Aerospace Manufacturing Skills

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

Annual Report - 2012

December 2012

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

Report Purpose

As Washington's aerospace industry has rebounded and hiring has increased substantially, concern is growing about our workforce training system's ability to meet the demand for aerospace workers.

In 2012, new legislation (Chapter 50 of the Laws of 2012) called for an annual evaluation of "programs recommended for review" by the Aerospace Pipeline Advisory Committee. The 15-member committee is tasked with monitoring the aerospace industry's workforce needs and working with industry partners and the community and technical college system to meet the demand. This report's evaluation was performed by the Workforce Training and Education Coordinating Board (Workforce Board) working with the State Board for Community and Technical Colleges (SBCTC). [1]

To conduct this evaluation, the range of firms that constitute Washington's aerospace industry had to be defined. Workforce Board staff gathered information for a definition by surveying aerospace employers, examining trade publications, and reviewing materials from other states. Further consultation occurred with members of the Aerospace Pipeline Advisory Committee as well as with staff from the state's Employment Security Department (ESD), the Governor's Office of Aerospace, and SBCTC. The result is an aerospace industry definition based on the North American Industry Classification System (NAICS) which classifies firms on the activity in which they are primarily engaged.[2]

This report's definition of the aerospace industry includes the core aerospace industry codes (NAICS 336411 through 336419 and 927000) that capture work exclusively done by the Boeing Company and major contractors. But the definition also includes codes for the many smaller suppliers within the supply chain that do not exclusively produce aerospace materials. These additional industry codes capture smaller machine shops, manufacturers, and composite suppliers that comprise a key part of the aerospace supply chain. Together, this two-tier definition represents the aerospace and related industries in Washington.

This report evaluates the community and technical college programs that are most active in educating and training workers employed in aerospace and related industries in Washington.

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[1] This December 2012 report updates the preliminary report released in September 2012. For more on the history of the Pipeline Committee and this report, see Appendix E.

[2] NAICS is the standard used by federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. economy. For more information on industry classification: www.bls.gov/bls/naics.htm

This first annual report measures employment and earning outcomes of workers who have participated in these programs. This report also uses a recent survey of aerospace employers to gauge hiring needs. Future annual reports will also provide data regarding employer satisfaction with the skills of program graduates.

This report includes the following appendices:

Appendix A	Aerospace Pipeline Advisory Committee
Appendix B	Aerospace Industry Employment by North American Industry Classification System (NAICS codes that constitute this report's definition of aerospace and related firms).
Appendix C	List of industries, with a small number of aerospace companies, excluded from the industry definition.
Appendix D	Aerospace Employer Survey Results
Appendix E	Report History

Report Findings

There are 1,248 firms in Washington's aerospace and aerospace-related industries, 175 in the core industry and 1,073 firms in related industries. Altogether, these firms employ 128,000 workers in Washington with 92,000 of them employed in the core industry.

Forecasts based on national economic models indicate that aerospace and related industry employment will grow by 3.6 percent per year, or an average of 5,086 net job openings each year between 2015 and 2020. However, in this state, the average growth rate of aerospace occupations is anticipated to be 6.2 percent per year, based on survey responses from 186 Washington aerospace employers. This projected growth rate may increase as additional survey responses are received.

Of the survey respondents, 77 percent do business with the Boeing Company, 41 percent with Bombardier, 39 percent with Airbus, 32 percent with Lockheed Martin, 29 percent with Gulfstream, and 28 percent with Northrop Grumman.

There are 14 different programs of study at community and technical colleges that supply 10 or more workers per year to aerospace and related firms. Together, in 2011 these programs trained 784 students who went to work for aerospace and related firms.

Roughly 58 percent of program participants were employed seven to nine months (third quarter) after exiting one of the programs. Of those employed, 19 percent worked at aerospace and related firms. The median annual earnings of these program participants who then worked for aerospace and related firms was $46,782 per year. Program participants who

ended up working in the manufacturing sector earned $44,369 and those employed across all industries earned $31,409.

Machinist and engineer are the two aerospace and related occupations with the largest number of employees. These are also the top two occupations for which aerospace and related firms have had a problem filling vacancies over the past year.

Over the next five to 10 years, the estimated number of annual job openings in Washington at aerospace and related firms includes: 880 openings for engineers; 850 for welders, machinists, CNC programmer/operators, metal workers and tool makers, and 760 for inspectors and quality assurance workers. (The estimated number of job openings will likely be higher as additional survey responses are received.)

Firms who said they had difficulty finding qualified job applicants most commonly responded by having their employees work overtime (65 percent of firms), increasing recruiting efforts (51 percent), leaving the position vacant (49 percent), or hiring a less qualified applicant (44 percent).

Aerospace Industry and Related Training Programs

This report analyzes three cohorts of students who participated and exited community and technical college programs. These programs were selected based on participants subsequently being employed in aerospace and related industries. The three cohorts include the school years 2001-02, 2005-06, and 2010-11 (the most recent data available). These years were selected to study students that had been out of training for several years, but to also follow recent students in light of the industry's increased hiring activities. This analysis assesses the number of program exiters and the percent employed seven to nine months later (third quarter) in either aerospace or aerospace-related industries (according to our NAICS definition). Median annual earnings of those program exiters are also reported.

The community and technical college programs providing the greatest number of employees to the aerospace core and related industries are shown in the table below. Not all the selected programs are in manufacturing. In fact, there is a wide range of programs that prepare employees to work in the aerospace industry. The table below identifies program participants who went to work in the industry after training.[3]

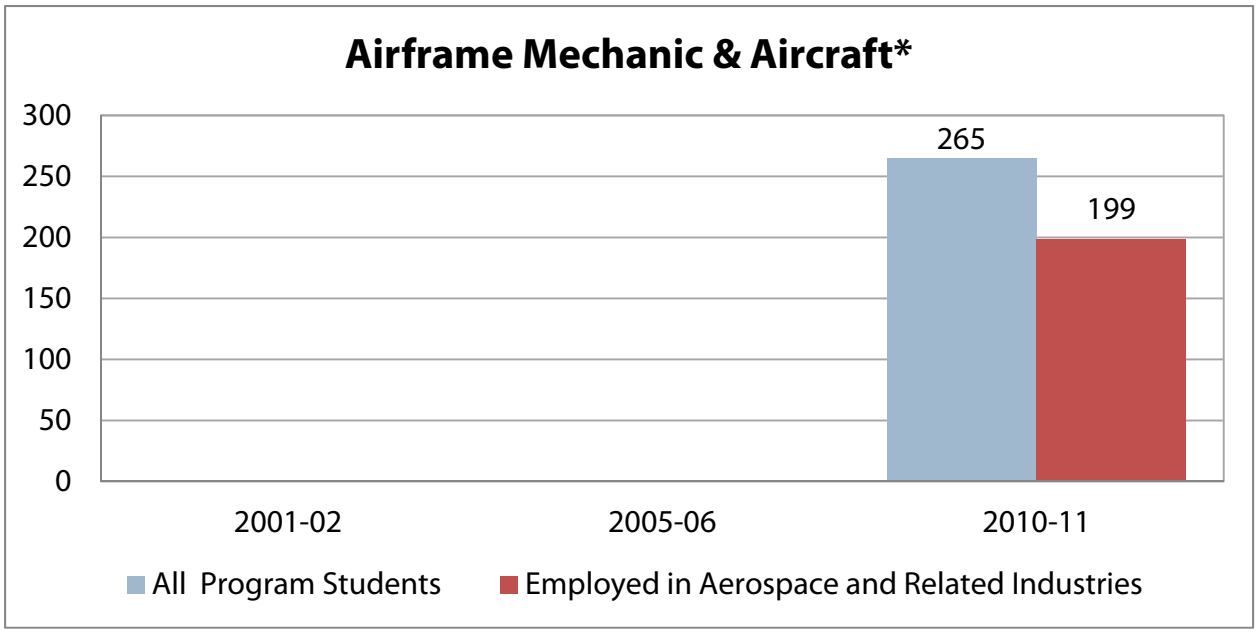
[3] Due to the regulations under the Family Educational Rights and Privacy Act (FERPA), only groups of 10 or more students are allowed to be reported. So while other programs may prepare students to work in the industry, only those with at least 10 in the identified NAICS industries of interest were included in this report.

Between 2002 and 2011, the number of students from these programs going to work in the aerospace and related industries increased by nearly two and a half times. This does not cover all new entrants. Students entered into aerospace and related industries from a variety of programs that do not specifically train them for the position. They also may have acquired other skills after participating in a training program to qualify them for this field. Students may also have gone to work for suppliers that are not captured in the industry codes used for this report, yet who still supply parts for aerospace.

Aerospace and Related Employment, 2010-11

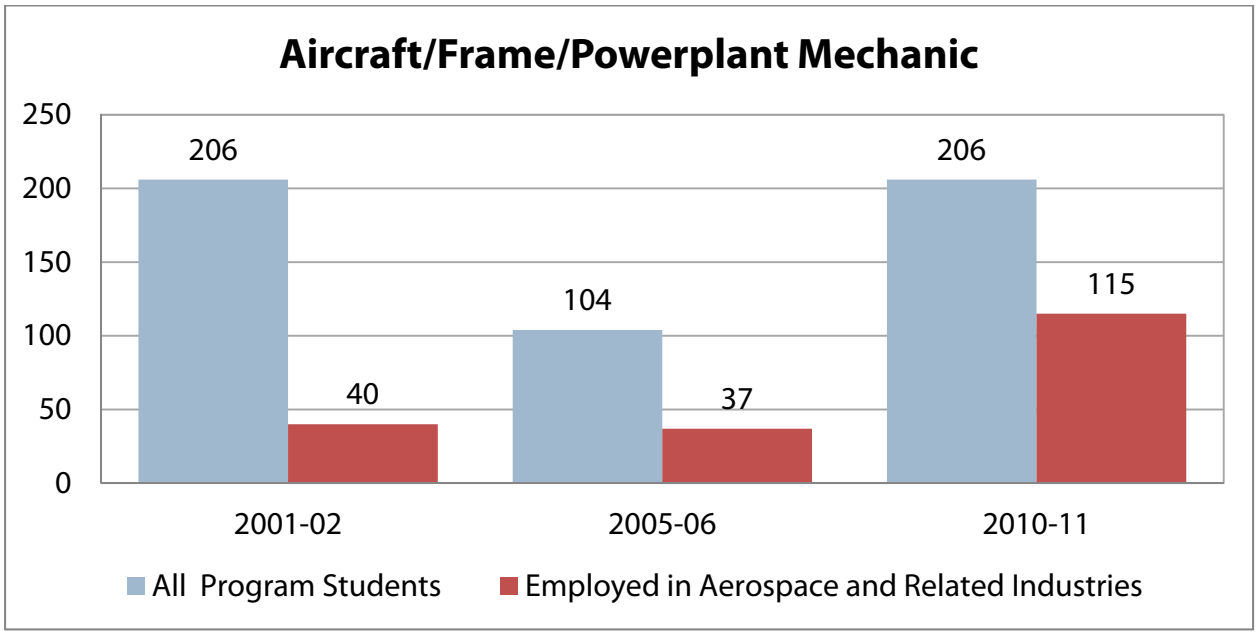
Program Code (CIP)	Program Title	All 2010-11 Students	Employed in aerospace & related industries	% of All 2010-11 Students
470607	AIRFRAME MECH & AIRCRAFT	265	199	75%
470687	AIRCRAFT/FRAME/PWRPLANT ME	206	115	56%
480508	WELDING TECH	1121	103	9%
480501	MACHINE TOOL TECH	243	91	37%
151301	DRAFT & DESIGN TECH, GENL	270	69	26%
110901	COMP SYS NETWORK/TELECOMM	734	44	6%
150303	ELECT/ELECTR & COMM TECH	163	31	19%
470605	DIESEL MECHANICS TECH	317	24	8%
110301	INFORMATION PROCESSING	319	22	7%
151302	CAD DRAFT/DESIGN TECH	78	22	28%
110201	COMPUTER PROGRAMMING	320	20	6%
111003	COMP & INFO SYS SECURITY	182	18	10%
470201	HEAT/AC/VENT/REFRIG MAINT	200	16	8%
460302	ELECTRICIAN	131	10	8%
	Total	**5,557**	**784**	**17%**

In 2011, the program feeding the largest number of students into aerospace employment was Airframe Mechanic and Aircraft with 75 percent (199) of all the program students employed in aerospace and related industries.

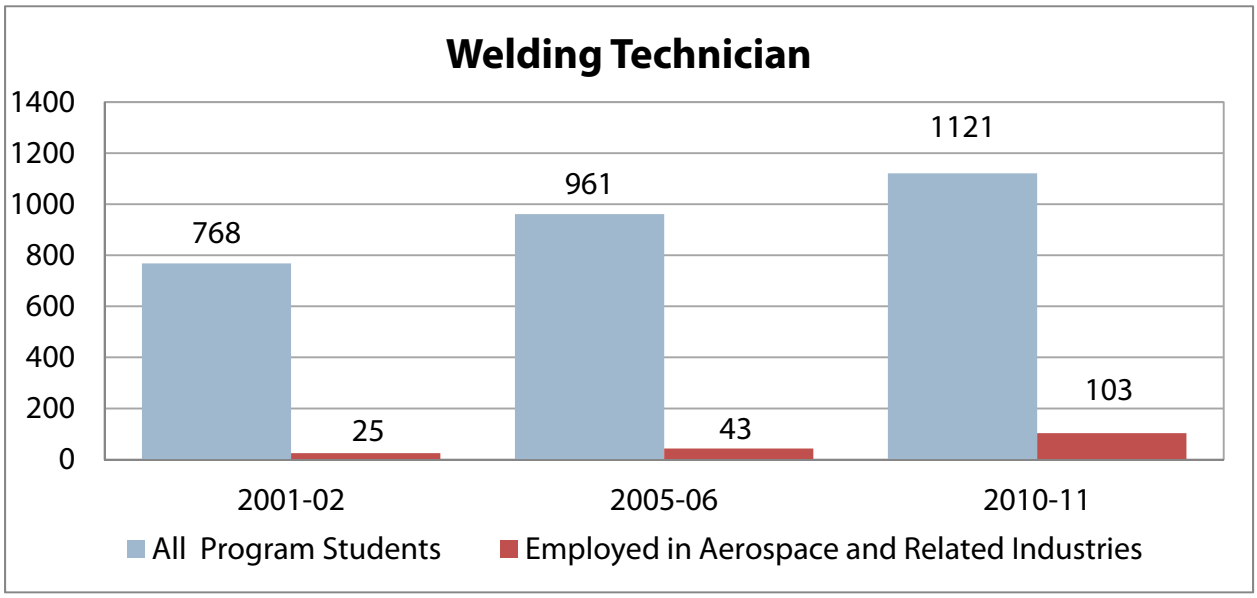


*The Airframe Mechanic & Aircraft program did not have students in the 2001-02 and 2005-06 periods.

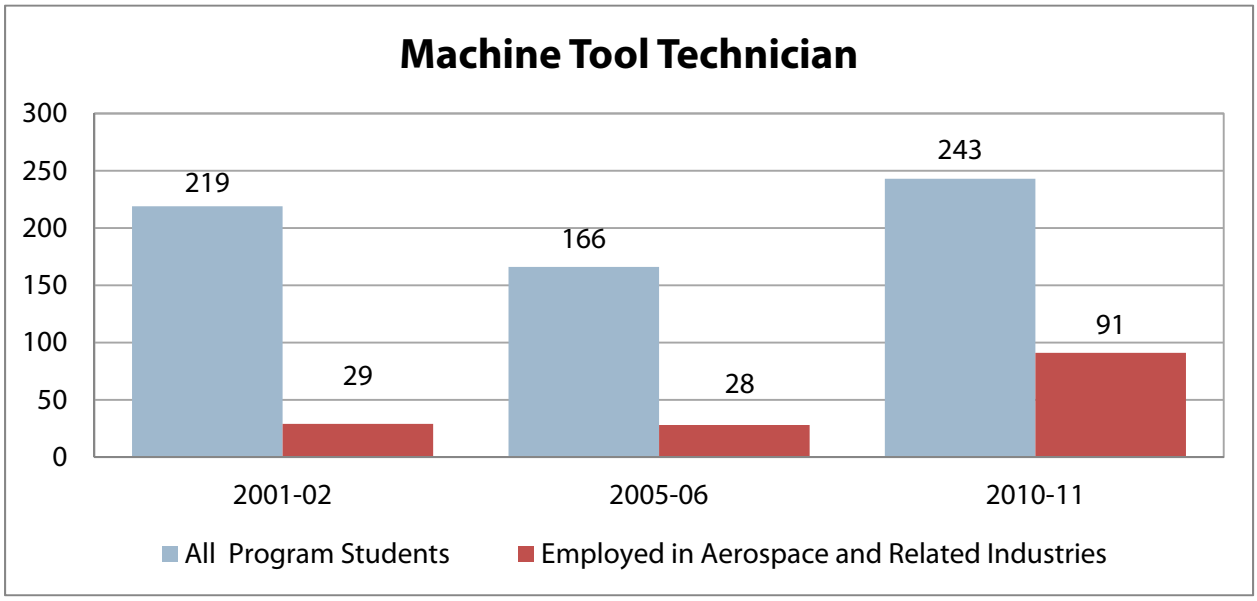
The next highest feeder program was Aircraft/Frame/Power Plant Mechanics. The number of students going to work in aerospace and related firms increased over the three cohorts, as shown in the table below, increasing from 40 exiters in 2002 to 115 exiters in 2011.



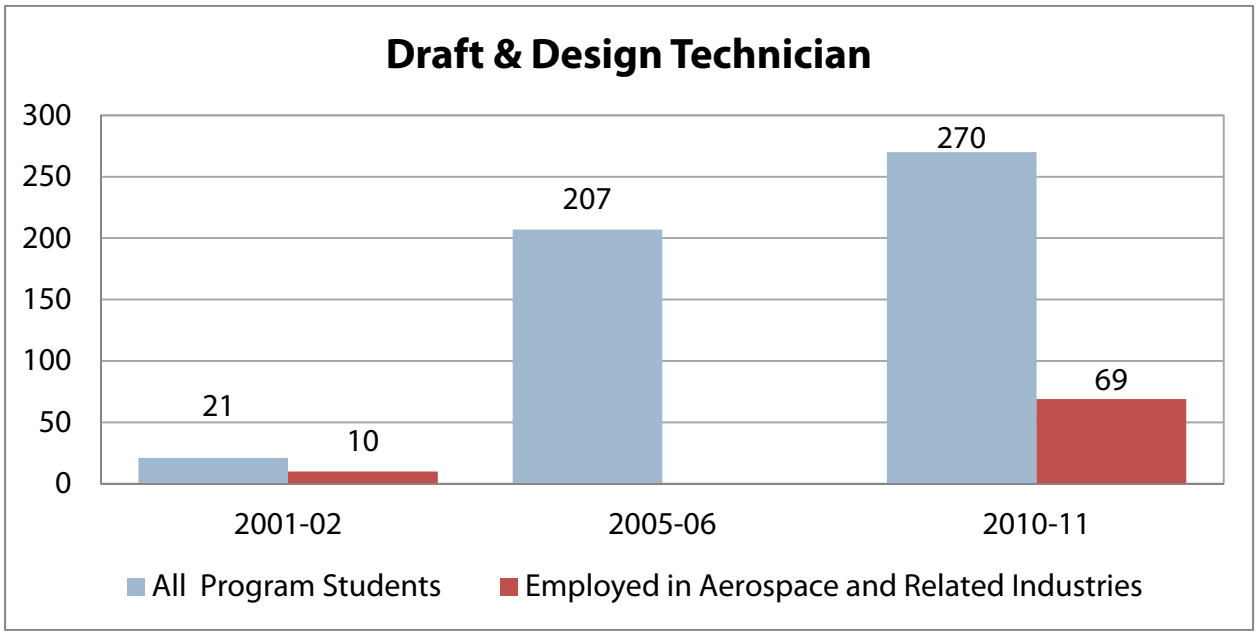
The Welding Technician program provided the third largest supply of employees to aerospace and related employers. The number of students going to work in aerospace rose from 25 in 2002 to 103 in 2011.



The Machine Tool Technician program provided the fourth largest number of employees to aerospace and related firms. The numbers going to work in aerospace increased over the three cohorts, as shown in the table below, growing from 29 exiters in 2002 to 91 exiters in 2011.



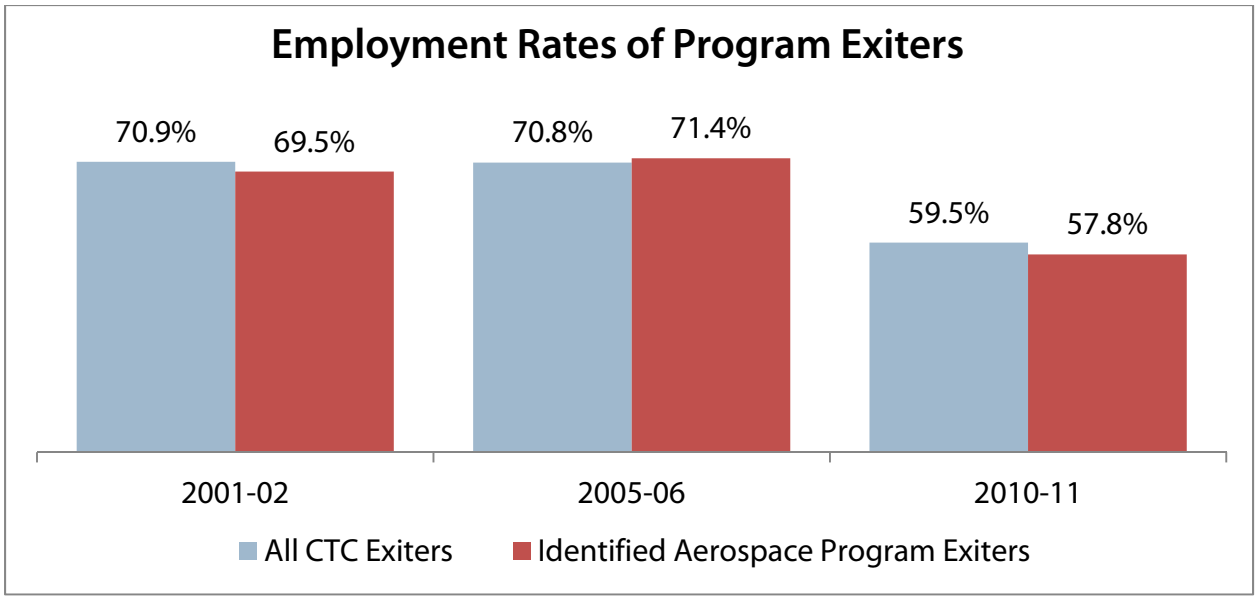
The program furnishing the fifth largest number of students employed in the aerospace industry was a general program for Draft & Design Technicians. The number of students going into aerospace core and related employment grew over the three cohorts, increasing from 10 of the exiters in 2002, to 69 as of 2011, as displayed in the table below. (Note: the number of students who went to work from this program in 2006 in the aerospace industry was too small to report.)



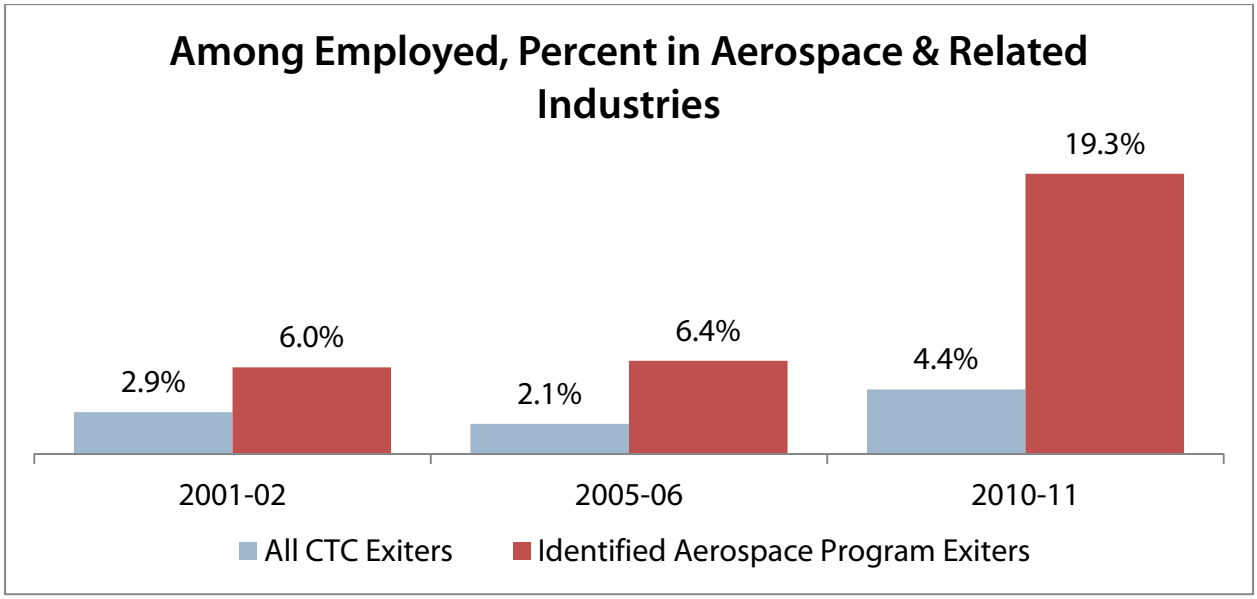
Aerospace Industry Employment & Annual Earnings

Among students in the identified aerospace programs, 58 percent were employed three-quarters after exiting the program in 2010-11.[4] This is slightly lower than the employment rate among all community college program exiters, and lower than the employment rate in two earlier cohorts. This is likely due to the continued impact of the Great Recession on the job prospects of recent students.

[4] These figures apply to those with employment reported to state employment agencies seven to nine months after leaving the program. Employment rate does not include self-employment, employment outside the Northwest or military service and thus understates total employment by approximately 10 percent. Employment and earnings of workforce program participants are looked at the third quarter after exit because this period after exit is considered the best single representation of a program's relative and lasting results, without waiting years to obtain long-term results.



Students in the identified aerospace programs were much more likely to be employed in aerospace and related industries than other community and technical college students. More than 19 percent of the 2010-11 employed program exiters were working in the aerospace industry compared to only 4 percent of all community and technical college program exiters. Yet, the proportion of employment within the aerospace industry is significantly higher for this recent cohort than the two earlier cohorts—for all community and technical college exiters and those exiting from the identified aerospace programs.



The table below depicts median annual earnings in the third quarter after a participant exited. The programs listed are those programs that provided the greatest number of employees to the aerospace and related industries, as introduced in the prior section.

Earnings of Program Participants Employed in Aerospace and Related Industries
Median Annual Earnings - 2010-11 Cohort

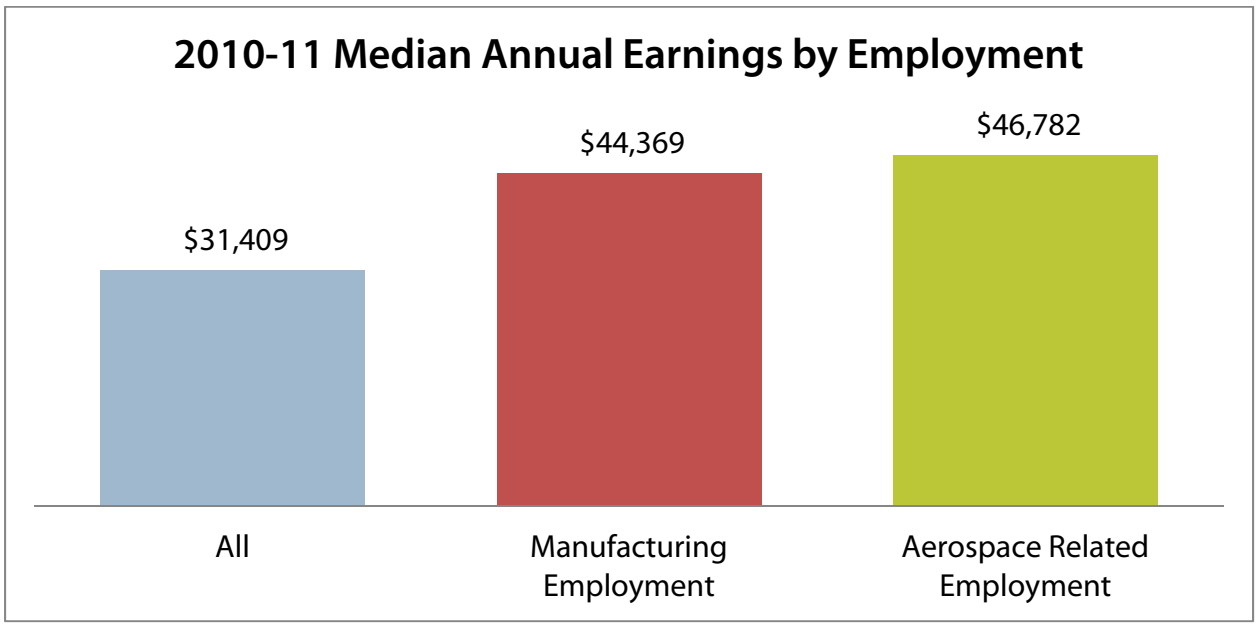
Program Code (CIP)	Program Title	Aerospace & Related Industries Median Earnings
111003	COMP & INFO SYS SECURITY	$ 97,804
110901	COMP SYS NETWORK/TELECOMM	$ 58,154
151301	DRAFT & DESIGN TECH, GENL	$ 55,707
470687	AIRCRAFT/FRAME/PWRPLANT	$ 55,375
470201	HEAT/AC/VENT/REFRIG MAINT	$ 52,595
110201	COMPUTER PROGRAMMING	$ 51,857
151302	CAD DRAFT/DESIGN TECH	$ 47,640
470607	AIRFRAME MECH & AIRCRAFT	$ 46,963
150303	ELECT/ELECTR & COMM TECH	$ 45,318
110301	INFORMATION PROCESSING	$ 44,535
460302	ELECTRICIAN	$ 44,392
470605	DIESEL MECHANICS TECH	$ 42,112
480508	WELDING TECH	$ 39,384
480501	MACHINE TOOL TECH	$ 34,583
Group Median		**$ 46,782**
Information based on participant employment 7-9 months after exiting a program, based on matches with employment and wage records.		

Among exiters in these programs employed three quarters after exit in the aerospace industry, median annual earnings were $46,782. The highest median earners were those in computer and information systems security programs ($97,804) and the lowest median earners were those from the machine tool tech program ($34,583). The program feeding the largest number of students into the aerospace industry—airframe mechanic—had median annual earnings just short of $47,000, while the next largest program, aircraft/frame/power plant mechanics, had median annual earnings of over $55,000.

Aerospace Industry Annual Earnings – Industry Comparison

Individuals from the identified community and technical college programs working in the aerospace industry have median annual earnings of $47,000. This is five percent higher than the median earnings of individuals exiting the same programs who work in manufacturing

($44,000) and 41 percent higher than individuals exiting the same programs across all industries ($31,000). [5]



Aerospace Future Demand

The current long-term industry-level employment forecast for aerospace and related firms projects 5,086 average net job openings each year between 2015 and 2020.[6] There are, however, limitations to this forecast.

The industry-level employment forecast uses the Global Insight national model as the main input, but the aerospace industry is below the level of detail used in the Global Insight forecast. The closest industry sector in Global Insight model is "other transportation equipment," but it has a very different mix on the national and state level, making its use insufficient. This fact combined with significant contribution to employment trends by one employer (the Boeing Company) and the cyclical nature of aerospace employment makes forecasting for this industry a challenge.[7]

[5] Examined earnings of all 2010-11 identified aerospace feeder program exiters based on where employed: aerospace, manufacturing and all employers. Earnings income is based on third quarter after leaving the program.

[6] LMEA, Washington Occupational Employment Projections, May 2012. Proportion of aerospace core and aerospace-related occupational openings were determined by cross-referencing the occupation-level employment in these industries as reported in LMEA's Industry Control Totals for Occupational Employment, May 2012.

[7] LMEA uses industry inputs and occupational/industry staffing patterns to convert industry employment projections to occupation-level employment projections. The staffing patterns come from the Occupational Employment Survey (OES) with three-year cycles, which by

To supplement the forecast, the Workforce Board conducted a survey of aerospace and related firms. The primary goal of the survey was to provide a more nuanced understanding of the anticipated hiring needs of employers and how the state can better prepare the labor force for increases in aerospace production over the coming years.

A survey was fielded from early October through mid-November 2012. A total of 186 employers responded to the survey—17 through paper surveys and 169 via the web-based survey. [8] This survey response rate of 26.2 percent is above average for a non-incentivized survey. The survey instrument and full survey results are appended at the end of this report (Appendix D).

Survey Results – Employer Participation & Characteristics

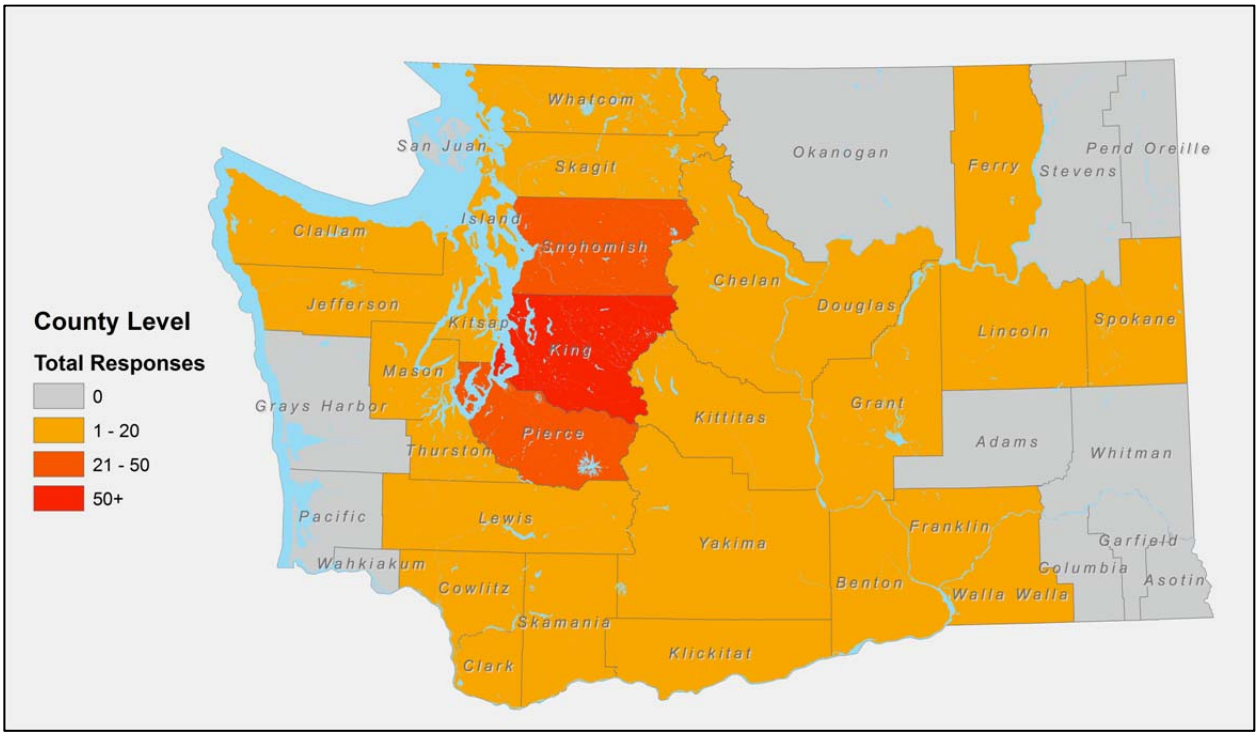
The state map below depicts the number of firms responding to the survey by county. Many of the survey respondents are located in King County (over 50 firms), and in Pierce and Snohomish counties (between 21 and 50 firms each), though the bulk of the state was represented.

The employers participating in the survey represent both small and large firms. Of the Washington-based operations, approximately 32 percent of firms have 20 or fewer employees, 40 percent between 20 and 100 employees, and nearly 23 percent have 100 or more employees. Over 30 percent of the firms also have employees in another state, and 19 percent have employees outside of the U.S. Of firms responding, nine percent are unionized.

design do not reflect the latest changes. The OES have been unstable for aerospace, and as a general rule have not been comparable across time. However, it remains the best occupational data available. LMEA occupational projections also incorporate limited change factors based on national and state data, which reflect the changes in staffing patterns with time.

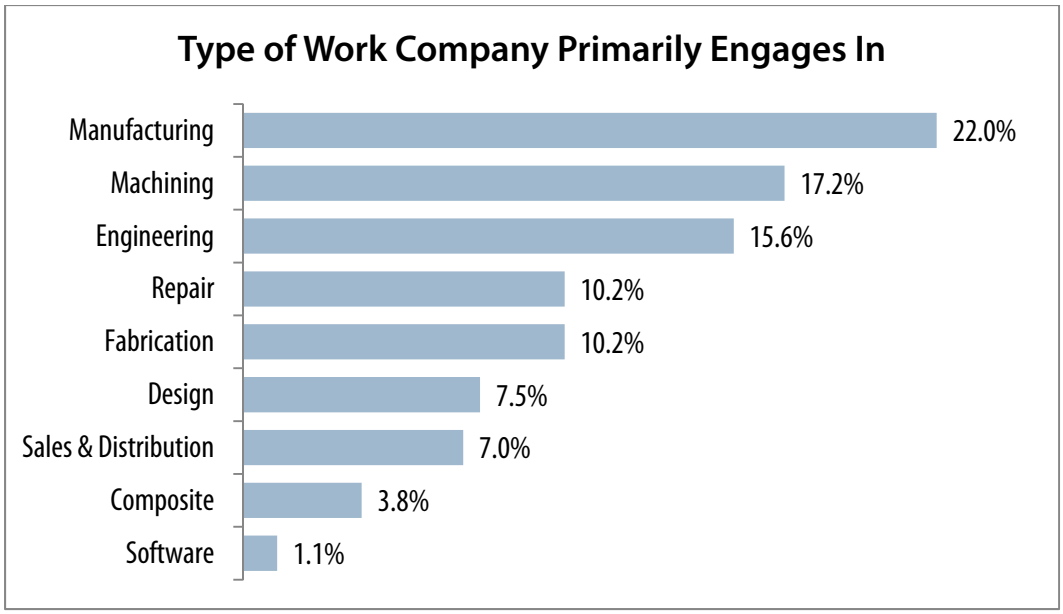
[8] The survey was primarily web-based, distributed through the Aerospace Futures Alliance of Washington and Pacific Northwest Aerospace Alliance employer association email lists, the industry list of the Association of Washington Business, and by direct distribution from the Workforce Board. To make sure the largest number of firms possible participated in the survey, paper versions of the survey were mailed to the small number of firms lacking a web presence.

Aerospace Firm Survey Participation by County

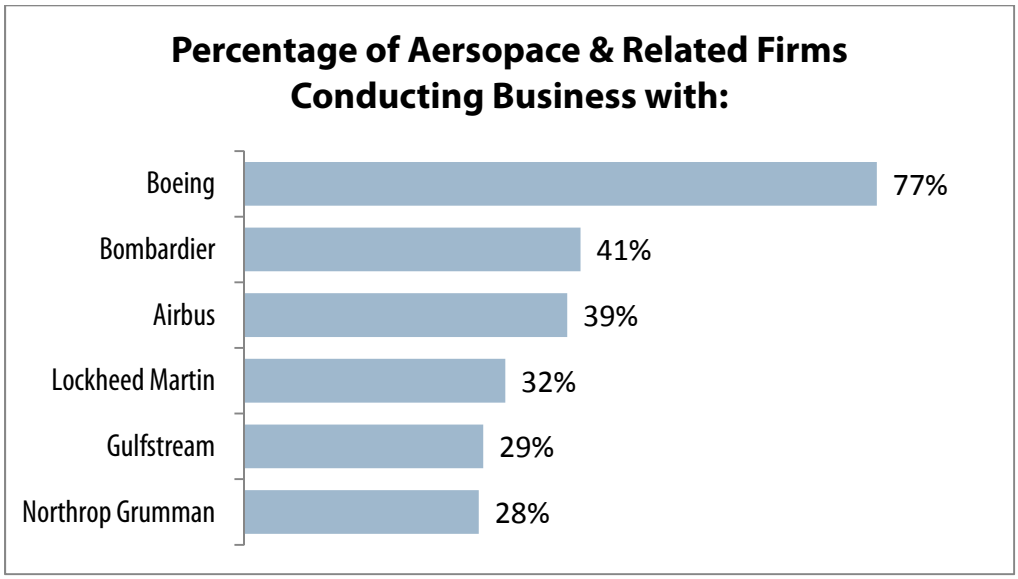


Over 39 percent of firms reported doing *all* of their business in support of the aerospace industry, with 86 percent of firms doing more than 25 percent of their business in support of the aerospace industry. Responding firms engage in a substantial amount of business with companies outside of Washington. Whereas 21 percent of firms indicated that at least three-fourths of their sales are to other businesses in Washington, another 38 percent of firms have less than 25 percent of their sales to other businesses in Washington—indicating they predominantly work with clients and firms beyond state borders.

Firms represented a cross-section of aerospace related work. Among respondents, 22 percent of firms describe their primary business as being in manufacturing, whereas 17 percent self-attribute their work as machine shops, and nearly 16 percent as engineering firms.



Almost 77 percent of the aerospace and related companies responding to the survey indicate engaging in some business with the Boeing Company—with nearly 1 out of 5 firms conducting the majority of their business with Boeing. However, firms also conduct business with other aerospace firms, the largest being Bombardier (41 percent).



Survey Results – Employer Workforce

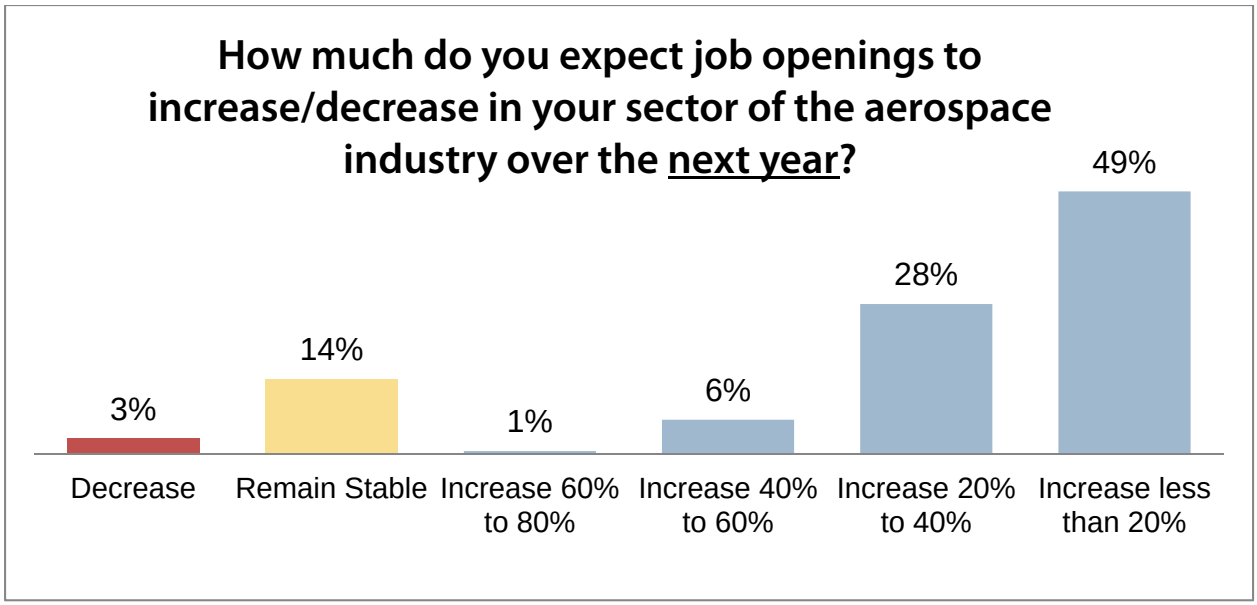
Of the aerospace and aerospace-related firms surveyed, nearly 85 percent indicated that they hired new employees in the last 12 months, with over 20 percent of employers hiring more than 50 employees.

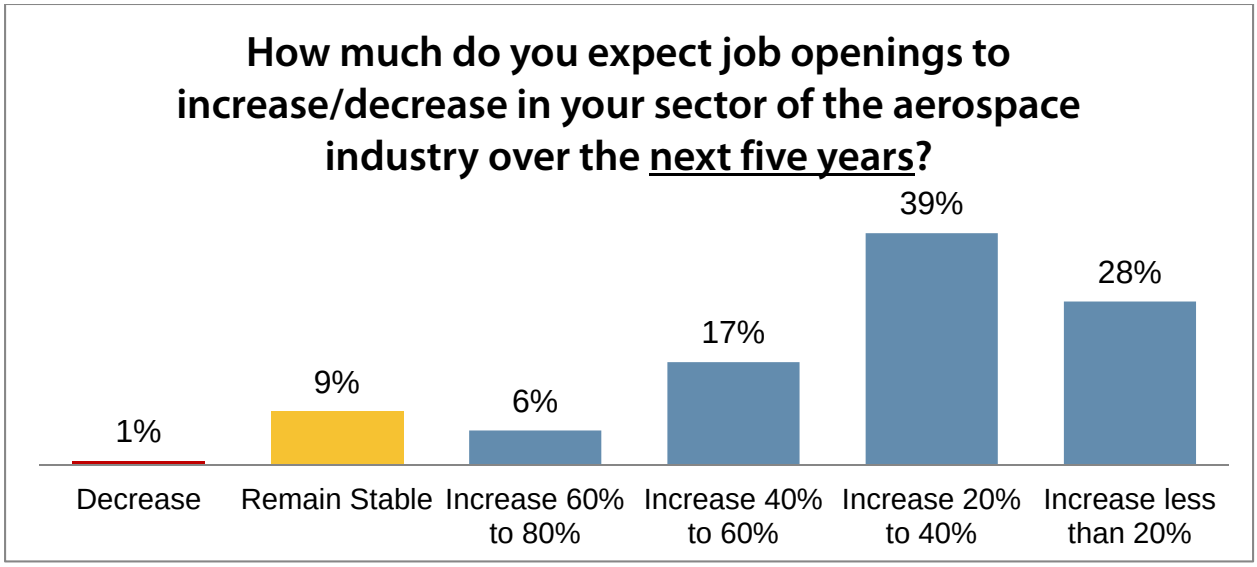
Firms identified machinist and engineer as the two occupations in which they currently have the largest number of employees. These are also the top two occupations identified for which firms have had a problem filling vacancies over the past year. Firms have responded to the difficulty in finding qualified applicants in several ways, including increasing overtime hours for their current workforce (65 percent), increasing recruiting efforts (51 percent), leaving the position vacant (49 percent), and hiring a less qualified applicant (44 percent).

Based on responses to a separate question, employers may also be using interns to help fill short term employment needs, as nearly two-thirds of companies report employing student interns. Additionally, employers indicated an increase in their use of in-house or self-funded training to skill-up the available workforce to meet their growing demand for skilled labor.

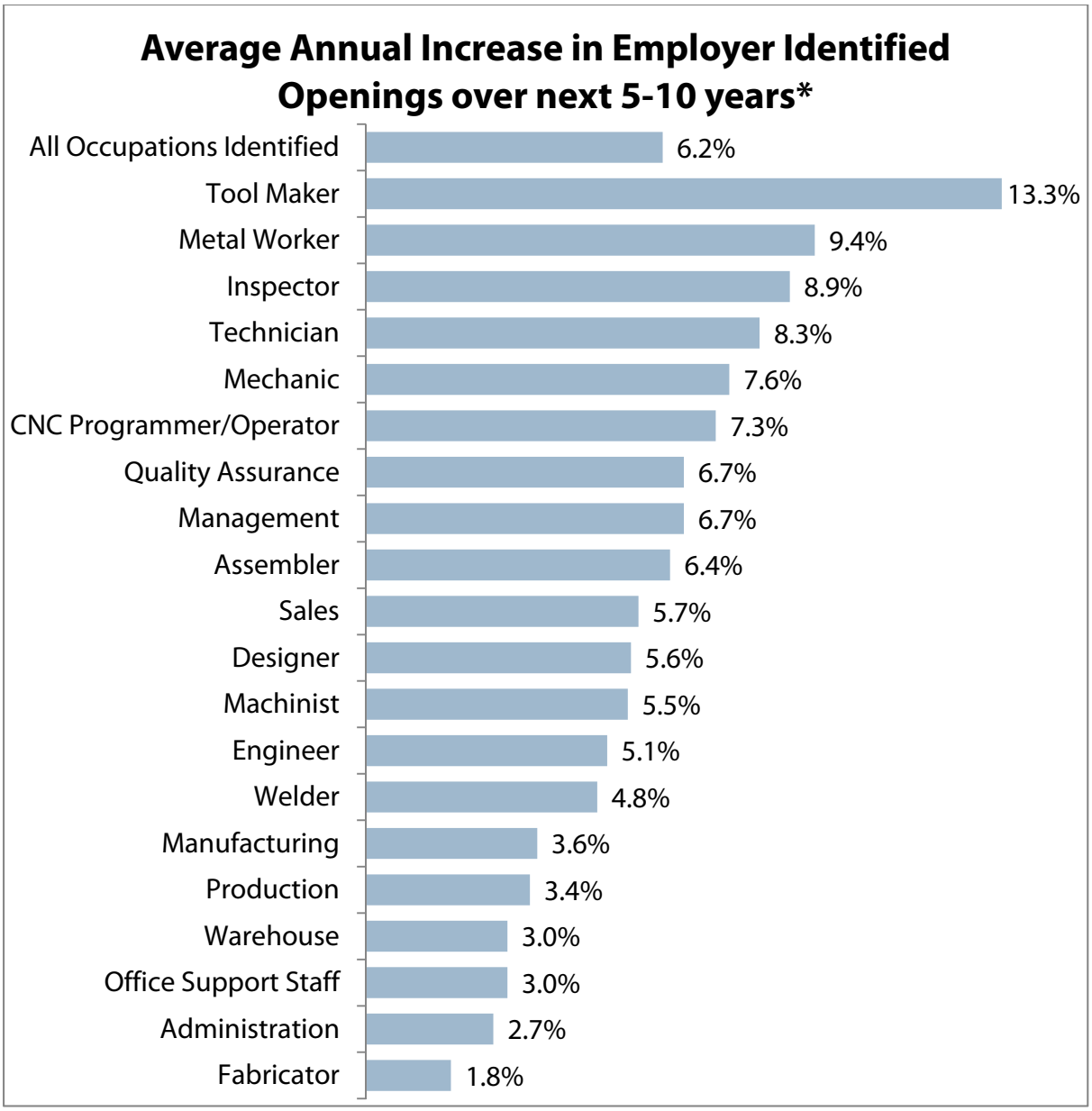
One of the primary survey goals was to better capture the employment impact in Washington due to the recent expansion in aerospace production. Employment Security Department's long-term projections for aerospace and related employment suggest there would be 5,086 average annual net openings between 2015 and 2020. Of these net openings, 1,655 will be due to job growth, while 3,431 (or 67 percent of the total average annual openings) will be due to replacement of retiring workers. This is a 3.6 percent average annual increase in employment. Survey responses indicate that the increase might be higher.

Overall, when aerospace and related firms were asked about changes in expected job openings in their sector of the aerospace industry over the next year and next five years, four out of five employers saw openings increasing in the near and distant future. Further, 34 percent of employers expect job openings to increase more than 20 percent over the next year, while 56 percent expect job openings to increase by more than 20 percent over the next five years (figures below).





Employers who were surveyed identified occupations with the largest anticipated increase in the number of employees hired over the next five to 10 years. Employers anticipated needing to increase these key occupations by an average annual rate of 6.2 percent—and even higher rates for some selected occupations (Figure below). This rate is nearly 2.5 percentage points above the forecasted long-term average annual increase for all aerospace and related occupations in Washington. This offers evidence that among aerospace employers, there is a greater than anticipated need for skilled aerospace workers than identified in the long-term forecast. (The projected growth may increase as additional survey responses are returned.)



*Based on survey results. Percentages may increase as additional survey responses are received.

More than 5,000 annual job openings in these 20 fields are projected over the next five to 10 years, based on an extrapolation from the employment increases anticipated by surveyed employers. The number of average annual job openings includes 760 inspectors and quality assurance (350 more than the latest long-term occupational projection in aerospace), 850 job openings for welders, machinists, CNC programmer/operators, metal workers and tool makers (400 more than the latest long-term occupational projection in aerospace), and 880 engineering jobs (nearly 200 more than the latest long-term occupational projection in aerospace). These projected net openings may increase as additional survey responses are returned.

Appendix A

Aerospace Pipeline Advisory Committee

Industry Representatives

Frank Nichols, CEO, Silicon Forest Electronics

Eric Hahn, Vice President/organization Development, General Plastics

Michael Greenwood, Senior Manager, The Boeing Company

Al Pennell, The Boeing Company

Debbie Byrd, Human Resources Manager, GE Aviation Services LLC

John Theisen, President and CEO, ORION

Jackie Davis, Regional Sales Manager, AMI Metals Inc

Bahman Hadi, Cascade Engineering Services

Tom Doughty, VP Administration, Janicki Industries

Ben Hempstead, Engineer-Mechanical Lead, Electroimpact

Linda Lanham, Director, Aerospace Future Alliance

Education Representatives

David Beyer, President, Everett Community College

Larry Cluphf, Director, Washington Aerospace Training & Research Center

Steve Hanson, President, Renton Technical College

Laura Hopkins, Executive Director, Aerospace Joint Apprenticeship Program

Labor Representatives

Ken Atkinson, Design Engineer, SPEEA, IFPTE Local 2001

Ron Harrell, Staff Assistant, IAM&AW District Lodge 160

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Mary Kaye Bredeson, Director, Center of Excellence for Aerospace & Advanced Materials Manufacturing

Betty Klattenhoff, Career and Technical Education Director, Office of the Superintendent of Public Instruction

Marty Brown, Executive Director, WA State Board for Community & Technical Colleges

Alexis Holzer, Assistant Director-Economic Development, Washington State University

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Tina Bloomer, Policy Research Associate, WA State Board for Community & Technical Colleges

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Appendix B – Aerospace Industry Employment by North American Industry Classification System

Employment counts per industry code were derived from quarterly contribution reports filed by almost every employer. These reports counted only filled jobs, whether full or part-time, temporary or permanent, by place of work. The quarterly reports included the establishment's monthly employment levels for the pay periods that included the 12th of the month. Because the QCEW (Quarterly Census of Employment and Wages) data was based on an establishment census which counts only filled jobs, it is likely that a multi-job holder will be counted two or more times in QCEW data. Major exclusions from UI coverage included self-employed workers, most agricultural workers on small farms, all members of the Armed Forces, elected officials in most states, most employees of railroads, some domestic workers, most student workers at schools, and employees of certain small nonprofit organizations.

The next page is the table of NAICS codes that constitute this report definition of aerospace and related firms. The rows of shaded NAICS codes represent the core aerospace industry.

Aerospace Industry Employment by NAICS

NAICS Code	Industry Description	Dec-02	Dec-03	Dec-04	Dec-05	Dec-06	Dec-07	Dec-08	Dec-09	Dec-10	Dec-11	Mar-12
325211	Plastics Material and Resin Manufacturing	144	308	358	394	448	*	506	446	485	*	*
332710	Machine Shops	3,141	2,995	3,312	3,705	4,002	4,369	4,123	3,560	4,070	4,544	4,690
332813	Electroplating, anodizing, and coloring	853	852	832	906	905	1,024	935	767	803	920	943
332999	Miscellaneous fabricated metal product manufacturing	805	909	983	925	1,043	1,141	1,166	841	805	787	773
333512	Machine Tool Manufacturing	229	247	392	411	482	515	531	465	484	-	-
333514	Special Die and Tool Manufacturing	299	419	604	611	675	721	747	623	711	822	783
333517	Machine tool manufacturing	-	-	-	-	-	-	-	-	-	547	553
333611	Turbine and turbine generator set units	*	*	*	*	*	*	*	55	55	58	62
333612	Speed changer, drive, and gear manufacturing	*	120	138	148	180	256	*	*	153	*	*
333613	Mechanical power transmission equipment	*	*	*	*	*	39	38	57	67	71	71
333618	Other engine equipment manufacturing	*	96	89	71	*	27	27	23	*	*	*
334417	Electronic Connector Manufacturing	251	226	232	241	240	273	283	252	304	285	283
334418	Printed Circuit Assembly (Electronic Assembly) Manufacturing	735	797	744	721	1,016	659	826	703	759	827	881
334419	Other Electronic Component Manufacturing	1,855	1,718	1,907	2,068	2,072	2,594	2,553	2,110	2,105	2,189	2,340
334511	Search, Detection, Navigation, Guidance, and Nautical System Manuf.	1,865	1,789	1,951	1,934	1,855	1,955	1,715	1,640	1,687	1,744	1,739
334513	Instruments and Related Products Manufacturing	669	612	610	641	688	722	743	702	789	846	873
334515	Instrument Manufacturing for Measuring and Testing Electricity and Electrical Signals	2,397	1,916	1,883	1,963	1,922	2,556	2,282	2,035	2,054	2,119	2,140
334519	Other Measuring and Controlling Device Manufacturing	866	805	779	791	762	743	766	700	771	769	765
335311	Power, Distribution, and Specialty Transformer Manufacturing	*	186	179	181	105	101	88	36	77	228	253
335314	Relay and Industrial Control Manufacturing	797	851	911	1063	1211	1319	1480	1532	1719	2101	2033
335921	Fiber Optic Cable Manufacturing	*	*	*	-	-	-	-	-	-	-	-
335991	Carbon and Graphite Product Manufacturing	-	-	-	-	-	-	-	-	*	*	*
335999	All Other Miscellaneous Electrical Equipment and Component Manufacturing	1,136	1,055	1,275	1,323	1,352	1,170	1,332	1,091	1,109	1,169	1,017
336411	Aircraft Manufacturing	63,769	54,692	55,435	61,787	66,027	71,027	74,132	71,190	71,456	79,316	80,196
336412	Aircraft Engine and and Engine Parts Manufacturing	176	183	148	124	126	148	162	128	86	187	209
336413	Other Aircraft Parts and Auciliary Equipment Manuf.	7,233	6,546	6,953	7,951	9,287	10,986	10,464	9,364	9,776	10,947	11,091
336414	Guided Missile and Space Vehicle Manufacturing	-	-	-	-	-	-	-	-	-	-	-
336415	Guided Missle and Space Vehicle Propulsion Manuf.	*	*	*	*	*	*	*	*	*	*	*
336419	Other Guided Missile and Space Vehicle Parts Manuf.	*	*	*	*	*	*	*	*	*	*	*
481111	Scheduled passenger air transportation	12,851	11,571	11,584	10,408	10,321	10,049	10,069	9,678	9,693	10,081	10,150
481112	Scheduled freight air transportation	159	154	131	185	222	168	136	99	105	100	103
481211	Nonscheduled air passenger chartering	307	297	255	299	315	291	330	281	292	280	281
481212	Nonscheduled air freight chartering	108	117	101	87	86	88	74	68	68	81	85
481219	Other nonscheduled air transportation	124	131	136	112	134	170	117	83	79	104	99
488111	Air traffic control	*	*	*	*	*	*	*	*	*	*	*
488119	Other airport operations	1,424	1,497	1,414	1,864	1,897	2,162	1,999	1,699	1,692	1,809	1,873
488190	Other support activities for air transpo	1,041	1,237	1,450	1,684	1,810	1,838	1,778	2,033	2,108	2,054	2,046
611512	Flight Training	750	639	639	478	524	561	513	374	375	373	*
927000	Space Research and Technology	-	-	-	-	-	-	-	-	-	-	-
	Total "Aerospace" Employment (shaded codes above)	**71,721**	**61,995**	**62,833**	**70,390**	**75,979**	**82,745**	**85,323**	**81,198**	**81,865**	**90,991**	**92,040**
	Total "Aerospace-related" Employment (all NAICS codes listed above)	**105,293**	**94,183**	**96,340**	**104,224**	**110,848**	**119,494**	**121,055**	**113,643**	**115,848**	**126,953**	**127,954**

* Employment and wages not shown to avoid disclosure of data for individual employer.
Labor Market and Economic Analysis Branch
Washington State Employment Security Department

Shaded rows are the NAICS codes considered part of the core Aerospace industry.

Appendix C – Aerospace Industry Excluded NAICS

The following NAICS industries were excluded from the aerospace industry definition due to insufficient numbers of firms to include in the entire industry definition. However, we know that a small number of aerospace companies are found under these industry codes.

NAICS Code	Industry Description
334220	Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing
334411	Electron Tube Manufacturing
334412	Bare Printed Circuit Board Manufacturing
334413	Semiconductor and Related Device Manufacturing
334414	Electronic Capacitor Manufacturing
334415	Electronic Resistor Manufacturing
334416	Electronic Coil, Transformer, and Other Inductor Manufacturing
334417	Electronic Connector Manufacturing
334510	Electromedical and Electrotherapeutic Apparatus Manufacturing
334512	Automatic Environmental Control Manufacturing for Residential, Commercial, and Appliance Use
334514	Totalizing Fluid Meter and Counting Device Manufacturing
334516	Analytical Laboratory Instrument Manufacturing
334517	Irradiation Apparatus Manufacturing
334518	Watch, Clock, and Part Manufacturing
335312	Motor and Generator Manufacturing
335313	Switchgear and Switchboard Apparatus Manufacturing
335911	Storage Battery Manufacturing
335912	Primary Battery Manufacturing
335929	Other Communication and Energy Wire Manufacturing
335931	Current-Carrying Wiring Device Manufacturing
335932	Noncurrent-Carrying Wiring Device Manufacturing
336900	Other Motor Vehicle Parts Manufacturing
423860	Other transportation goods merchant wholesalers
517410	Satellite Telecommunications
541330	Engineering services
541512	Computer Systems Design Services
541712	Research and development in the Physical, Engineering, and Life Sciences
928110	National security

Appendix D - Aerospace Employer Survey Results

Overall Response Rates

- 709 firms surveyed (who received email or post version)
    - 977 firms were identified on our combined contact list of aerospace employers. We combined lists from the following sources: Governor's office, Association of Washington Businesses (AWB), and the Pacific Northwest Aerospace Alliance (PNAA).
        - 161 firms were removed due to returned emails or opt-outs due to not being in industry or not being in business.
        - 107 firms were removed due to returned mail surveys indicating company was out of business or had moved.
- 186 responses (26.2 percent)

Survey Type	N	Percent
Paper	17	9.1%
Web	169	90.9%
Total	**186**	**100%**

Survey starts here

Workforce Needs

We are interested in knowing about the employment situation among employers in the aerospace industry and in advanced manufacturing supporting that industry. If you are not directly involved in the aerospace industry, but supplying or supporting the aerospace and/or advanced materials industry, please answer these questions about the part of your business that supplies or supports these industries.

1) What is your industry classification code (e.g., NAICS[9])?

Full Reported and Cleaned NAICS Codes

Revised NAICS	NAICS Title	Responses	Percent	Percent of Those Who Know
Blank	-	8	4.0%	-
Do not know	-	37	18.4%	19.2%
23833x	Flooring Contractors	1	0.5%	0.5%
31321x	Broad woven Fabric Mills	1	0.5%	0.5%
326130	Laminated Plastics Plate, Sheet (except Packaging), and Shape Manufacturing	1	0.5%	0.5%
331221	Rolled Steel Shape Manufacturing	1	0.5%	0.5%
331315	Aluminum Sheet, Plate, and Foil Manufacturing	2	1.0%	1.0%
332312	Fabricated Structural Metal Manufacturing	2	1.0%	1.0%
33232x	Ornamental and Architectural Metal Products Manufacturing	1	0.5%	0.5%
332322	Sheet Metal Work Manufacturing	1	0.5%	0.5%
332410	Power Boiler and Heat Exchanger Manufacturing	1	0.5%	0.5%
332420	Metal Tank (Heavy Gauge) Manufacturing	2	1.0%	1.0%
332710	Machine Shops	6	3.0%	3.1%
332721	Precision Turned Product Manufacturing	1	0.5%	0.5%
332811	Metal Heat Treating	1	0.5%	0.5%
332813	Electroplating, Plating, Polishing, Anodizing, and Coloring	1	0.5%	0.5%
332996	Fabricated Pipe and Pipe Fitting Manufacturing	1	0.5%	0.5%
332999	All Other Miscellaneous Fabricated Metal Product Manufacturing	2	1.0%	1.0%
333220	Plastics and Rubber Industry Machinery Manufacturing	1	0.5%	0.5%
333513	Machine Tool (Metal Forming Types) Manufacturing	1	0.5%	0.5%
334417	Electronic Connector Manufacturing	1	0.5%	0.5%
334418	Printed Circuit Assembly (Electronic Assembly) Manufacturing	1	0.5%	0.5%
334419	Other Electronic Component Manufacturing	1	0.5%	0.5%
334513	Instruments and Related Products Manufacturing for Measuring, Displaying, and Controlling Industrial Process Variables	1	0.5%	0.5%
334519	Other Measuring and Controlling Device Manufacturing	1	0.5%	0.5%
335311	Power, Distribution, and Specialty Transformer Manufacturing	1	0.5%	0.5%
335931	Current-Carrying Wiring Device Manufacturing	1	0.5%	0.5%
3364xx	Aerospace Product and Parts Manufacturing	100	49.8%	51.8%
423510	Metal Service Centers and Other Metal Merchant Wholesalers	1	0.5%	0.5%
423840	Industrial Supplies Merchant Wholesalers	1	0.5%	0.5%
424610	Plastics Materials and Basic Forms and Shapes Merchant Wholesalers	1	0.5%	0.5%
424690	Other Chemical and Allied Products Merchant Wholesalers	1	0.5%	0.5%

[9] *http://www.census.gov/eos/www/naics/*

481112	Scheduled Freight Air Transportation	1	0.5%	0.5%
48811x	Airport Operations	1	0.5%	0.5%
488119	Other Airport Operations	1	0.5%	0.5%
488190	Other Support Activities for Air Transportation	3	1.5%	1.6%
511210	Software Publishers	1	0.5%	0.5%
541xxx	Professional, Scientific, and Technical Services	1	0.5%	0.5%
541330	Engineering Services	3	1.5%	1.6%
541380	Testing Laboratories	1	0.5%	0.5%
541511	Custom Computer Programming Services	1	0.5%	0.5%
541519	Other Computer Related Services	1	0.5%	0.5%
541690	Other Scientific and Technical Consulting Services	1	0.5%	0.5%
541710	Scientific Research and Development Services	1	0.5%	0.5%
611512	Flight Training	2	1.0%	1.0%

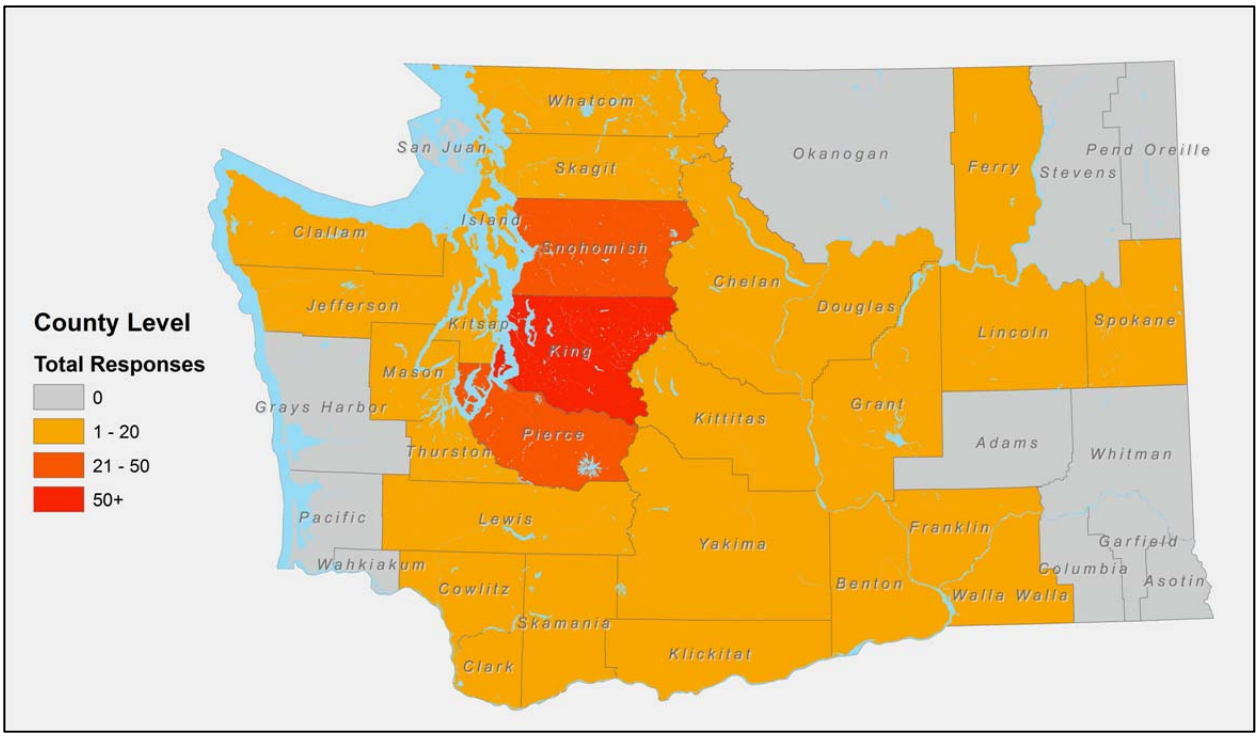
4-Digit Reported and Cleaned NAICS Codes

Revised 4-Digit NAICS	NAICS Title	Responses	Percent	Percent of Those Who Know
Do not know	-	45	22.4%	-
2383	Building Finishing Contractors	1	0.5%	0.6%
3132	Fabric Mills	1	0.5%	0.6%
3261	Plastics Product Manufacturing	1	0.5%	0.6%
3312	Steel Product Manufacturing from Purchased Steel	1	0.5%	0.6%
3313	Alumina and Aluminum Production and Processing	2	1.0%	1.3%
3323	Architectural and Structural Metals Manufacturing	4	2.0%	2.6%
3324	Boiler, Tank, and Shipping Container Manufacturing	3	1.5%	1.9%
3327	Machine Shops; Turned Product; and Screw, Nut, and Bolt Manufacturing	7	3.5%	4.5%
3328	Coating, Engraving, Heat Treating, and Allied Activities	2	1.0%	1.3%
3329	Other Fabricated Metal Product Manufacturing	3	1.5%	1.9%
3332	Industrial Machinery Manufacturing	1	0.5%	0.6%
3335	Metalworking Machinery Manufacturing	1	0.5%	0.6%
3344	Semiconductor and Other Electronic Component Manufacturing	3	1.5%	1.9%
3345	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	2	1.0%	1.3%
3353	Electrical Equipment Manufacturing	1	0.5%	0.6%
3359	Other Electrical Equipment and Component Manufacturing	1	0.5%	0.6%
3364	**Aerospace Product and Parts Manufacturing**	**100**	**49.8%**	**64.1%**
4235	Metal and Mineral (except Petroleum) Merchant Wholesalers	1	0.5%	0.6%
4238	Machinery, Equipment, and Supplies Merchant Wholesalers	1	0.5%	0.6%
4246	Chemical and Allied Products Merchant Wholesalers	2	1.0%	1.3%
4811	Scheduled Air Transportation	1	0.5%	0.6%
4881	Support Activities for Air Transportation	5	2.5%	3.2%
5112	Software Publishers	1	0.5%	0.6%
541x	Professional, Scientific, and Technical Services	1	0.5%	0.6%
5413	Architectural, Engineering, and Related Services	4	2.0%	2.6%
5415	Computer Systems Design and Related Services	2	1.0%	1.3%
5416	Management, Scientific, and Technical Consulting Services	1	0.5%	0.6%
5417	Scientific Research and Development Services	1	0.5%	0.6%
6115	Technical and Trade Schools	2	1.0%	1.3%

2) What is your company name?

NOT REPORTED DUE TO CONFIDENTIALITY

What is the ZIP code for your company location?
Aerospace Firm Survey Participation by County



3) Approximately what percent of your business is part of or supports the aerospace industry?

Percent of Business Supporting Aerospace	N	Percent
100%	73	39.2%
More than 75%	50	26.9%
25% to 75%	36	19.4%
Less than 25%	22	11.8%
None	4	2.2%
Missing	1	0.5%

4) In which two (or more) occupations do you currently have the most employees?

Occupation with most employees currently identified by firms	Firms Identifying Occupation	Average # of Employees
Machinist	70	23
Engineers	43	54
Assemblers	31	34
Production	24	74
Sales	21	27
Technician	19	30
Administration	18	42
CNC Programmer/Operator	18	18
Manufacturing	17	57
Mechanic	17	19
Management	13	43
Quality Assurance	12	7
Inspector	11	10
Office Support Staff	10	8
Warehouse	8	19
Welder	8	13
Designers	5	16
All Occupations Identified	**-**	**33**

5) How many new employees have you hired in the last twelve (12) months?

New employees hired last 12 months	N	Percent
101 to 500	5	2.7%
51 to 100	5	2.7%
21 to 50	25	13.4%
1 to 20	122	65.6%
None	23	12.4%
Missing	6	3.2%

6) Which two (or more) occupations have you had the hardest time filling vacancies for over the past 12 months?

Occupations firms have had the hardest time filling vacancy past 12 months	Firms Identifying Occupation	Average Vacancies
Machinist	63	4
Engineers	44	5
CNC Programmer/Operator	24	3
Management	19	3
Quality Assurance	17	2
Inspector	15	2
Technician	12	4
Mechanic	11	5
Assemblers	9	4
Sales	9	2
Production	7	4
Manufacturing	7	3
Designers	4	6
Welder	4	4
Administration	3	1
Warehouse	2	2
Office Support Staff	0	0
All Occupations Identified	**-**	**4**

7) How have you responded over the last year to difficulty finding qualified applicants? [Can select more than one]

Response to over last year to difficulty finding qualified applicants	N	Percent
Increased overtime hours for current workers	121	65.1%
Increased recruiting efforts	94	50.5%
Did not fill the job opening	91	48.9%
Hired a less qualified applicant	81	43.5%
Outsourced work or purchased services from another firm	68	36.6%
Increased earnings to attract more applicants	48	25.8%
Engaged education providers to access skilled graduates exiting their programs	42	22.6%
Established in house training	15	8.1%
Have not had any difficulty	8	4.3%

Aside from those skills specific to particular occupations, what are the general skills you **currently** have the most trouble finding among:

8) Professional level workers

General skills most trouble finding: Professional level workers	N	Percent
Engineering Skills	37	19.9%
Project Planning & Client Management	28	15.1%
Aerospace Experience	15	8.1%
Soft skills (e.g., On time, courteous, et cetera)	15	8.1%
Sales experience	9	4.8%
Administrative	8	4.3%
Leadership	8	4.3%
Database & Software Engineers	7	3.8%
Tech Savvy	5	2.7%
Composites	4	2.2%
Electrical Design	4	2.2%
Quality Assurance	4	2.2%
CNC Programming	3	1.6%
Accounting	3	1.6%
ISO9001/AS9100 knowledge	3	1.6%

9) Skilled trades and technical workers

General skills most trouble finding: Skilled trades and technical workers	N	Percent
Machining	38	20.4%
Soft skills (e.g., On time, courteous, et cetera)	27	14.5%
CNC	17	9.1%
Aerospace Experience	13	7.0%
Assembly Experience	10	5.4%
Welding	8	4.3%
Quality Engineer	7	3.8%
Electrical Skills	7	3.8%
Inspection Skills	7	3.8%
Composites	6	3.2%
Blue Print/Drawing Reading	6	3.2%
Math	6	3.2%
Fabrication	5	2.7%
Engineering Skills	4	2.2%
Tech Savvy	4	2.2%
Database & Software Engineers	4	2.2%
Administrative	2	1.1%
Project Planning & Client Management	2	1.1%
AS9100 knowledge	1	0.5%

10) Support and maintenance workers

General skills most trouble finding: Support and maintenance workers	N	Percent
Soft skills (e.g., On time, courteous, et cetera)	25	13.4%
Aerospace Experience	5	2.7%
Technician Skills	5	2.7%
Production Planning	5	2.7%
CNC	3	1.6%
Math	2	1.1%
Machining	2	1.1%
Composites	1	0.5%
AS9100 knowledge	1	0.5%
Blue Print/Drawing Reading	1	0.5%

11) Which of the following methods does your company use to help the next generation of workers prepare for careers?

How does your company prepare next generation of workers	N	Percent
Employ interns from colleges and/or universities	85	45.7%
Employ interns from high school vocational programs	41	22.0%
Allow employees to mentor high school or college students on company time	33	17.7%
Encourage employees to mentor high school or college students on their own time	30	16.1%
Provide OJT (on the job training) and external training to young workers	15	8.1%
None	10	5.4%
Connect with local apprenticeship programs	6	3.2%

12) How much do you expect job openings to increase/decrease in your sector of the aerospace industry (e.g., machining, electrical equipment):

Expected job openings to change over…	Next Year (Count)	Next Year %	Five Years (Count)	Five Years %
Increase less than 20%	84	47.7%	43	24.9%
Increase 20% to 40%	48	27.3%	61	35.3%
Increase 40% to 60%	11	6.3%	27	15.6%
Increase 60% to 80%	1	0.6%	9	5.2%
Remain Stable	24	13.6%	14	8.1%
Decrease by 50% to 100%	3	1.7%	-	-
Decrease by less than 50%	2	1.1%	1	0.6%
Refuse/Don't Know	3	1.7%	5	2.9%
Missing	10	-	13	-

13) Which two (or more) occupations will likely see the **largest growth** in the number of employees hired **over the next 5-10 years**?

Occupations with largest increase in # employees hired over next 5-10 years	Firms	Current Employees	Future Employees	Total Increase %	Average Annual Increase %
Production	13	97	122	25.8%	3.4%
Designers	2	60	85	41.7%	5.6%
Engineers	34	58	80	37.9%	5.1%
Machinist	59	34	48	41.2%	5.5%
Manufacturing	6	26	33	26.9%	3.6%
Assemblers	21	23	34	47.8%	6.4%
Technician	10	21	34	61.9%	8.3%
CNC Programmer/Operator	21	20	31	55.0%	7.3%
Metal Worker	4	17	29	70.6%	9.4%
Fabricator	3	15	17	13.3%	1.8%
Mechanic	13	14	22	57.1%	7.6%
Welder	6	11	15	36.4%	4.8%
Administration	2	10	12	20.0%	2.7%
Office Support Staff	1	9	11	22.2%	3.0%
Warehouse	4	9	11	22.2%	3.0%
Sales	11	7	10	42.9%	5.7%
Tool Makers	3	7	14	100.0%	13.3%
Inspector	12	6	10	66.7%	8.9%
Management	7	6	9	50.0%	6.7%
Quality Assurance	8	4	6	50.0%	6.7%
All Occupations Identified	**-**	**30**	**44**	**46.7%**	**6.2%**

14) Which two (or more) occupations will likely see the **largest decline** in the number of employees **over the next 5-10 years**?

Occupations with largest decline in # employees hired over next 5-10 years	Responding Firms	Current Employees	Future Employees	Total Decline %'	Average Annual Decline %
Unskilled Labor	5	30	19	-36.7%	-4.9%
Pilots and Instructors	2	23	9	-60.9%	-8.1%
Management	3	18	14	-22.2%	-3.0%
Manufacturing	1	18	10	-44.4%	-5.9%
Assemblers	1	15	5	-66.7%	-8.9%
Machinist	6	15	8	-46.7%	-6.2%
Administration	5	12	6	-50.0%	-6.7%
Engineers	1	5	5	0.0%	0.0%
Production	1	5	2	-60.0%	-8.0%
Office Support Staff	1	4	3	-25.0%	-3.3%
Mechanic	2	3	2	-33.3%	-4.4%
Technician	3	3	2	-33.3%	-4.4%
Sales	1	2	1	-50.0%	-6.7%
All Occupations Identified	-	**15**	**9**	**-40.0%**	**-5.3%**

15) Will the retiring of the baby boomers **over the next 5-10 years** create the need to hire heavily in any particular occupations?

Retiring of baby boomers over the next 5-10 requires hiring heavily in particular occupations	COUNT	PERCENT
No	86	46.2%
Yes	88	47.3%
Missing	12	6.5%

15b) If so, please identify which occupations.

Occupations that are affected by retiring of baby boomers	Firms Identifying Occupation	Anticipated Vacancies
Machinist	31	12
Engineers	13	20
CNC Programmer/Operator	9	14
Sales	9	3
Management	8	7
Manufacturing	7	8
Mechanic	6	1173
Production	5	8
Quality Assurance	5	2
Welder	4	8
Assemblers	4	4
Inspector	4	2
Technician	3	12
Administration	3	3
Designers	1	40
Warehouse	0	0
All Occupations Identified	**-**	**71**

16) Other than the size and demographic mix of the labor force, what are the other biggest recent changes in your current workforce situation or employment practices **over the past year**?

Two major issues identified by employers included:

- Employers expressed frustration with losing highly skilled workers to Boeing. However, several employers also point out that the increased work from Boeing's pipeline is increasing their need to hire.
- Many employers are turning to in-house or self-funded training to meet the skill demands of their workforce that they are unable to meet through the labor market. This included hiring less skilled workers and "skilling them up."

17) Other than the size and demographic mix of the labor force, what do you project to be the biggest changes in your employment practices **over the next 5-10 years**?

Two major issues identified by employers included:

- Employers expressed concerns over growing health care costs and accordant tax increases.

- Here, as in the responses above to question 17, employers anticipate needing to increase the amount of in-house or self-funded training to meet the skill demands of their workforce over the next 5-10 years. This will include the use of co-op programs and internships, OJT and any other means to find qualified skilled labor not available on the market.

18) Will aerospace industry expansion **over the next 5-10 years** result in any other anticipated impact on your workforce or employment practices, including outsourcing, which we have not asked about?

Two major issues identified by employers included:

- Nearly 25% of respondents anticipate zero impact of industry expansion on their workforce or hiring practices over the next 5-10 years.
- Several employers expressed concern over increased cost of business in Washington and, for those located in the King County region, specifically the Seattle area. Increased wages and benefits in the state and specifically Seattle are a concern.

Company Information

19) What kind of work does your company primarily engage in? For example, engineering & design, composite manufacturing, fabrication of fasteners, electrical equipment & cable assemblies, machining. (If your business has a large non-aerospace component, describe your primary aerospace-related work.)

Type of work company primarily engages in	N	Percent
Manufacturing	41	22.0%
Machining	32	17.2%
Engineering	29	15.6%
Repair	19	10.2%
Fabrication	19	10.2%
Design	14	7.5%
Sales & Distribution	13	7.0%
Composite	7	3.8%
Software	2	1.1%
Missing	10	5.4%

20) Is your firm ISO9001 and/or AS9100 certified?

Is firm ISO9001 and/or AS9100 certified?	N	Percent
No	65	34.9%
Yes	110	59.1%
Missing	11	5.9%

21) Approximately what percent of your sales are to other businesses in Washington?

Approximate percent of sales to other businesses in Washington	N	Percent
100%	4	2.2%
More than 75%	35	18.8%
25% to 75%	55	29.6%
Less than 25%	61	32.8%
None	11	5.9%
Missing	20	10.8%

22) Approximately what percentage of your business is with the following major aerospace firms or their subsidiaries? **PLEASE ANSWER FOR EACH FIRM.**

Aerospace Business with…	Boeing		Airbus		Bombardier		Gulfstream	
	Responses	Percent	Responses	Percent	Responses	Percent	Responses	Percent
None	28	15.1%	68	36.6%	66	35.5%	77	41.4%
Less than 25%	47	25.3%	58	31.2%	70	37.6%	51	27.4%
25% to 75%	60	32.3%	14	7.5%	5	2.7%	2	1.1%
More than 75%	31	16.7%						
100%	5	2.7%	1	0.5%	1	0.5%	1	0.5%
Any business		**76.9%**		**39.2%**		**40.9%**		**29.0%**
Missing	15	8.1%	45	24.2%	44	23.7%	55	29.6%

Aerospace Business with…	Lockheed Martin		Northrop Grumman		Other	
	Responses	Percent	Responses	Percent	Responses	Percent
None	77	41.4%	84	45.2%	19	10.2%
Less than 25%	51	27.4%	46	24.7%	65	34.9%
25% to 75%	7	3.8%	6	3.2%	20	10.8%
More than 75%					6	3.2%
100%	1	0.5%	1	0.5%	12	6.5%
Any business		**31.7%**		**28.5%**		**55.4%**
Missing	50	26.9%	49	26.3%	64	34.4%

23) How many employees does your company have?

Size of Workforce in…	Washington		U.S.		Outside of U.S.	
	N	Percent	N	Percent	N	Percent
1 to 20	59	31.7%	19	10.2%	19	10.2%
21 to 50	39	21.0%	6	3.2%	2	1.1%
51 to 100	35	18.8%	3	1.6%	1	0.5%
101 to 500	39	21.0%	9	4.8%	5	2.7%
More than 500	3	1.6%	16	8.6%	7	3.8%
Refuse/Don't Know	4	2.2%	7	3.8%	8	4.3%
Missing	7	3.8%	126	67.7%	144	77.4%

24) What percentage of your workforce is unionized?

Percent Workforce Unionized	N	Percent
100%	3	1.6%
More than 75%	3	1.6%
25% to 75%	6	3.2%
Less than 25%	5	2.7%
None	165	88.7%
Missing	4	2.2%

25) We intend to contact approximately 10 employers to participate in a short follow-up in-person interview. Are you willing to be contacted for a follow-up interview, if selected, to further elaborate on some of your responses to this survey?

Interested in Follow Up Interview	N	Percent
No	91	48.9%
Yes	92	49.5%
Missing	3	1.6%

Appendix E - Report History

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 aims to improve the state aerospace training system by better aligning it with the industry's immediate and long term training needs. The legislation also seeks to "increase jobs available for Washington's citizens" by increasing their skill development and training.

The State Board for Community and Technical Colleges (SBCTC) is to "facilitate coordination and alignment of aerospace training programs to the maximum extent possible." This is to be done through coordination with other training and apprenticeship program providers. The alignment activities include:

- Providing current information about the state's programs.
- Providing information about grants and partnerships.
- Coordinating professional development of faculty and training providers.
- Evaluating programs identified by the Aerospace Pipeline Advisory Committee (as discussed in the body of this report).
- Making specific budget recommendations to the Governor and the Legislature for aerospace and advanced materials manufacturing programs.

SBCTC is empowered to "establish an aerospace and advanced materials manufacturing pipeline advisory committee" (Aerospace Pipeline Advisory Committee Appendix A) with the majority of the 11-15 members coming from the industry. Labor representation (2) from the industry is also included. The Aerospace Pipeline Advisory Committee's duties include:

- Providing direction for a skills gap analysis produced with the Workforce Training and Education Coordinating Board (Workforce Board) using data developed from the Education Research and Data Center (ERDC) that is consistent with *A Skilled and Educated Workforce—Joint Report*[10] by the Washington Student Achievement Council, SBCTC, and the Workforce Board providing the "number and type of higher education and training credentials required to match employer demand for a skilled and educated workforce."
- Establishing goals for students served, program completion rates, and employment rates.

[10] A Skilled and Educated Workforce, 2011. A Joint report prepared by the Workforce Board, SBCTC & Washington Student Achievement Council, formerly HECB. www.wsac.wa.gov/sites/default/files/SkilledEducatedWorkforce2011.pdf

- Coordinating and disseminating industry advice from aerospace and advanced materials programs.
- Recommending training programs for review by the Workforce Board in coordination with SBCTC.

On September 1, 2012 and each September thereafter, a report is due that evaluates "the programs recommended for review" by the Aerospace Pipeline Advisory Committee. The evaluation, to be performed by the Workforce Board working with SBCTC, is to include "outcome results both for the persons receiving training and the employers."

The first meeting of the Aerospace Pipeline Advisory Committee was in July 2012 and meetings have taken place every other month since. Since the initial meeting, an Executive Order from the Governor's Office disbanded the Governor's Washington Council on Aerospace. The committee has overseen the definition of the aerospace industry, selection of specific training programs, and aerospace employer survey, all of which are presented in this report.

While Second Substitute House Bill 2156 indicated that the ERDC's employment data should be used for the report, due to the limited timeframe to produce this report and the long history of the Workforce Board and SBCTC sharing data, ERDC was consulted and all agreed that the most efficient path was to use SBCTC's data warehouse to produce the report, with data analyzed by Workforce Board and SBCTC research staff. It is anticipated that the ERDC will provide the full data set needed for the next report.