

Composite Aerospace Manufacturing

Inland Empire/Desert Region (Riverside-San Bernardino-Ontario Metropolitan Statistical Area)

Summary

- Employment for the composite aerospace manufacturing occupational group is expected to **increase by 10% between 2017 and 2022** in the Inland Empire/Desert Region. More than **1,000 job openings** will be available over the five-year timeframe.
- The entry-level wage for each occupation in the composite aerospace manufacturing occupational group is **above the MIT Living Wage estimate of \$12.30 per hour** for a single adult living in the Inland Empire/Desert Region.
- There appears to be an opportunity for program growth based on the average annual number of program completions for the selected community college programs (**9 average annual community college credentials**), and the annual openings for composite aerospace manufacturing occupations in the local region (**202 annual job openings**).

Introduction

This report details occupations related to the aeronautical and aviation technology program. This program prepares students for positions of responsibility within composite aerospace manufacturing, such as the theory of flight and the design, construction, operation, and maintenance of aircraft, aircraft propulsion units, and aerospace vehicles. The occupations included in the composite aerospace manufacturing occupational group are:

- Aerospace Engineering and Operations Technicians
- Aircraft Mechanics and Service Technicians
- Aircraft Structure, Surfaces, Rigging, and Systems Assemblers
- Avionics Technicians

Job Opportunities

In 2017, there were about 1,900 jobs in the composite aerospace manufacturing occupational group in the Inland Empire/Desert Region. This occupational group is projecting to increase employment by 10% by 2022. Employers in the region will need to hire more than 1,000 workers over the next five years to fill new jobs and backfill jobs that workers are permanently vacating (includes retirements). Appendix A, Tables 1 & 2 show the projected job growth, wages, education, training, and work experience required for each occupation in this group in the Inland Empire/Desert Region and the total employment in California.

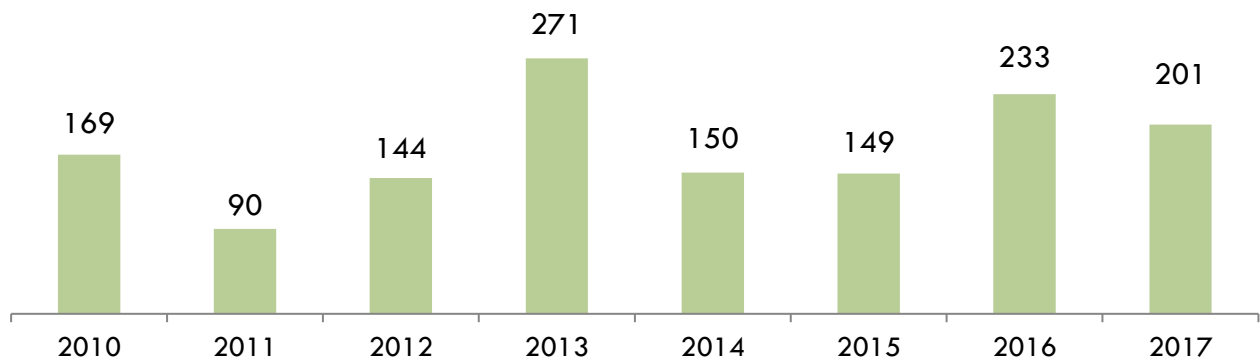
Exhibit 1: Five-year projections for the composite aerospace manufacturing occupational group in the Inland Empire/Desert Region and California

Region	2017 Jobs	5-Yr Change	5-Yr % Change (New Jobs)	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
Inland Empire/Desert	1,901	193	10%	1,011	202	22%
California	22,212	1,998	9%	11,582	2,316	25%

Source: EMSI 2018.2

Over the last 12 months (June 2017 to May 2018), there were 244 advertisements (ads) for jobs in the composite aerospace manufacturing occupational group in the Inland Empire/Desert Region. From 2010 to 2017, there was an annual average of 176 job ads per year (Exhibit 2).

Exhibit 2: Number of online job postings for the composite aerospace manufacturing occupational group in the Inland Empire/Desert Region, 2010 to 2017



Source: Burning Glass – Labor Insights

The average time to fill for composite aerospace manufacturing occupations in the Inland Empire/Desert Region is seven days longer than the national average, indicating that it is slightly more difficult for local employers to find qualified candidates to fill their open positions in the region. Exhibit 3 shows the number of job ads posted during the last 12 months along with the regional and national average time to fill.

Exhibit 3: Job ads by each of the composite aerospace manufacturing occupations in the Inland Empire/Desert Region during the last 12 months and time to fill, June 2017 – May 2018

Occupation	Job Ads	Regional Average Time to Fill (Days)	National Average Time to Fill (Days)
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	155	44	41
Aircraft Mechanics and Service Technicians	59	60	41
Avionics Technicians	25	44	41
Aerospace Engineering and Operations Technicians	5	44	41
TOTAL	244	-	-

Source: Burning Glass – Labor Insights

Earnings

The entry-level wage for each of the occupations in the composite aerospace manufacturing occupational group is above the MIT Living Wage estimate of \$12.30 per hour for a single adult living in the Inland Empire/Desert Region. These wages are also sufficient for an adult living in a household with one other working adult and one child (\$14.50 per hour, per adult or \$30,160 annually for each adult). Exhibit 4 displays wage information for this occupational group in the Inland Empire/Desert Region and California.

Exhibit 4: Earnings for the composite aerospace manufacturing occupational group in the Inland Empire/Desert Region and California

Occupation	Area	Entry to Experienced Hourly Earnings Range*	Median Wage*	Avg. Annual Earnings
Avionics Technicians	IE/Desert	\$29.00 to \$35.67	\$32.39	\$66,200
	California	\$26.57 to \$36.73	\$32.04	\$66,700
Aerospace Engineering and Operations Technicians	IE/Desert	\$27.93 to \$35.92	\$32.04	\$68,600
	California	\$30.23 to \$38.63	\$34.65	\$71,800

Occupation	Area	Entry to Experienced Hourly Earnings Range*	Median Wage*	Avg. Annual Earnings
Aircraft Mechanics and Service Technicians	IE/Desert	\$24.05 to \$43.15	\$30.49	\$70,500
	California	\$23.24 to \$35.78	\$30.63	\$62,400
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	IE/Desert	\$15.66 to \$25.14	\$19.67	\$43,400
	California	\$16.78 to \$29.04	\$22.73	\$48,400

Source: EMSI 2018.2

*Entry Hourly is 25th percentile wage, the median is 50th percentile wage, experienced is 75th percentile wage.

Work Locations, Employers, Skills, and Education

Exhibit 5 displays the top employers posting job ads as well as the top work locations from job ads during the last 12 months. N/A indicates instances where employer information was not available or too unreliable due to the low number of job postings.

Exhibit 5: The top employers and work locations for the composite aerospace manufacturing occupational group in the Inland Empire/Desert Region, June 2017 – May 2018

Occupation	Top Employers	Top Work Locations
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers (n=79)	<ul style="list-style-type: none"> • CIRCOR International Inc. • Danaher Corporation • Rockwell Collins 	<ul style="list-style-type: none"> • Corona • Riverside • Hemet
Aircraft Mechanics and Service Technicians (n=53)	<ul style="list-style-type: none"> • General Atomics • PAE Incorporated • United Parcel Service Incorporated 	<ul style="list-style-type: none"> • Ontario • San Bernardino • Adelanto
Avionics Technicians (n=20)	<ul style="list-style-type: none"> • General Atomics • General Electric Company 	<ul style="list-style-type: none"> • Adelanto • San Bernardino
Aerospace Engineering and Operations Technicians (n=5)	<ul style="list-style-type: none"> • N/A 	<ul style="list-style-type: none"> • Ontario • Riverside

Source: Burning Glass – Labor Insights

Exhibit 6 lists a sample of in-demand specialized and soft skills that employers are seeking when looking for workers to fill composite aerospace manufacturing positions. N/A indicates that there were too few job postings to obtain data.

Exhibit 6: Sample of in-demand skills from employer job ads for composite aerospace manufacturing occupations in the Inland Empire/Desert Region, June 2017 – May 2018

Occupation	Specialized skills	Soft skills	Software and Programming skills
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers (n=98)	<ul style="list-style-type: none"> • Hand Tools • Manual Dexterity • Soldering 	<ul style="list-style-type: none"> • Work Area Maintenance • Communication Skills • Detail-Oriented 	<ul style="list-style-type: none"> • N/A
Aircraft Mechanics and Service Technicians (n=55)	<ul style="list-style-type: none"> • Repair • Aircraft Maintenance • Hand Tools 	<ul style="list-style-type: none"> • Troubleshooting • Preventive Maintenance • English 	<ul style="list-style-type: none"> • Active Server Pages (ASP) • Microsoft Office
Avionics Technicians (n=22)	<ul style="list-style-type: none"> • Repair • Epoxy • Record Keeping 	<ul style="list-style-type: none"> • Work Area Maintenance • Troubleshooting • Problem Solving 	<ul style="list-style-type: none"> • N/A
Aerospace Engineering and Operations Technicians (n=5)	<ul style="list-style-type: none"> • Technical Writing/Editing • Test Results Recording • Flow Diagrams 	<ul style="list-style-type: none"> • Spanish • Bilingual • Problem Solving 	<ul style="list-style-type: none"> • Microsoft Office

Source: Burning Glass – Labor Insights

Exhibit 7 displays the entry-level education typically required to enter each occupation according to the Bureau of Labor Statistics, educational attainment for incumbent workers with “some college, no degree” and an “associate degree” according to the U.S. Census, and the minimum advertised education requirement requested by employers in online job ads.

Exhibit 7: Typical entry-level education requirement, educational attainment, and online job ads with minimum advertised education requirements for the composite aerospace manufacturing occupational group in the Inland Empire/Desert Region, June 2017 – May 2018

Occupation	Typical Entry-Level Education Requirement	Educational Attainment*	Minimum Advertised Education Requirement from Job Ads			
			Number of Job Postings (n=)	High school diploma or vocational training	Associate degree	Bachelor's degree or higher
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	High school diploma or equivalent	35%	72	100%	-	-
Aircraft Mechanics and Service Technicians	Postsecondary nondegree	62%	38	97%	3%	-
Avionics Technicians	Associate degree	66%	13	92%	8%	-
Aerospace Engineering and Operations Technicians	Associate degree	54%	-	-	-	-

Source: EMSI 2018.2, Burning Glass – Labor Insights

*Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework

Composites in Aerospace Manufacturing

The use of composite materials in aerospace manufacturing is on the rise. Since 1987, the aerospace industry has doubled its use of composite materials every five years, and new composite materials are being created and used on a regular basis.¹ It has been estimated that industry demand for carbon fiber alone is expected to reach 22,100 tons by 2020.² Rising fuels costs, environmental regulations, and an increase in airline traffic have been the main driving factors associated with the growing use of composite materials in aerospace manufacturing.³

Two of the occupations included in this report, avionics technicians and aircraft structure, surfaces, rigging, and systems assemblers, both list “composite technician” as an alternative job title, which further illustrates the important role that composite materials play in the aerospace industry. An additional real-time search of job postings was conducted, using the job title, “composite technician” to quantify the demand for this specific job. This search yielded 13 job ads from the last 12 months. The results are detailed in the following exhibits 8 through 10.

¹ Retrieved from <https://www.thoughtco.com/composites-in-aerospace-820418> on 06/18/2018

² Retrieved from <https://acmanet.org/composites-industry-overview/> on 06/18/2018

³ Retrieved from <http://compositesmanufacturingmagazine.com/category/aerospace/> on 06/18/2018

All 13 job ads for composite technicians were linked to the occupation, avionics technicians. All 13 postings came from General Atomics in Adelanto, CA. Exhibit 8 displays the job titles associated with the search.

Exhibit 8: Job ads by job title in the Inland Empire/Desert Region, June 2017 – May 2018

Job Title	Job Ads
Mid-Level Composite Technician	4
Mid-Level Composite Assembly Technician	3
Composite Technician	3
Entry Composite Technician	2
Mid-Level Composite Technician-Painter	1
Total	13

Source: Burning Glass – Labor Insights

Exhibit 9 lists a sample of in-demand specialized and soft skills that employers are seeking when looking for composite technicians. N/A indicates that there were too few job postings to obtain data.

Exhibit 9: Sample of in-demand skills from employer job ads for composite technicians in the Inland Empire/Desert Region, June 2017 – May 2018

Job Title	Specialized skills	Soft skills	Software and Programming skills
Composite Technician (n=12)	<ul style="list-style-type: none"> • Epoxy • Record Keeping • Calculation • Calipers, Lathes, Drill Presses & Band Saws 	<ul style="list-style-type: none"> • Work Area Maintenance • Computer Literacy 	<ul style="list-style-type: none"> • N/A

Source: Burning Glass – Labor Insights

The 13 postings for composite technicians over the last 12 months in the Inland Empire/Desert Region demonstrate a much higher demand than average when compared to the rest of the nation. It is also worth noting that the top two locations posting job ads for composite technicians are Los Angeles and San Diego. Exhibit 10 displays the top 15 hiring metropolitan area for composite technicians across the country.

Exhibit 10: Job ads for composite technicians by location, June 2017 – May 2018

Location	Job Ads
San Diego-Carlsbad, CA	119
Los Angeles-Long Beach-Anaheim, CA	102
Phoenix-Mesa-Scottsdale, AZ	38
Cincinnati, OH-KY-IN	30
Dallas-Fort Worth-Arlington, TX	24
Seattle-Tacoma-Bellevue, WA	21
Miami-Fort Lauderdale-West Palm Beach, FL	19
Jacksonville, FL	19
Salt Lake City, UT	18
Baltimore-Columbia-Towson, MD	17
Provo-Orem, UT	17
Savannah, GA	15
Detroit-Warren-Dearborn, MI	14
Riverside-San Bernardino-Ontario, CA	13
Tulsa, OK	12

Source: Burning Glass – Labor Insights

Student Completions

Exhibit 11 shows the annual average regional community college credentials (associate degrees and certificates) conferred during the three academic years between 2014 and 2017, with the relevant TOP code as well as the program title used at each college, sourced from the Chancellor’s Office Curriculum Inventory (COCI). Please note, an award is not equivalent to a single person in search of a job opening since a student may earn more than one award, such as an associate degree in addition to a certificate. Community College student outcome information was obtained from the CTE LaunchBoard based on the selected TOP code(s) and region.

Exhibit 11: Annual average community college student completions for aeronautical and aviation technology programs in the Inland Empire/Desert Region

0950.00 – Aeronautical and Aviation Technology	Annual Community College Headcount (2016-17)	Community College Annual Average Credentials (2014-17)
Chaffey – Aviation Maintenance	44	
Certificate 60+ semester units		5
San Bernardino – Aviation Maintenance Technician	42	
Associate Degree		2
Certificate 30 to < 60 semester units		2
Victor Valley – Aviation Maintenance Technology	93	
Associate Degree		
Total Community College Headcount (2016-17)	179	
Total Annual Average Community College Credentials (2014-17)		9

Source: LaunchBoard, IPEDS, COCI

0950.00 – Aeronautical and Aviation Technology program Strong Workforce outcomes in the Inland Empire/Desert Region in the academic year 2015-16 [unless noted otherwise]:

- Number of course enrollments: 379 (California median: 379) [2016-17]
- Number of students who transferred to a 4-year institution: N/A (CA: 8)
- Employed in the second fiscal quarter after exit: N/A (CA: 59%)
- Median earnings in the second fiscal quarter after exit: \$13,768 (CA: \$9,463)
- Employed in the fourth fiscal quarter after exit: N/A (CA: 63%)
- Median annual earnings: \$29,095 (CA: \$30,127)
- The percentage in a job closely related to the field of study: N/A (CA: 71%) [2014-15]
- Median change in earnings: 91% (CA: 111%)
- The proportion of students who attained a living wage: N/A (CA: 57%)

Sources

O*Net Online
 Labor Insight/Jobs (Burning Glass)
 Economic Modeling Specialists International (EMSI)
 CTE LaunchBoard
 MIT Living Wage Calculator
 Chancellor’s Office Curriculum Inventory (COCI, version 2.0)
 The Integrated Postsecondary Education Data System (IPEDS)

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Appendix A: Occupation definitions, sample job titles, five-year projections, and earnings for composite aerospace manufacturing occupations

Occupation Definitions (SOC code), Education and Training Requirement, Community College Education Attainment

Aerospace Engineering and Operations Technicians (17-3021)

Operate, install, calibrate, and maintain integrated computer/communications systems, consoles, simulators, and other data acquisition, test, and measurement instruments and equipment, which are used to launch, track, position, and evaluate air and space vehicles. May record and interpret test data.

Sample job titles: *Avionics Technician, Avionics Test Technician, Calibration Technician, Communication Technician, Electronics Technician, Engineering Technician, Instrumentation Technician, Spacecraft Systems Engineer, Systems Test Technician, Test Technician*

Entry-Level Educational Requirement: Associate degree

Training Requirement: None

Percentage of incumbent workers with a Community College Credential or Some Postsecondary

Coursework: 54%

Avionics Technicians (49-2091)

Install, inspect, test, adjust, or repair avionics equipment, such as radar, radio, navigation, and missile control systems in aircraft or space vehicles.

Sample job titles: *Aircraft Electrical Systems Specialist, Aircraft Technician, Aviation Electrical Technician, Aviation Electronics Technician, Avionics Electronics Technician, Avionics Installer, Avionics Manager, Avionics Systems Integration Specialist, Avionics Technician, Composite Technician, Electronic Technician*

Entry-Level Educational Requirement: Associate degree

Training Requirement: None

Percentage of incumbent workers with a Community College Credential or Some Postsecondary

Coursework: 66%



Aircraft Mechanics and Service Technicians (49-3011)

Diagnose, adjust, repair, or overhaul aircraft engines and assemblies, such as hydraulic and pneumatic systems. Includes helicopter and aircraft engine specialists.

Sample job titles: *Aircraft Maintenance Director, Aircraft Maintenance Supervisor, Aircraft Maintenance Technician (Aircraft Maintenance Tech), Aircraft Mechanic, Aircraft Restorer, Aircraft Technician, Airframe and Powerplant Mechanic (A and P Mechanic), Aviation Maintenance Technician (AMT), Aviation Mechanic, Helicopter Mechanic*

Entry-Level Educational Requirement: Postsecondary nondegree award

Training Requirement: None

Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework: 62%

Aircraft Structure, Surfaces, Rigging, and Systems Assemblers (51-2011)

Assemble, fit, fasten, and install parts of airplanes, space vehicles, or missiles, such as tails, wings, fuselage, bulkheads, stabilizers, landing gear, rigging and control equipment, or heating and ventilating systems.

Sample job titles: *A&P Technician (Airframe and Powerplant Technician), Aircraft Line Assembler, Assembler, Assembly Riveter, Composite Technician, Fabricator, Helicopter Technician, Sheet Metal Assembler and Riveter (SMAR), Sheet Metal Mechanic, Structures Mechanic, Structures Technician*

Entry-Level Educational Requirement: High school diploma or equivalent

Training Requirement: None

Percentage of incumbent workers with a Community College Credential or Some Postsecondary Coursework: 35%



Table 1. 2017 to 2022 job growth, wages, education, training, and work experience required for the composite aerospace manufacturing occupational group, Inland Empire/Desert Region

Occupation (SOC)	2017 Jobs	5-Yr Change	5-Yr % Growth	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage*	Median Hourly Wage	Average Annual Earnings	Typical Entry-Level Education & On-The-Job Training Required	Work Experience Required
Aircraft Mechanics and Service Technicians (49-3011)	1,328	114	9%	127	\$24.05 to \$43.15	\$30.49	\$70,500	Postsecondary nondegree award & none	None
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers (51-2011)	385	62	16%	55	\$15.66 to \$25.14	\$19.67	\$43,400	High school diploma or equivalent & 1 to 12 months	None
Aerospace Engineering and Operations Technicians (17-3021)	123	3	2%	11	\$27.93 to \$35.92	\$32.04	\$68,600	Associate degree & none	None
Avionics Technicians (49-2091)	65	13	20%	8	\$29.00 to \$35.67	\$32.39	\$66,200	Associate degree & none	None
Total	1,901	193	10%	202	-	-	-	-	-

Source: EMSI 2018.2

*Entry Hourly is 25th percentile wage, the median is 50th percentile wage, experienced is 75th percentile wage.



Table 2. 2017 to 2022 job growth, wages, education, training, and work experience required for the composite aerospace manufacturing occupational group, California

Occupation (SOC)	2017 Jobs	5-Yr Change	5-Yr % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage*	Median Hourly Wage	Average Annual Earnings	Typical Entry-Level Education & On-The-Job Training Required	Work Experience Required
Aircraft Mechanics and Service Technicians (49-3011)	14,261	1,478	10%	1,433	\$23.24 to \$35.78	\$30.63	\$62,400	Postsecondary nondegree award & none	None
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers (51-2011)	3,442	338	10%	452	\$16.78 to \$29.04	\$22.73	\$48,400	High school diploma or equivalent & 1 to 12 months	None
Aerospace Engineering and Operations Technicians (17-3021)	2,480	7	0%	231	\$30.23 to \$38.63	\$34.65	\$71,800	Associate degree & none	None
Avionics Technicians (49-2091)	2,030	174	9%	200	\$26.57 to \$36.73	\$32.04	\$66,700	Associate degree & none	None
Total	22,212	1,998	9%	2,316	-	-	-	-	-

Source: EMSI 2018.2

*Entry Hourly is 25th percentile wage, the median is 50th percentile wage, experienced is 75th percentile wage.