wiring diagrams, and technical documentation; perform systematic troubleshooting and testing.
- **Computers & Digital Tools:** Use computers, electronics, and instrumentation for maintenance tasks, diagnostics, documentation, and quality assurance.

Electrical Technicians are strongly encouraged to obtain OSHA 10 for workplace safety and Lean (Intro to Lean) to support continuous improvement and efficient system troubleshooting.

Program Completions (2023)

Role	Education Program Name	Program Completions	Total Pathway Program Completions	Top Programs
Electrical Technicians (Electrical and Electronic Engineering Technologists and Technicians)	Electrical, Electronic, and Communications Engineering Technology/Technician	51	66	Front Range Community College (33)
	Manufacturing Engineering Technology/Technician	15		Metro State Denver (33)

Supply/Demand Analysis

Four cohort employers hire electrical technicians and reported 85 openings, including 50 new full-time roles and 33 replacement positions, reflecting both expansion and ongoing turnover. With 22 open roles per cohort employer, and high posting activity shown in Labor Market Information (LMI)—309 total postings for 153 unique postings—the market shows clear signs of intensity and competition for qualified talent.

On the supply side, training program output is modest relative to employer demand. In 2023, Colorado institutions produced 66 completions from electrical technician–relevant programs, some transition into engineering, maintenance, or automation positions, further shrinking the available pool for electrical technician hiring. Employers also report that electrical roles often require additional on-the-job training, familiarity with specific systems (e.g., PLC platforms), and the ability to troubleshoot across mechanical and electrical domains, making it even harder to fill roles quickly.

The combination of strong employer demand, relatively limited program output, and competition from related fields (automation, engineering technology, industrial maintenance) places consistent pressure on the regional talent pipeline.

Industrial Maintenance Technician Overview

Industrial Maintenance Technician Demand - 4 Employers Hire: Barber Nichols, CoorsTek, Lockheed, Honeywell (Sundyne) (Information was not provided by level)

	Employer Cohort Actuals						LMI Data		
Role	**New FT**	**New PT**	**Replace FT**	**Replace PT**	**Total Open**	**Open Roles/ Cohort Employ**	**UJP**	**EC**	**Posting /EC**
Entry	4	2	32	3	**41**	**11**	561	222	**3**

Industrial Maintenance Technicians maintain, troubleshoot, and repair complex equipment and facility systems to ensure safety and operational reliability, reduce downtime, and support continuous improvement in modern, technology-driven manufacturing environments.

Core competencies include:

- **Equipment Maintenance:** Perform predictive and preventive maintenance to minimize downtime.
- **Electrical & PLC Controls:** Work with electrical systems and PLCs (Siemens, Allen Bradley) to monitor and control production processes.
- **Mechanical Systems:** Maintain and repair pumps, hydraulics, pneumatics, and HVAC systems.
- **Machining & Fabrication:** Use manual machining and welding for repairs or part replacements.
- **Calibration & Instrumentation:** Calibrate and maintain sensors and control devices for accurate performance.
- **CMMS Systems:** Use software (e.g., Maintenance Connection, eMaint) to track maintenance schedules and work orders.
- **Safety & Compliance:** Follow Lockout/Tagout (LOTO), OSHA, and other safety procedures.
- **Technical Literacy:** Read schematics, blueprints, and wiring diagrams; document maintenance activities.
- **Quality & Continuous Improvement:** Apply QMS principles to support reliability and process improvement.

Technicians typically hold OSHA 10 and Lean (Intro to Lean) certifications for workplace safety and process efficiency.

Program Completions (2023)

Role	Education Program Name	Program Completions	Total Pathway Program Completions	Top Programs
Industrial Maintenance Technicians (Industrial Machinery Mechanics)	Mechanical/Mechanical Engineering Technology/Technician	37	37	Metro State Denver (37)
	Industrial Mechanics and Maintenance Technology/Technician	0		

Supply/Demand Analysis

Three cohort employers hire Industrial Maintenance Technicians and report 41 projected openings, including 4 new full-time roles, 2 new part-time roles, and 35 replacement positions. Replacement demand is especially notable and reflects the aging workforce, retirements, and a culture of job hopping. With an average of 11 openings per employer, the role is one of the most difficult to staff and the most costly to have understaffed. Labor Market Information (LMI) underscores these challenges: 561 job postings for only 222 unique postings, meaning employers must repost openings multiple times because of the limited candidate pool.

On the supply side, completion data shows a significant mismatch between employer demand and available new talent. In 2023, only 37 program completions were recorded statewide across pathways relevant to Industrial Maintenance. All 37 completions came from Metro State University Denver's Mechanical/Mechanical Engineering Technology program, which only partially aligns with hands-on industrial maintenance work. Critically, the CIP code most directly tied to this occupation—Industrial Mechanics and Maintenance Technology/Technician—reported zero completions in the same year. This means there were no graduates from a directly aligned, occupation-specific training program entering the Colorado labor market.

The combination of steady employer demand, high replacement needs, and minimal formal training output—including zero completions from the most relevant CIP—highlights a significant talent gap.

Shared Technical Competencies Across Critical Roles

While each role—CNC Machinist, Precision Machinist, Quality Inspector, Miscellaneous Assemblers & Fabricators, Electrical Technician, and Industrial Maintenance Technician—has distinct technical requirements, they share a strong foundation of core manufacturing competencies. This detailed table highlights areas of overlap across all six roles, illustrating where shared skills, certifications, and competencies create natural pathways for cross-training, advancement, and talent mobility within the aerospace and advanced manufacturing ecosystem. These are the key insights:

- **Shared Foundations:** All six roles rely on safety (OSHA 10), basic math and measurement, blueprint interpretation, and lean/5S awareness—forming a strong foundation for cross-training or

pathway mobility.

- **Machining Cluster:** CNC Machinists and Precision Machinists share extensive overlap in GD&T, tool knowledge, CAM programming, and quality verification, with Precision Machinists performing more manual and high-tolerance work.

- **Quality & Inspection:** Quality Inspectors share strong alignment with both machining roles on measurement, GD&T, and QMS, but diverge into calibration, CMM operation, and root cause analysis.

- **Assembly & Fabrication:** Assemblers & Fabricators align with machinists and inspectors on drawing interpretation, measurement, and safety, while adding strengths in production process, GMP, and warehousing.

- **Electrical & Maintenance Pathways:** Electrical Technicians and Industrial Maintenance Techs overlap in PLC controls, instrumentation, hydraulics, and preventive maintenance, with maintenance techs more broadly spanning mechanical systems and QMS auditing.

Durable Skills

In addition to the common technical competencies, shared durable skills are the core professional and interpersonal abilities that support success across all manufacturing roles. They reinforce workplace culture, productivity, and adaptability, helping workers grow within their current roles and prepare for future technologies, roles, and environments.

These qualities apply to all critical roles and experience levels:

- **Cleanliness and Safety:** Maintain organized, clean work areas; proactively identify hazards and raise safety or quality concerns immediately.

- **Dependability and Focus:** Arrive on time and stay on task.

- **Initiative, Curiosity, and Problem Solving :** Take initiative during downtime to seek ways to lend a hand, learn new processes, and observe others' work to learn new skills; Identify issues quickly and recommend or implement practical solutions.

- **Detail Orientation and Quality:** Follow specifications carefully and double-check work for accuracy.

- **Project and Time Management:** Plan tasks efficiently, estimate timelines, and coordinate work to meet production goals.

- **Team Orientation:** Communicate clearly, collaborate effectively, and support coworkers.

- **Verbal Communication:** Ask questions for clarity, advocate for self when work is complete, and engage respectfully with supervisors and peers.

Additional durable skills required for leads, supervisors, and those progressing into management roles:

- **Leadership & Supervision:** Guide and support team members to meet performance and quality goals.
- **Team Management:** Assign work effectively and foster collaboration and accountability.
- **Conflict Management:** Address issues constructively to ensure a respectful and productive team environment.

Top skills identified to prepare workers for the next generation of manufacturing:

- **Digital Literacy:** Use digital tools, data systems, and documentation software confidently and accurately.
- **Augmented & Virtual Reality (AR/VR):** Apply immersive technologies for training, troubleshooting, and equipment operation.
- **Systems Thinking:** Understand how individual tasks and processes connect within larger manufacturing systems.

Employer Back Mapping

Just as with demand, the Lightcast data provides only a piece of the supply picture. It doesn't show where the completers go to work or in what capacity, nor does it indicate the quality of the program. Employers in the cohort were asked to identify the sources of their new hires for the past two years (a process called back mapping).

Leveraging Previously Gathered Information

A previous back mapping effort for CNC Machinists produced the program-related information below based on 24 employees across four employers. These employers ran reports in their HR systems to gather information on all CNC Machinists hired in the previous two years (2023 and 2024) and were still employed after one year. Specific training programs noted in the reports:

High Schools: *Endeavor Academy (1), Castle View (1), Bear Creek (1)*
Post-secondary programs: *University of New Mexico, Automotive Tech, ASE Certification (1), CC Denver (1), Machining for Warriors (1)*

View the entire aggregated data set here.

RRCC AB Data

In line with the goal of the RRCC grant to evaluate local program quality and gaps, employers in this effort were asked to react to the specific set of local programs. This is the aggregated information by pathway and program from the three respondents:

- **CNC Machinist Programs:**
    - RRCC - CNC Machinist 1 Semester (1); Cherry Creek - Aerospace Manufacturing (2); Community College Denver (1); Front Range Community College (FRCC) (1); Warren Tech

(1)

- **Precision Machinist Programs:**
  - RRCC - Machinist AAS; Warren Tech (1); FRCC (1)
- **Industrial Maintenance Tech Programs:**
  - FRCC - Industrial Technology/Technician -2 Semesters (1)
- **Quality Inspector Programs**:
  - Red Rocks/Warren Tech. - Metrology Quality Control (2)

Building a clear, shared understanding of the current training landscape illustrates the strong partnership between the Chamber and EDL. After the Chamber surfaced and aligned the employer needs and requested employer data, EDL advanced the process by facilitating a gallery walk of existing regional programs and offerings identified through their landscape analysis. Employers and partners reviewed the components of each program and provided targeted feedback on what is missing, redundant, or unnecessary for the roles in focus. Through this collaborative review, the group also identified a common set of foundational skills that could serve as the basis for a hub-and-spoke program model, strengthening alignment and reducing duplication across training pathways.

Initial Talent Strategy Established

To increase the depth of the talent pool, training more people will be required. A program for CNC Machinists has been launched at Red Rocks Community College, and Warren Tech is designing one for Mechatronics supporting six career pathways, to be launched in Fall 2027.

CNC Machinist Boot Camp

Employers and partners selected America's Cutting Edge machinist training curriculum, which has been successfully implemented in other states. Taking advantage of Red Rocks Community College's (RRCC) existing Machinist program and Warren Tech's facilities that are unused at night, RRCC will begin to offer a 32-hour in-person Machinist Boot Camp in January, 2026, increasing seats by 40 annually, with the vision of growing in the future. A 6-hour online course is a prerequisite, but learners can also take it to get a taste of machining and see if they want to pursue the pathway further.

Mechatronics Program

Warren Tech is designing a program to launch in 2027 that includes four high school classes, all of which result in a Certification and three of which earn Concurrent Enrollment credit. The drafted courses (Electronics DC/AC, Robotics & Automated Systems, Electronics – Analog/Robotics, and Robotics Mechatronics Technology (A/B)) will apply to both aerospace and quantum manufacturing.

Key Aerospace Manufacturing Sector Takeaways

Consistent with findings from the Advanced Manufacturing TPM effort, the Aerospace Manufacturing sector is challenged with:

- Perception is more of a concern than general awareness. A culture shift is required to move people away from the old days of "dirty, dusty, and dangerous" to the reality of today's computer-driven manufacturing environments, and can require a lot of responsibility.

- The skills gap is not just for entry-level, but with the aging workforce in this industry, it is hard to replace the knowledge and experience of someone who's been there "42 years."
- Younger employees are looking for career pathing and clear progression pathways, but the industry has historically promoted based on tenure.
- An information gaps exist throughout the ecosystem:
    - Students/parents don't know what the profession is really like, and the growth and financial potential
    - Workforce centers need more information about the training available to job seekers to prepare them for open advanced manufacturing jobs
    - Employers don't know the full scope of where to find talent outside of their go-to's

Next Steps

With the foundational labor market analysis, employer insights, and program landscape review complete, EDL will lead the next phase of work, focusing on design and development of the Aerospace Manufacturing Career Pathways and Micro-Credential Framework. This framework will outline clear, stackable pathways across the five focus areas and include a shared set of baseline, cross-functional skills that all learners can acquire before selecting a specialty. This "core first, specialize second" approach will create smoother on-ramps, allow learners to enter pathways at the level that matches their existing skills, and provide greater flexibility for career exploration, ultimately helping more learners persist and succeed in the aerospace manufacturing sector.

As the ACE Machinist Boot Camp launches in January 2026, it will be part of a pilot of a Verified Talent Provider (VTP) program, which will strengthen the employer-provider feedback loop and expand the regional talent pipeline. VTP status recognizes training providers that deliver high-quality preparation for Jefferson County's most in-demand jobs, based on employer-validated skills, hiring requirements, and projected demand. Other programs will be incorporated as appropriate once they launch as well.

In 2026, the full Steering Committee and Advisory Board will be invited to a convening in Arizona to visit aerospace manufacturing companies, learn from their workforce innovations, and collaborate on new approaches to strengthening aerospace manufacturing talent pipelines. This convening will deepen shared understanding, inspire creative solutions, and further solidify the region's employer-education-workforce partnership.

The project will conclude in May 2026 with a comprehensive share-out of the pathway and micro-credential designs, recommended implementation strategies, and opportunities for continued collaboration across partners. This final phase will position the region with a clear, aligned roadmap for building and sustaining a robust aerospace manufacturing workforce ecosystem.