Aerospace Manufacturing Skills

Supply, Demand, and Outcomes for Washington's Aerospace Training Programs

Annual Report – 2015

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This report and other aerospace-related information can be viewed at: www.wtb.wa.gov/aerospace.asp

BACKGROUND

The Aerospace and Advanced Materials Manufacturing Pipeline Advisory Committee monitors the workforce needs of Washington's aerospace industry. The 16-member committee pays close attention to emerging trends in manufacturing and production, pinpoints training required of today's aerospace workers, and looks ahead to retirement and other factors that will impact the talent pipeline. In particular, the committee works to better align the state's community and technical college system and apprenticeship training with industry demand.

The committee was formed in 2012[1] and issued a preliminary report in September of that year. The committee's inaugural report was distributed in December 2012, making this the fourth annual report. All of the reports were jointly written by the state's Workforce Training and Education Coordinating Board (Workforce Board) and the State Board for Community and Technical Colleges (SBCTC).

The 2013 and 2014 reports evaluated how many people were trained in community and technical college aerospace programs, and their outcomes, along with the employment and earnings of students trained by apprenticeship programs, industry hiring needs, and employer satisfaction with aerospace program graduates. This year's report does not include an industry survey focused on hiring needs or satisfaction with aerospace program graduates. However, the 2016 Report will feature this survey.

EXECUTIVE SUMMARY

Key Themes

Industry Outlook

- At the same time forecasters project moderate job declines, retirements promise openings. In addition, aerospace firms are expected to continue to struggle to find workers for certain hard-to-fill occupations.

Pipeline Issues

- High anticipated retirement rates necessitate a stronger pipeline.
- While the state does not expect large net increases in aerospace employment, new jobs will likely require more education and be higher paying.

[1] The committee was formed to implement Chapter 50, following the passage of 2SSB 2156 (2012).

Summary of Findings

Washington is an aerospace industry hub

- Washington's aerospace manufacturing and supporting industries were comprised of 1,425 firms in 2014, with 195 of these firms located in the core industry.[2]

- The core of Washington's aerospace industry is Aerospace Manufacturing and Parts (NAICS 3364), employing 93,891 as of 2014.[3] Surrounding that core are an array of aerospace-related industries comprised of materials and parts suppliers, air transportation and related infrastructure employing over 134,527 Washingtonians as of 2014.

- Washington accounts for nearly 20 percent (or in one in five) of the nation's aerospace jobs, up from 14 percent in 2004.

- Washington outpaces other leading states in both specialization and overall employment. With a location quotient of 9.2, aerospace employment is over nine times more concentrated in Washington than across the rest of the nation. The earnings location quotient, or relative share, is even higher than that of employment (10.6). In other words, Washington aerospace workers collectively earn relatively more than aerospace workers outside the state.

- Production, engineering, business/finance, and computer and mathematical occupations made up the bulk of Washington aerospace occupations.

Training is accelerating in apprenticeships and at community & technical colleges

- As of December 2015, 303 apprentices were enrolled in a four-year track at the Aerospace Joint Apprenticeship Committee (AJAC).

- The number of students served by the five aerospace programs selected for review at Washington's community and technical colleges increased 29 percent over the five-year period between 2010 and 2015.

- In 2014-15, colleges enrolled 4,936 total (headcount) students for 3,120 full-time equivalents (FTES). Figure 13 below shows enrollments (by college).

- All community and technical college training programs, aside from drafting and design technician, notched increases. Plastics Engineering Technician (also known as Composites Manufacturing Technician or Composites Fabricator) is a relatively new program for the colleges. Composites have become increasingly important in manufacturing.

[2] Retrieved from Washington's Employment Security Department quarterly census of employment and wages.
[3] NAICS 927000 - Space Research and Technology was also identified in the core of Washington's aerospace industry, yet employment data are sparse for this industry; therefore when the report refers to the "core" it's generally referring to NAICS 3364 – Aerospace Manufacturing and Parts. Data for Space Research and Technology are included wherever possible.

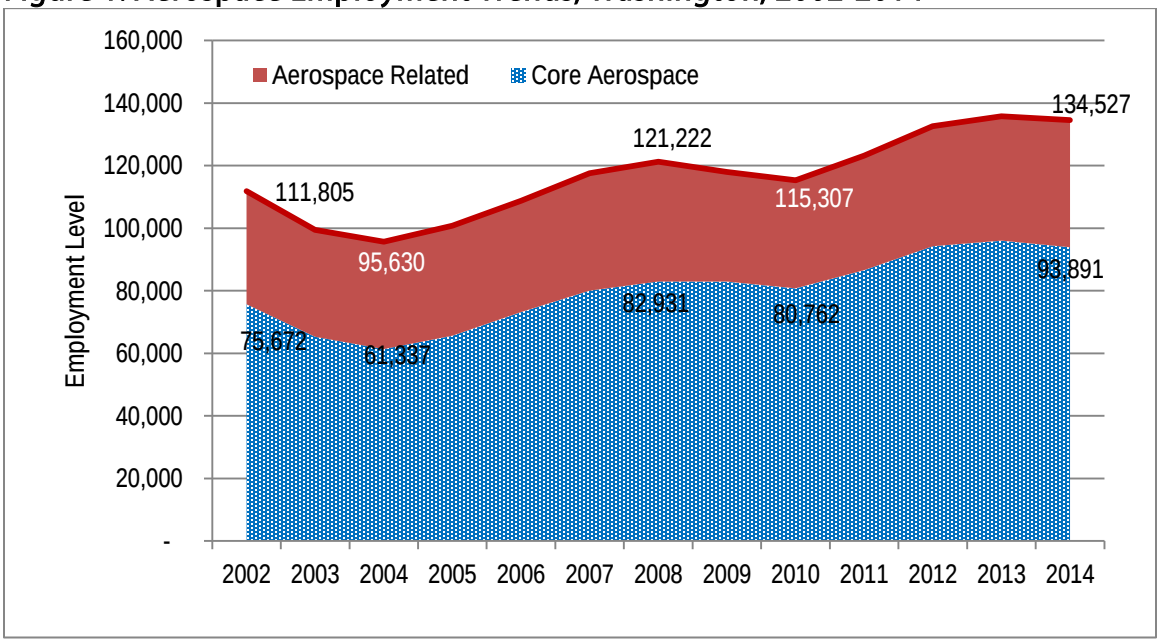
OVERVIEW OF WASHINGTON'S AEROSPACE INDUSTRY

Firms and Employment

Washington's first aerospace company, Boeing, was established in 1916, almost 100 years ago. Since then, the industry has expanded to include 1,361 firms, with 186 of these firms located in the core industry.

The core of Washington's aerospace industry is the "Aerospace Manufacturing and Parts" (NAICS 3364) industry, employing 93,891 in 2014.[4] Surrounding that core are an array of aerospace-related industries comprised of materials and parts suppliers, air transportation and related infrastructure, on average employing over 134,000 Washingtonians in 2014. Appendix B shows detailed employment trends for both the core and broader aerospace-related industries.

Figure 1: Aerospace Employment Trends, Washington, 2002-2014



Source: Washington's Employment Security Department

**See Appendix B for a complete list of industries included in the aerospace-related group.*

Relative Concentration

By most measures, Washington is the nation's aerospace industry leader. One useful measure is the state's relative concentration in the aerospace industry. Relative concentration is measured using the location quotient (LQ), which is simply a ratio of the regional (in this case, statewide) share of employment (or wages) in a certain industry compared to national share of employment (or wages) in the same industry.

[4] 2014 Annual Average Employment, Washington State Department of Employment Security.

Figure 2: Aerospace Core Industry Employment and Location Quotients, 2014, Washington and Other States

	Aerospace				Location Quotients			
	Total Employment		Total Wages		Total Employment		Total Wages	
Area	2004	2014	2004	2014	2004	2014	2004	2014
USA	438,329	486,670	$30,818,897,000	$46,705,602,000	1.00	1.00	1.00	1.00
Washington	61,384	93,890	$ 4,772,356,000	$ 10,329,365,000	6.72	9.18	7.43	10.61
Kansas	34,230	30,479	$ 2,088,959,000	$ 2,296,175,000	7.79	6.31	8.12	5.89
Connecticut	29,892	27,634	$ 2,206,765,000	$ 2,941,928,000	5.40	4.54	4.38	3.85
Arizona	26,361	25,052	$ 1,863,565,000	$ 2,473,240,000	3.30	2.72	3.57	3.12
Missouri	15,900	17,778	$ 1,216,655,000	$ 1,974,625,000	1.78	1.80	2.19	2.35
Alabama	11,486	12,296	$ 640,795,000	$ 1,013,291,000	1.83	1.75	1.71	1.78
Georgia	17,427	21,326	$ 1,106,297,000	$ 1,861,006,000	1.34	1.47	1.26	1.39
Utah	6,493	6,045	$ 402,673,000	$ 479,872,000	1.79	1.47	1.93	1.52
Oklahoma	2,822	7,048	$ 154,547,000	$ 511,003,000	0.58	1.30	0.58	1.27
Texas	45,986	44,695	$ 3,200,080,000	$ 4,245,890,000	1.45	1.26	1.47	1.29
California	73,359	70,971	$ 5,600,313,000	$ 7,116,547,000	1.45	1.26	1.38	1.16
Vermont	0	1,319	$ -	$ 106,221,000	NA	1.19	NA	1.17
South Carolina	0	7,002	$ -	$ 643,555,000	NA	1.04	NA	1.23

Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

As seen in Figure 2, Washington's 2014 LQ was 9.18—up from 6.72 in 2004. What this means is that the share of aerospace employment in Washington was over nine times larger than the aerospace share nationally. Not only is this the highest LQ among states, but Washington's aerospace workforce was nearly three times the size of the next biggest state (Kansas). The wage location quotient (which shows the relative size of wages earned compared to all sectors) was even higher—10.61.

Occupational Composition

The majority of aerospace positions in Washington were concentrated in production (30.5 percent) or architecture and engineering (23.1 percent). Business/financial operations (15.3 percent) followed by computer/mathematical (10.1 percent) occupations round out the state's top aerospace occupational groups. Overall, these occupations account for nearly 80 percent of industry employment. See Appendix D for details on the top 50 occupations in Washington's aerospace industry and the extent to which they're concentrated in aerospace compared to all other industries.

Figure 3: Aerospace Core Industry Occupational Composition, NAICS 3364, 2014, Washington

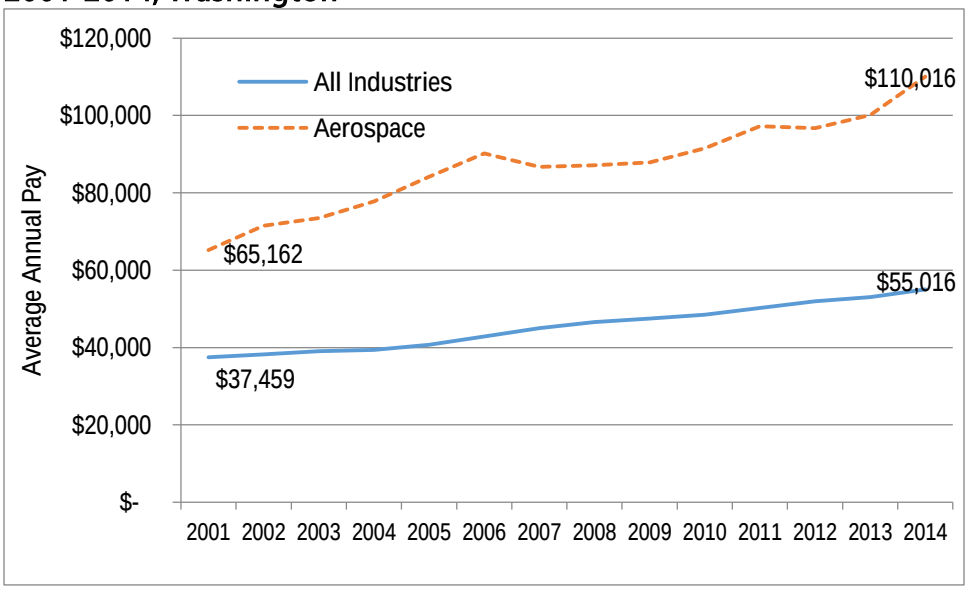
Major Occupation Group	% of Total Aerospace Employment	2014-2nd Quarter Employment
Production	30.5%	28,557
Architecture and Engineering	23.1%	21,663
Business and Financial Operations	15.3%	14,375
Computer and Mathematical	10.1%	9,462
Subtotal	79.0%	74,057
Installation, Maintenance, and Repair	6.8%	6,403
Office and Administrative Support	4.8%	4,464
Management	4.5%	4,241
Transportation and Material Moving	1.7%	1,619
All other major occupation groups	3.2%	2,973
Total	100.0%	93,757

Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

Wages

Average annual wages earned by aerospace workers (see Figure 4) continue to significantly outpace the overall average wages of all Washington workers. In 2001 average aerospace wages were 74 percent higher than the average wage across all industries. By 2014, aerospace wages were about double that of the average wage across all industries.

Figure 4: Annual Wage Trends for Aerospace and All Industries 2001-2014, Washington

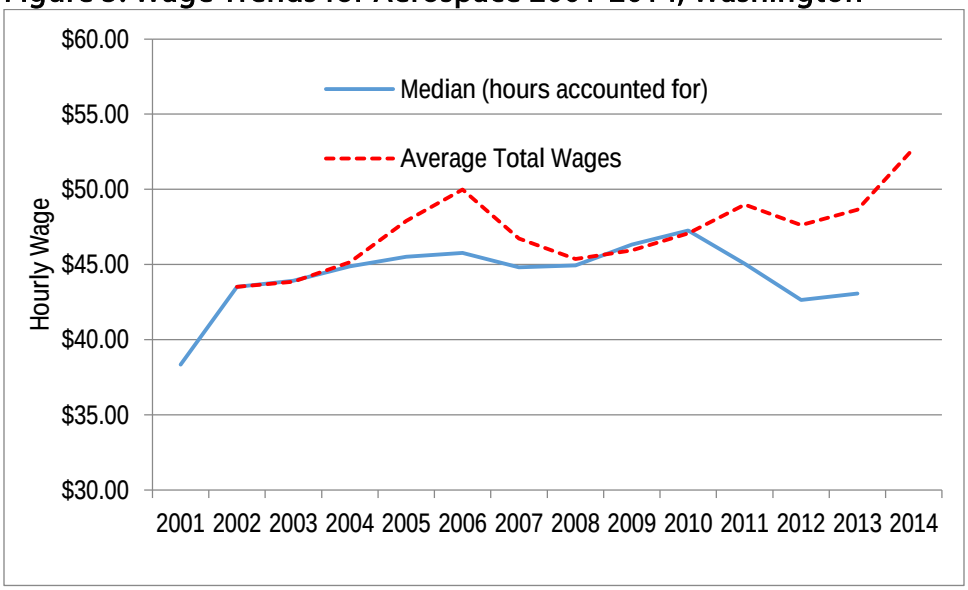


Source: U.S. Bureau of Labor Statistics, Quarterly Census of Employment and Wages

While aerospace pays much better on average than other industries, as seen in Figure 4, averages are susceptible to outliers and may mask substantial inequalities among different occupations within the same industry. The following chart (Figure 5) compares the average total wages (same as shown in Figure 4) to median hourly earnings. The median hourly earnings take into account actual hours worked and show a less positive trend since 2010 when compared to the Quarterly Census of Employment and Wages figure.

The implication of these two trends diverging is that it has taken more hours worked to see increasing wages. One caveat though is that we don't have hourly adjusted wage data for 2014, so it is possible there will be an uptick.

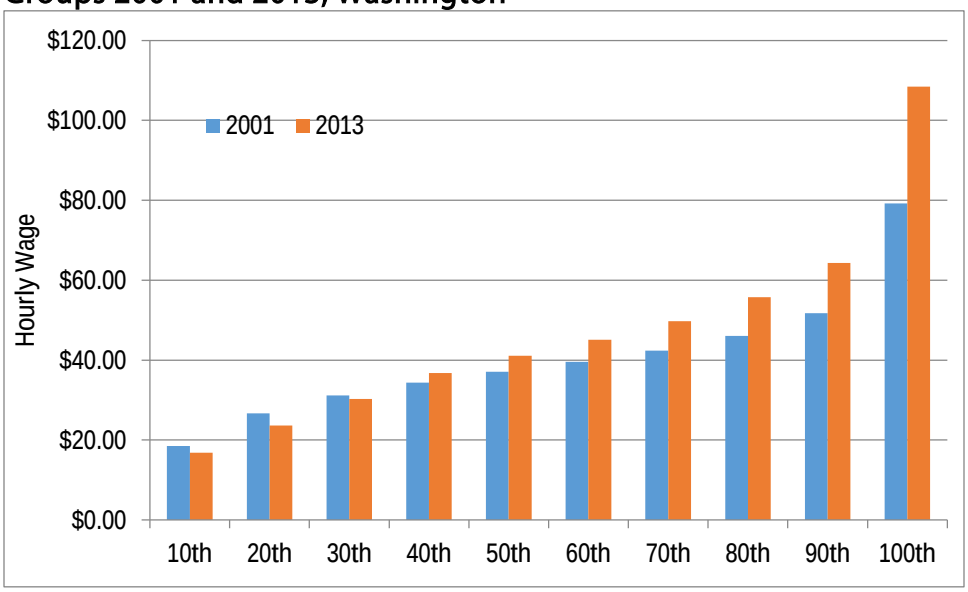
Figure 5: Wage Trends for Aerospace 2001-2014, Washington



Source: Bureau of Labor Statistics, Quarterly Census of Employment and Wages

This divergence between average total wages vs. how much people earned each hour can be further clarified by looking at wage deciles—a way of looking at how wages are distributed by organizing earners into 10 groups based on hourly wages. Figure 6 shows not only how hourly wages vary significantly across the wage spectrum but have diverged even more in recent years. The bottom three deciles saw real wages fall between 2001 and 2013, while wages among higher earning workers rose, with the largest gains going to the top 10 percent.

Figure 6: Wage Trends for Aerospace Workers Across Wage Groups 2001 and 2013, Washington



Source: Washington's Employment Security Department

Recent hiring trends in the aerospace industry, such as rising wages coupled with limited employment growth, appear likely to continue in the near future. It is reasonable to assume there will be fewer jobs, but they will require more education and be higher paying. Workers with stronger math and analytical skills will be needed to operate increasingly sophisticated manufacturing systems. These positions will continue to be hard to fill unless the workforce is more highly educated.

Employment Forecasts

The Washington State Economic and Revenue Forecast Council projects net moderate job losses (less than 3 percent annually) in the aerospace industry during the next several years.[5] Increasing productivity and restructuring are expected to spur these job losses, despite a growing backlog of orders. The Employment Security Department forecasts a 10 percent decline in net aerospace employment over the next 10 years (2013-2023).[6]

As with all forecasts, these projections—while well supported by current trends—are not a sure thing. This is especially true for Washington's aerospace industry, which is largely dominated by one firm whose economic health greatly impacts supporting companies and businesses. It should also be noted that the projected job declines are net figures. Given the graying of the workforce and normal industry churn, turnover and retirements will drive a number of openings. Last year the Boeing Company reported a retirement rate of about 2.8 percent per year. Nearly a third (31 percent) of the company's current workforce is eligible to retire.

Figure 7: Washington State Employment Projections, Aerospace and Selected Manufacturing Industries, 2013-23

Industry	Estimated employment			Average annual growth rate	
	2013	2018	2023	2013-2018	2018-2023
TOTAL NONFARM	2,969,000	3,297,900	3,543,900	2.1%	1.4%
MANUFACTURING	286,400	294,800	300,500	0.6%	0.4%
Durable Goods	209,400	214,400	218,300	0.5%	0.4%
Wood Product Manufacturing	13,000	14,800	15,000	2.6%	0.3%
Nonmetallic Mineral Product Manufacturing	9,100	10,300	11,000	2.5%	1.3%
Primary Metal Manufacturing	5,700	6,000	6,000	1.0%	0.0%
Fabricated Metal Product Manufacturing	19,200	22,200	23,400	2.9%	1.1%
Machinery Manufacturing	14,900	18,300	20,200	4.2%	2.0%
Computer and Electronic Product Manufacturing	20,200	20,900	21,900	0.7%	0.9%
Electrical Equipment and Appliance Mfg	4,900	5,800	6,900	3.4%	3.5%
Aerospace Product and Parts Manufacturing	96,100	89,000	86,600	-1.5%	-0.5%
Other Transportation Equipment	9,700	9,300	8,900	-0.8%	-0.9%

Source: Washington's Employment Security Department, Long-term Industry Employment Projections

[5] http://www.erfc.wa.gov/forecasts/documents/t0915.pdf
[6] https://fortress.wa.gov/esd/employmentdata/docs/occupational-reports/long-term-industry-projections.xls.

EDUCATION AND TRAINING

The aerospace industry plays a significant role in the nation's economy. It's an even more dominant player in Washington, where it is a key industry. Undoubtedly, meeting the workforce needs of the aerospace industry is important to the economic vitality of the state, as well as the economic wellbeing of Washington residents and their families. After all, not only are aerospace jobs relatively abundant, the majority of these jobs pay well. However, most require a variety of industry-specific skills and changing technology is calling for higher levels of training.

To meet these training needs, education programs have grown over the past few years. This expansion in training programs is increasingly critical to the industry as Washington's workforce ages and more workers reach retirement age each year. The state's education and training system continues to face increasing pressure to provide a fresh supply of skilled workers.

Washington has responded to this challenge by investing heavily in several aerospace-focused training programs:

- *The Aerospace Joint Apprenticeship Committee* or AJAC, is a statewide, registered apprenticeship program which combines supervised on-the-job training with college-level classroom instruction.

- *The Air Washington Initiative,* which ended in the fall of 2015*,* brought together a consortium of 11 Washington community and technical colleges and one apprenticeship program through a $20 million federal grant that provided aerospace training to students throughout the state. The consortium had a target of training more than 2,600 workers, but far exceeded it with 4,772 trainees by mid-2015. The program ran from October 1, 2011 to September 30, 2015. (http://www.coeaerospace.com/AirWa-091015_ebook.pdf)

- *The Washington Aerospace Training & Research* (WATR) *Center* at Edmonds Community College offers short-term aerospace training based at Paine Field in Everett.

- Washington's community and technical colleges have continued to invest in aerospace training, expanding programs, and updating curriculum and equipment, to meet industry needs.

This report analyzes training activities, employment, and annual earnings of state-funded efforts in Washington.

Aerospace Apprenticeship Programs

Aerospace apprenticeship combines supervised on-the-job training experience with college-level classroom instruction. The following section analyzes aerospace apprenticeship dynamics, enrollments, and a snapshot of completers since the creation of the Aerospace Joint Apprenticeship Committee (AJAC) in 2008.

AJAC works with the incumbent workforce, is employer driven by occupation and location, and is open to all employers in Washington. AJAC hires instructors from industry to ensure that training reflects current industry needs and technologies. AJAC partners with local community and technical colleges, employers, high schools and Skills Centers, as well as regional Workforce Development Councils, to provide pre-apprenticeship training in an effort to supply industry with a pipeline of diverse, entry-level skilled workers.

AJAC offers Washington employers the opportunity to:

- Tap the knowledge and skills of their most experienced craftspeople and transfer expertise to the "new" generation of employees prior to retirements.
- Increase productivity and retention while reducing spending on hiring and training new workers.

AJAC offers apprentices the opportunity to:

- Earn while they learn on the job and in the classroom.
- Earn college credit at a reduced rate.
- Embark on an educational pathway which can lead to an associate degree with no college debt upon completion.
- Earn a nationally recognized industry certification upon completion.
- Earn on average over $300,000 more than non-apprentices over a lifetime.

Snapshot of AJAC Apprenticeship Completions and Outcomes:

- 303 apprentices enrolled as of December 2015.
- A total of 21 participants completed AJAC's apprenticeship program and 76 cancelled during the 2013-14 program year, with 34 expected to complete in 2016.
- 190+ partnering employer Training Agents.

- Five occupations out of 10 with active apprentices of which 88 percent are Machinist and Tool and Die Makers; 7.44 percent are Industrial Maintenance Technicians; 2.98 percent are Precision Metal Fabrication Technicians and 1.19 percent are Aircraft Maintenance Technicians (Airframe only).
- 46-month average for program completion (two of the five active occupations require a 48-month commitment; two require a 36-month completion; and one requires a 60 month commitment).
- 18 percent average annual growth in program enrollment.

Note that AJAC reports are based on the fiscal year, while the data in the following chart (Figure 8) are based on program year.

Snapshot of Apprenticeship Completions and Outcomes

A total of 83 people completed an apprenticeship in program year 2013-14. Of that number, AJAC trained 76 individuals, the Seattle Machinists Apprenticeship program four, the IAM/Boeing program one, and the Port Townsend Paper Corp In-Plant trained one.

Figure 8: Snapshot of Aerospace Apprenticeship Program Completions Washington State, 2013-14

Program	Did Not Complete	Completer[7]
Aerospace JAC	76	11
IAM/Boeing JAC	1	4
Port Townsend Paper Corp In-Plant	1	3
Seattle Machinists Apprenticeship	4	3
Totals	83	21

For 2013-2014 All Program Completers	
Median months to completion	46.5
Median annual wage (adjusted 2014 q1)	$70,052
Median quarterly hours	549

Source: Washington Department of Labor and Industries

Median annual wages for those who found full-time work was $70,052, (the lowest reported wage was $21,423, and the highest was $285,677). In 2013-14, apprenticeship completers clocked a median 549 hours per quarter, a little higher than the normal full-time 522 hours clocked during a three-month period.

[7] This is completers as defined by the Department of Labor and Industries for program year 2013-14. Apprenticeship programs may have different parameters and thus different numbers of completers than reported in this table.

Community and Technical College Programs

In 2012, the Legislature directed the Workforce Board to work with the State Board for Community and Technical Colleges to coordinate and evaluate workforce training for aerospace and materials manufacturing.[8] Soon after, the Aerospace and Advanced Materials Manufacturing Pipeline Advisory Committee recommended five programs be reviewed on an ongoing basis. They include:

- Engineering Technician
- Plastics Engineering Technician
- Drafting and Design Technician
- Aircraft/Frame/Powerplant Mechanic
- Machine Tool Technician

FTEs and Student Headcounts

As shown in the following chart (Figure 9), the number of full-time equivalent (FTE) students served in the selected programs has gone up 29 percent over the five-year period between 2010 and 2015. A full-time equivalent is the number of students divided by the total number of credit hours for a full-time load in fall, winter, and spring quarters (45 credits). All programs, aside from Drafting and Design Technician, experienced an increase. Plastics Engineering Technician (also known as Composites Manufacturing Technician or Composites Fabricator) is a relatively new program for the colleges. Composites have become increasingly important in manufacturing. The fall-off in Engineering Tech FTEs between 2013-14 and 2014-15 was a result of a needed coding correction in a specific program. A number of these FTEs were re-coded in 2013-14 as Airframe Mechanics. These FTEs are included with Aircraft/Frame/Power Plant Mechanics.

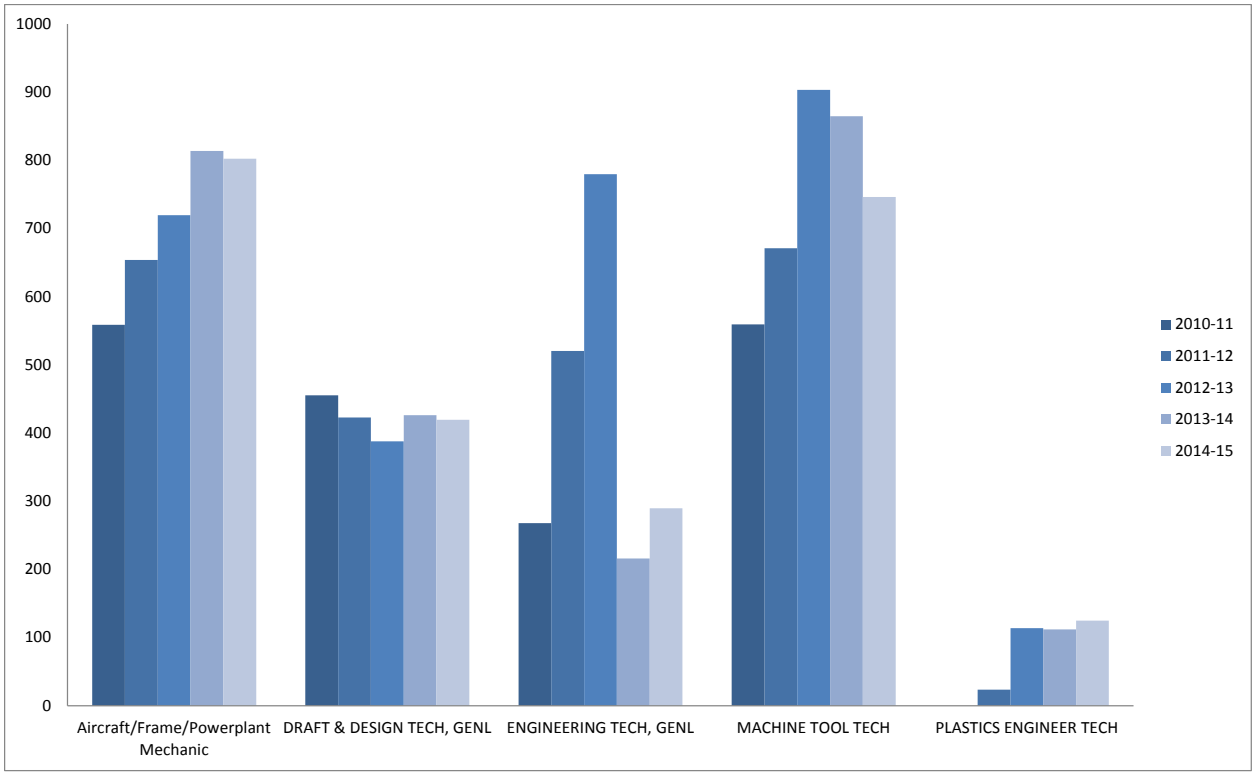
Figure 9: CTC Select Aerospace Education and Training Program FTEs, 2010-15

Program	2010-11	2011-12	2012-13	2013-14	2014-15	5 Year Change
Aircraft/Frame/Powerplant Mechanic	559	654	719	814	802	44%
DRAFT & DESIGN TECH, GENL	455	423	388	426	419	-8%
ENGINEERING TECH, GENL	268	520	780	216	290	8%
MACHINE TOOL TECH	559	671	903	865	746	33%
PLASTICS ENGINEER TECH	<10	24	114	112	125	about 10%
Total FTES in Selected Programs	1841	2291	2904	2433	2383	29%

Source: State Board for Community and Technical Colleges

[8] Second Substitute House Bill 2156 was passed in the 2012 Legislative session (Chapter 50 of the Laws of 2012). The bill relates to the "coordination and evaluation of workforce training for aerospace and materials manufacturing." The bill aimed to improve the state's aerospace training system by better aligning it with the industry's immediate and long-term training needs. The legislation also sought to "increase jobs available for Washington's citizens" by increasing their skill development and training.

Figure 10: CTC Select Aerospace Education and Training Program FTEs, 2010-15



Source: State Board for Community and Technical Colleges

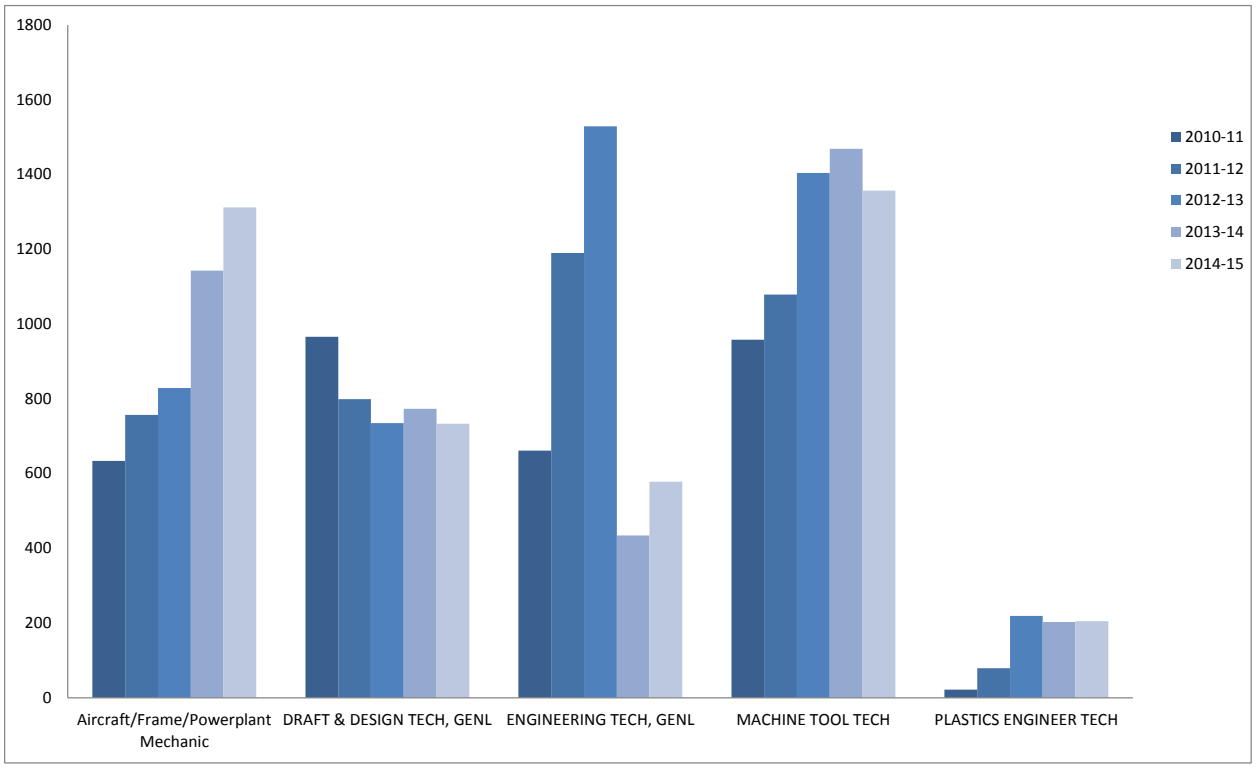
As shown in the following chart (Figure 11) the number of students in the selected programs has increased by 29 percent over the past five years. It represents a commitment from the state and the community and technical college system to increase the available workforce. FTEs and headcount trends are typically correlated, so the fall-off in student headcount for drafting and design engineer follows the decline in FTE students (see previous chart). In the case of engineering tech, however, a declining overall headcount over the five-year period with rising FTEs over the same period, suggests students are taking more credits in order to prepare themselves for work.

Figure 11: Select Aerospace Education and Training Program Headcount, 2010-15

	2010-11	2011-12	2012-13	2013-14	2014-15	5 Year Change
Aircraft/Frame/Powerplant Mechanic	634	757	829	1143	1312	107%
DRAFT & DESIGN TECH, GENL	966	799	735	773	733	-24%
ENGINEERING TECH, GENL	661	1190	1529	434	578	-13%
MACHINE TOOL TECH	958	1079	1404	1469	1357	42%
PLASTICS ENGINEER TECH	22	79	219	203	205	832%
Total HC in Selected Program	3241	3904	4716	4022	4185	29%

Source: State Board for Community and Technical Colleges

Figure 12: CTC Select Aerospace Education and Training Program Headcount, 2010-15



Source: State Board for Community and Technical Colleges

Engrossed House Bill 2088, which passed in November 2013, appropriated additional funding to the state's community and technical colleges to increase high-demand aerospace enrollments by an additional 1,000FTEs. Through a competitive process, college proposals were reviewed by a 10-member review panel made up of industry, labor, education and government agencies. As result of the deliberations 21 colleges received funding for 35 programs. The funding became available July 1, 2014. In 2014-15, colleges enrolled 4,936 headcount students for 3,120 FTEs. The following chart (Figure 13) shows enrollment at participating college by overall headcount and by FTEs.

Figure 13: CTC Headcount and FTE Engrossed House Bill 2088 High Demand Aerospace Enrollments

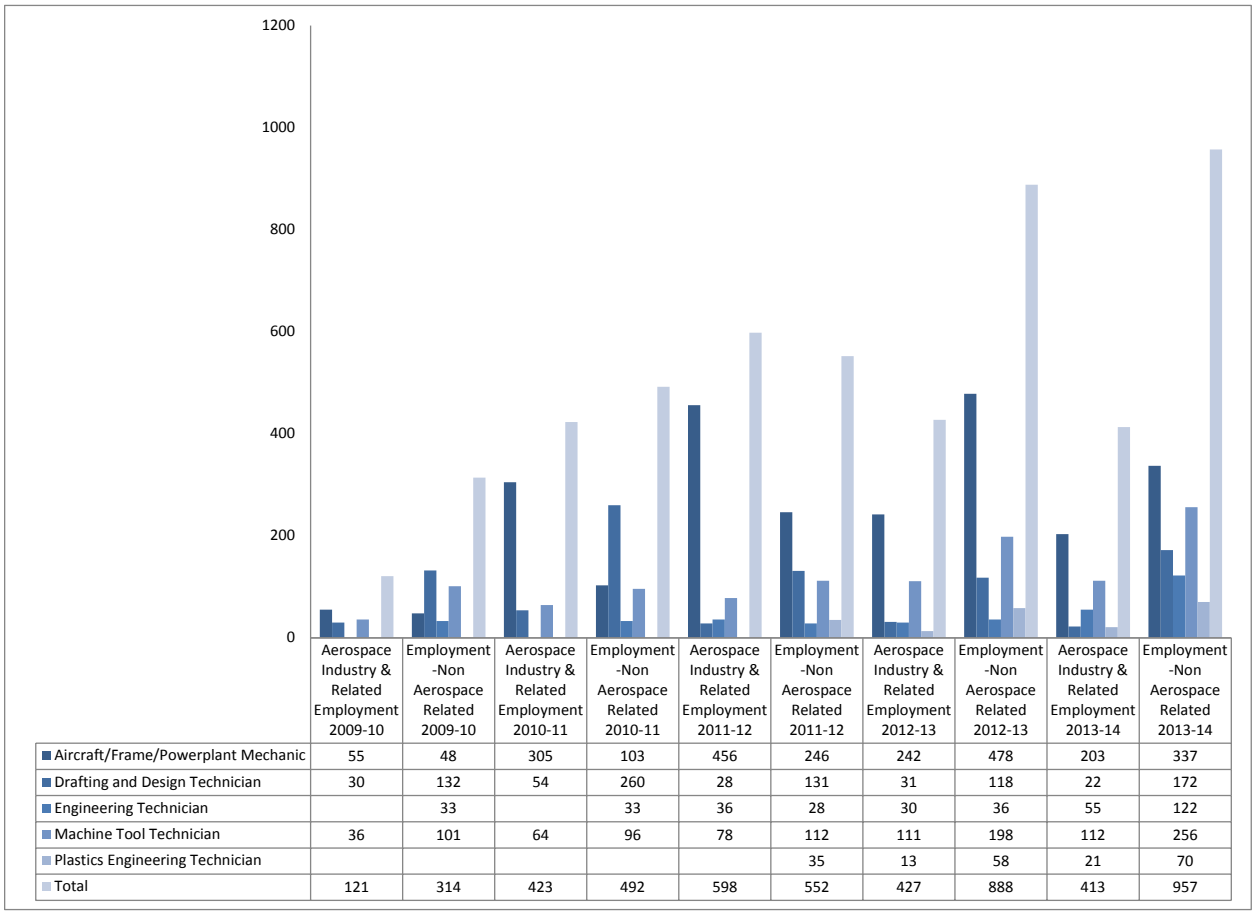
	Headcount	FTES
BATES	122	96
BELLINGHAM	178	127
BIG BEND	57	55
CLARK	89	61
CLOVER PARK	238	144
EDMONDS	804	465
EVERETT	869	476
GREEN RIVER	269	175
HIGHLINE	448	218
LAKE WASHINGTON	243	177
OLYMPIC	230	115
PENINSULA	37	20
RENTON	52	40
SEATTLE NORTH	193	98
SEATTLE SOUTH	228	179
SHORELINE	145	152
SKAGIT VALLEY	70	30
SOUTH PUGET SOUND	17	11
SPOKANE	166	181
TACOMA	462	286
WENATCHEE VALLEY	19	14
Total	4,936	3,120

Source: State Board for Community and Technical Colleges

Student Employment in the Year After Leaving College

The following chart (Figure 14) describes employment results for students in the year after leaving college in the five select programs. The definition of "leaver" encompasses more than one student category, including graduates who earned a degree or certificate, those who had at least one year of training and education, and those who left early and are considered non-completers. The total number of students employed each year is the sum of those employed in aerospace and non-aerospace industries. Students are measured for employment three calendar quarters (seven to nine months) after they leave college. The most recent cohort left college in 2013-14 and was typically measured in 2014-15. That year a total of 1,370 students were employed after leaving college. This includes 413 students employed in aerospace-related industries and 957 employed in non-aerospace industries.

Figure 14: Employment in Aerospace and Non-Aerospace Industries for Leavers from CTC Select Programs



	Aerospace Industry & Related Employment 2009-10	Employment -Non Aerospace Related 2009-10	Aerospace Industry & Related Employment 2010-11	Employment -Non Aerospace Related 2010-11	Aerospace Industry & Related Employment 2011-12	Employment -Non Aerospace Related 2011-12	Aerospace Industry & Related Employment 2012-13	Employment -Non Aerospace Related 2012-13	Aerospace Industry & Related Employment 2013-14	Employment -Non Aerospace Related 2013-14
Aircraft/Frame/Powerplant Mechanic	55	48	305	103	456	246	242	478	203	337
Drafting and Design Technician	30	132	54	260	28	131	31	118	22	172
Engineering Technician		33		33	36	28	30	36	55	122
Machine Tool Technician	36	101	64	96	78	112	111	198	112	256
Plastics Engineering Technician						35	13	58	21	70
Total	121	314	423	492	598	552	427	888	413	957

Source: State Board for Community and Technical Colleges
**Note: Programs with fewer than 10 students have been redacted due to privacy.*

The following chart (Figure 15) describes within each select program area, by year, the percentage of leavers that went to work in aerospace-related industries. Just three in 10 students leaving in 2013-14 were employed in aerospace-related industries. Seven in 10 students leaving in 2013-14 were employed in non-aerospace industries.

Leavers who *did not* go to work in the aerospace industry found employment in a wide variety of industries. Nearly half (48 percent) were employed in other manufacturing industries. Thirteen percent were employed in business services. Ten percent were employed in retail trade. The remaining students were employed across a broad cross section of industries.

Figure 15: Percent Employed in Aerospace & Related Industries in the Year after Training

Select Programs	2009-10	2010-11	2011-12	2012-13	2013-14
Aircraft/Frame/Powerplant Mechanic	53%	75%	65%	34%	38%
Drafting and Design Technician	19%	17%	18%	21%	11%
Engineering Technician			56%	45%	31%
Machine Tool Technician	26%	40%	41%	36%	30%
Plastics Engineering Technician				18%	23%
Total Selected Programs	28%	46%	52%	32%	30%

Source: State Board for Community and Technical Colleges
**Note: Programs with fewer than 10 students have been redacted due to privacy.*

Figure 16 details hourly wages and annualized earnings for students leaving select programs in 2013-14. Results are shown separately for students employed in aerospace and non-aerospace industries. As a group, students who went to work in aerospace-related industries earned an estimated $42,000 annually based upon their earnings in the third quarter after college. Engineering Techs and Drafting and Design Techs who went to work in aerospace led all students in earnings. Overall earnings for students who went to work in aerospace were 47 percent higher than for students who went to work in non-aerospace industries.

Figure 16: Median Wage and Estimated Annual Earnings, 2014-15

Program Title	Aerospace& Related Inflation Adjusted Wage	Aerospace & Related Inflation Adjusted Earnings	Non-Aerospace All Students Inflation Adjusted Wage	Non-Aerospace All Students Inflation Adjusted Earnings	% Earnings Difference between to leavers Working in Aerospace & Non-Aerospace Employment
Aircraft/Frame/Powerplant Mechanic	$18.84	$41,000	$14.61	$26,600	54%
AIRFRAME MECH & AIRCRAFT	$17.90	$42,000	$14.71	$26,400	59%
Drafting and Design Technician	$23.95	$50,500	$17.98	$34,500	46%
Engineering Technician	$24.62	$52,200	$14.60	$28,800	81%
Machine Tool Technician	$17.27	$37,700	$16.03	$29,400	28%
Plastics Engineering Technician	$18.40	$41,800	$12.11	$20,200	106%
All Programs	$18.84	$42,000	$15.36	$28,500	47%

Source: State Board for Community and Technical Colleges

Washington Aerospace Training and Research (WATR) Center

The WATR Center at Edmonds Community College provides short-term skills training in aerospace jobs. Students start with a four-week core program and move on to specialized certificates such as assembly mechanic, electrical assembler, tooling, composites and quality assurance. For this report, FTEs and headcount for the two most recent years, 2013-14 and 2014-15 are shown for students enrolled in WATR Center courses based upon item numbers presented to SBCTC by the WATR Center.

Figure 17: WATR Center Aerospace Program FTE, 2013-14 and 2014-15

Program	2013-14	2014-15
AIRCRAFT ELECT FAB & INSTL	17	26
AIRFRAME MECH & AIRCRAFT	71	181
ENGINEERING TECH, GENL	53	8
QUALITY CONTROL	2	
TOOL & DIE TECH	33	47
TOTAL	176	261

Source: State Board for Community and Technical Colleges based on course items identified by WATR Center

Figure 18: WATR Center Aerospace Headcount Enrollments, 2013-14 and 2014-15

Program	2013-14	2014-15
AIRCRAFT ELECT FAB & INSTL	32	53
AIRFRAME MECH & AIRCRAFT	181	420
ENGINEERING TECH, GENL	118	15
QUALITY CONTROL	<10	
TOOL & DIE TECH	59	74
TOTAL	397	562

Source: State Board for Community and Technical Colleges based on course items identified by WATR Center

WATR Center Post-Training Employment and Earnings

In 2012-13, some 320 WATR Center students were evaluated after leaving training, to see where they went to work and how much they earned. Two thirds (207 students), were employed in aerospace industries. Overall, these leavers had estimated annual earnings of nearly $49,900.

Among the 113 WATR Center students who left training in 2012-13 and found non-aerospace related employment, estimated earnings were far lower—just $23,000.

Figure 19: Wages and Earnings for Students Leaving College in 2013-14 and Employed in 2014-15 in Aerospace & Non-Aerospace Related Industries

Program Title	Students Employed in Aerospace and Related	Aerospace & Related Inflation Adjusted Wage	Aerospace & Related Inflation Adjusted Earnings*	All Students Employment-Non-Aerospace Related	All Students Inflation Adjusted Wage	All Students Inflation Adjusted Earnings*
AIRCRAFT ELECT FAB & INSTL	10	$16.93	$35,600	15	$14.25	$22,300
AIRFRAME MECH & AIRCRAFT	79	$19.57	$42,300	73	$14.21	$24,900
CAD DRAFT/DESIGN TECH	24	$23.80	$55,200	<10		
ENGINEERING TECH, GENL	<10			<10		
TOOL & DIE TECH	90	$24.77	$55,700	19	$13.10	$18,900
All Employed	207	$22.64	$49,900	113	$14.21	$22,800

Source: State Board for Community and Technical Colleges