February 2021

Labor Market Analysis

Drone Technology

Prepared by the Central Valley/Mother Lode Center of Excellence

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COVID-19 Statement: This report includes employment projection data by Emsi. Emsi's projections are modeled on recorded (historical) employment figures and incorporate several underlying assumptions, including the assumption that the economy during the projection period will be at approximately full employment or potential output. To the extent that a recession or labor shock, such as the economic effects of COVID-19, can cause long-term structural change, they may impact the projections. At this time, it is not possible to quantify the impact of COVID-19 on projections of industry and occupational employment. Other measures such as unemployment rates and monthly industry employment estimates will reflect the most recent information on employment and jobs in the state and, in combination with input from local employers, may help validate current and future employment needs as depicted here.

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Summary

Please note the COVID-19 statement on page 2 when considering this report's findings.

This study conducted by the Central Valley/Mother Lode Center of Excellence examines labor market demand, wages, skills, and postsecondary supply for drone technology. Two occupations related to drone technology were identified for Taft College:

- 53-2012, Commercial Pilots
- 53-2011, Airline Pilots, Copilots, and Flight Engineers

Key findings:

- **Occupational demand —** Nearly 870 workers were employed in jobs related to drone technology in 2019 in the South Central Valley/Southern Mother Lode (SCV/SML) subregion. The largest occupation is airline pilots, copilots, and flight engineers with 441 workers in 2019, a projected growth rate of 1% over the next five years, and 44 annual openings.

- **Wages —** Airline pilots, copilots, and flight engineers earn the highest entry-level wage, $47.38/hour in the subregion and $47.52/hour in the region.

- **Employers —** Employers with the most job postings in the subregion are Anthem Blue Cross, Air Method, and Lockheed Martin Corporation.

- **Occupational titles —** The most common occupational title in job postings in the subregion is commercial pilots. The most common job title is pilot rotor.

- **Skills and certifications —** The top baseline skill is communication, the top specialized skill is aviation regulations, and the top software skill is Microsoft Office. The most in-demand certification is a driver's license.

- **Education —** A high school diploma or equivalent is the typical entry-level education and training required for commercial pilots, and a bachelor's degree is the typical entry-level education for airline pilots, copilots, and flight engineers.

- **Supply —** Analysis of postsecondary completions in the region shows that on average 10 awards were conferred in the Central Valley/Mother Lode region each year.

Based on a comparison of occupational demand and supply, there is an undersupply of 94 trained workers in the subregion and 110 workers in the region. The Center of Excellence recommends that Taft College work with the college's advisory board, and local industry in the development of programs to address the shortage of drone technology workers in the region.

Introduction

The Central Valley/Mother Lode Center of Excellence was asked by Taft College to provide labor market information for drone technology. The geographical focus for this report is the South Central Valley/Southern Mother Lode (SCV/SML) subregion, but regional demand and supply data has been included for broader applicability and use.

The average living wage for a single adult in the South Central Valley/Southern Mother Lode (SCV/SML) subregion is $10.30/hour.[1]

Analysis of the program and occupational data related to drone technology resulted in the identification of applicable occupations. The Standard Occupational Classification (SOC) System codes and titles used in this report are:

- 53-2012, Commercial Pilots
- 53-2011, Airline Pilots, Copilots, and Flight Engineers

The occupational titles, job descriptions, sample job titles, and knowledge and skills from the Bureau of Labor Statistics and O*NET OnLine are shown below.

Commercial Pilots
Job Description: Pilot and navigate the flight of fixed-wing aircraft on nonscheduled air carrier routes, or helicopters. Requires Commercial Pilot certificate. Includes charter pilots with similar certification, and air ambulance and air tour pilots. Excludes regional, national, and international airline pilots.
Knowledge: Transportation, Customer and Personal Service, Geography, English Language, Public Safety and Security
Skills: Operation and Control, Operation Monitoring, Critical Thinking, Monitoring, Active Listening

Airline Pilots, Copilots, and Flight Engineers
Job Description: Pilot and navigate the flight of fixed-wing aircraft, usually on scheduled air carrier routes, for the transport of passengers and cargo. Requires Federal Air Transport certificate and rating for specific aircraft type used. Includes regional, national, and international airline pilots and flight instructors of airline pilots.
Knowledge: Transportation, Geography, Mathematics, English Language, Computers and Electronics
Skills: Operation and Control, Operation Monitoring, Active Listening, Critical Thinking, Monitoring

[1] The term "living wage" in Center of Excellence reports is calculated by averaging the self-sufficiency wages from the Insight Center's California Family Needs Calculator for each county in the subregion: https://insightcced.org/tools-metrics/self-sufficiency-standard-tool-for-california/.

Occupational Demand

The South Central Valley/Southern Mother Lode subregion employed 869 workers in drone technology occupations in 2019 (Exhibit 1). The largest occupation is airline pilots, copilots, and flight engineers with 441 workers in 2019. This occupation is projected to grow by 1% over the next five years and has the greatest number of projected annual openings, 44.

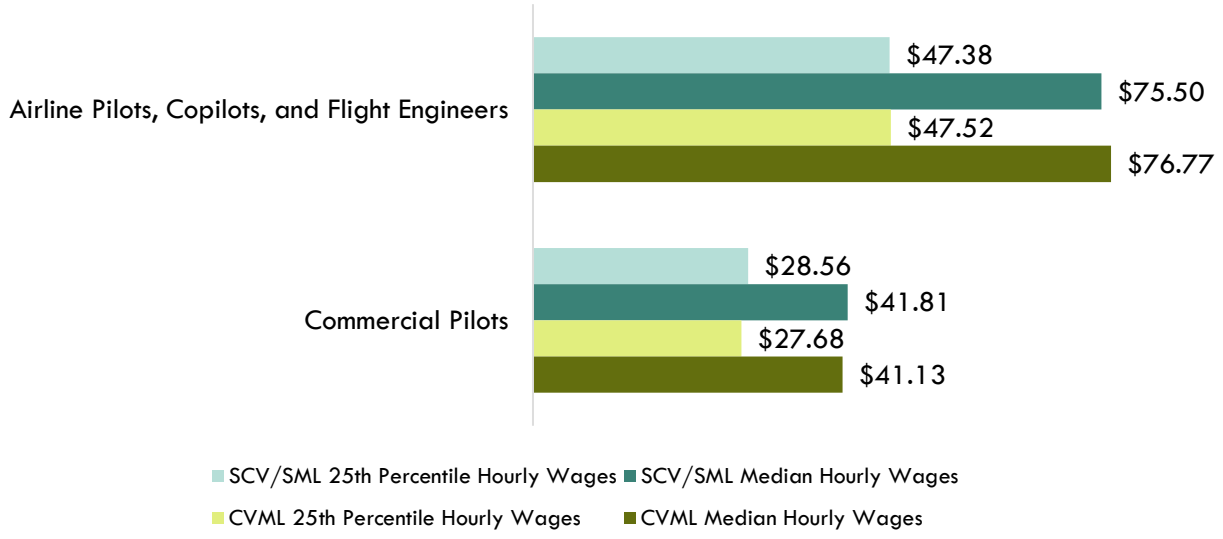
Exhibit 1. Drone technology employment and occupational projections in the SCV/SML subregion

Occupation	2019 Jobs	2024 Jobs	5-Year Change	5-Year % Change	Annual Openings
Commercial Pilots	428	465	37	9%	49
Airline Pilots, Copilots, and Flight Engineers	441	447	6	1%	44
TOTAL	**869**	**913**	**44**	**5%**	**94**

Wages

Exhibit 2 compares the entry-level and experienced wages of the drone technology occupations. Airline pilots, copilots, and flight engineers earn the highest entry-level wage, $47.38/hour in the subregion and $47.52/hour in the region.

Exhibit 2. Entry-level and experienced wage comparison in the SCV/SML subregion and region



Job Postings

There were 133 job postings for the two occupations in the SCV/SML subregion from August 2020 to January 2021.[2] The analysis was augmented using a key word search for the following terms: drone, pilots, and drone pilot. The employers with the most job postings are listed in Exhibit 3.

Exhibit 3. Top employers of drone technology workers by number of job postings

Employer	Job Postings	% Job Postings
Anthem Blue Cross	18	14%
Air Methods	12	9%
Lockheed Martin Corporation	9	7%
Air Methods Corporation	4	3%
Southern California Gas Company	4	3%
American Systems	3	2%
Beacon	3	2%
Federal Aviation Administration	3	2%
Hall Ambulance Service Incorporated	3	2%
Pacific Gas and Electric Company	3	2%

Exhibit 4 shows how job postings for the targeted occupations in the SCV/SML subregion are distributed across 10 O*NET OnLine occupations. The occupational title commercial pilots is listed in 23 job postings. Note how this occupational title dominates the job posting results. Common job titles in postings include pilot rotor in seven job postings, inspection review specialist IRS expert in four job postings, and forest pilot officer in three job postings.

Exhibit 4. Top occupational titles in job postings for drone technology

Occupational Title	Job Postings	% of Job Postings
Commercial Pilots	23	17%
Air Traffic Controllers	6	5%
Medical and Health Services Managers	6	5%
Network and Computer Systems Administrators	6	5%
Vocational Education Teachers, Postsecondary	5	4%
Aircraft Mechanics and Service Technicians	4	3%
Environmental Compliance Inspectors	4	3%
Managers, All Other	4	3%
Photographers	4	3%
Commercial Pilots	23	17%

[2] Other than occupation titles and job titles, the categories below can be counted one or multiple times per job posting, and across several areas in a single posting. For example, a skill can be counted in two different skill types, and an employer can indicate more than one education level.

Salaries

Exhibit 5 shows the "Market Salaries" for drone technology occupations that are calculated by Burning Glass which uses a machine learning model built off of millions of job postings every year, and accounts for adjustments based on locations, industry, skills, experience, education requirements, among other variables.

Exhibit 5. Salaries for drone technology

Market Salary Percentile	Salary Amount
10th Percentile	$40,278
25th Percentile	$52,066
50th Percentile	$67,656
75th Percentile	$90,768
90th Percentile	$121,161

Education

Of the 133 job postings, 92 listed an education level preferred for the positions being filled. Of those, 72% requested a bachelor's degree, 27% requested high school or vocational training, and 22% requested a master's degree (Exhibit 6). A job posting can indicate more than one education level. Hence, the percentages shown in the chart below total more than 100%.

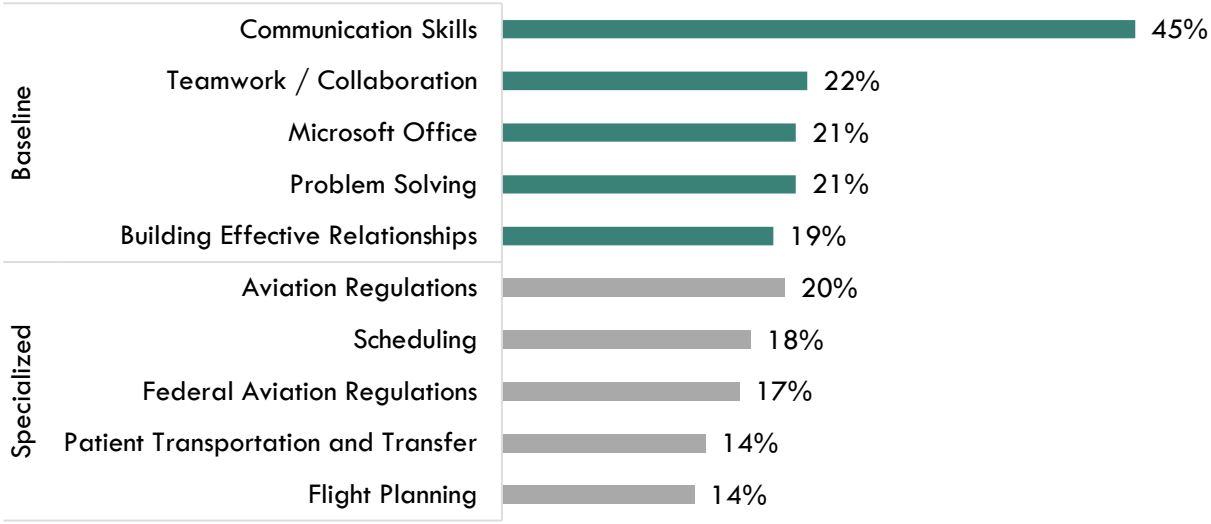
Exhibit 6. Education levels requested in job postings for drone technology

Education level	Job Postings	% of Job Postings
Bachelor's degree	66	72%
High school or vocational training	25	27%
Master's degree	20	22%
Associate degree	16	17%
Doctoral degree	3	3%

Baseline and Specialized Skills

Exhibit 7 depicts the top baseline and specialized skills for the targeted occupations. The three most important baseline skills are communication, 45% of job postings, teamwork/collaboration, 22%, and Microsoft Office, 21%. The top three specialized skills are aviation regulations, 20% of job postings, scheduling, 18%, and federal aviation regulations, 17%.

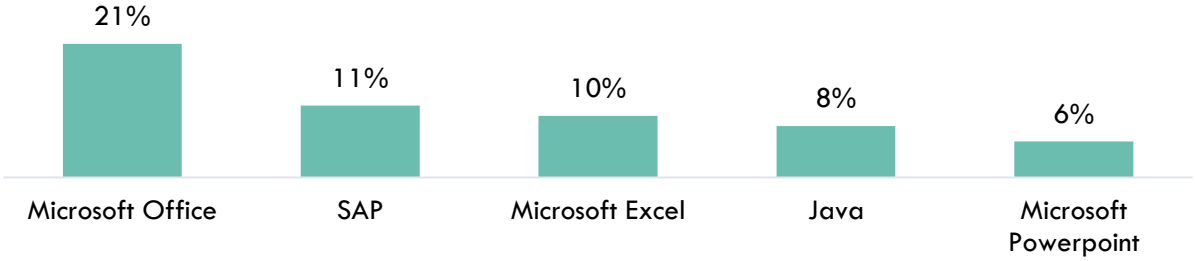
Exhibit 7. In-demand drone technology baseline and specialized skills



Software Skills

Analysis also included the software skills most in demand by employers. Microsoft Office and SAP were the top two software skills identified in job postings (Exhibit 8).

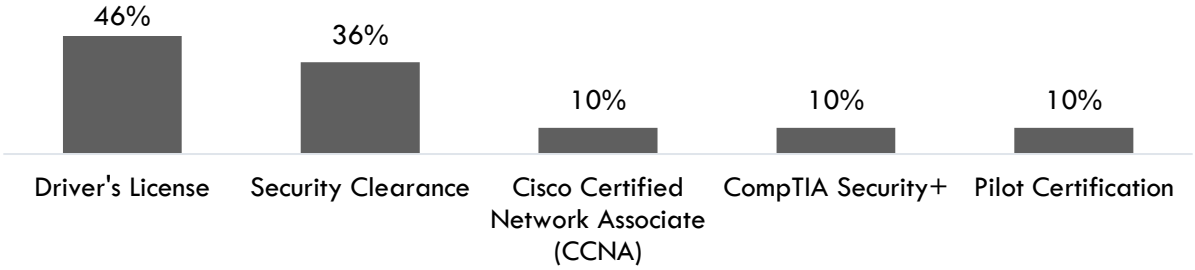
Exhibit 8. In-demand drone technology software skills



Certifications

Of the 133 job postings, 59 contained certification data. Among those, 46% indicated a need for a driver's license. The next top certifications are security clearance and Cisco Certified Network Associate (Exhibit 9). (Due to the low number of job postings with certifications listed, the chart below may not be representative of the full sample.)

Exhibit 9. Top drone technology certifications requested in job postings



Education, Work Experience & Training

A high school diploma or equivalent is the typical entry-level education and training required for commercial pilots, and a bachelor's degree is the typical entry-level education for airline pilots, copilots, and flight engineers (Exhibit 10).

Exhibit 10. Education, work experience, training, and Current Population Survey results for drone technology occupations[3]

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	CPS
Airline Pilots, Copilots, and Flight Engineers	Bachelor's degree	Less than 5 years	Moderate-term	20.6%
Commercial Pilots	High school diploma or equivalent	None	Moderate-term	20.6%

Supply

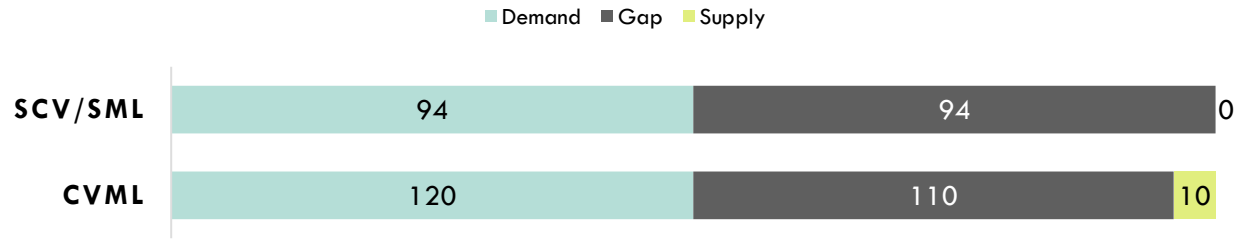
Analysis of program data from the California Community Colleges Chancellor's Office Data Mart included the TOP code and title: 095000-Aeronautical and Aviation Technology. Analysis of the last three years of data shows that, on average, 10 awards were conferred in the Central Valley/Mother Lode region each year (Exhibit 11).

Exhibit 11. Postsecondary supply for drone technology occupations in the region

TOP Title-Code	College	Associate Degree	Certificate 60+ Semester Units	Subtotal
095000-Aeronautical and Aviation Technology	Reedley College	3	6	9
	Sequoias	0		0
TOTAL		**3**	**6**	**10**

There is an undersupply of 94 drone technology workers in the SCV/SML subregion and 110 workers in the region (Exhibit 12).

Exhibit 12. Drone technology workforce annual demand and supply in the SCV/SML subregion and region



[3] "Labor Force Statistics from the Current Population Survey," Bureau of Labor Statistics, https://www.bls.gov/cps/.

Student Outcomes

Exhibit 13 summarizes employment and wage outcomes from the California Community College Chancellor's Cal-PASS Plus LaunchBoard for the TOP code related to drone technology. There were 23 aeronautical and aviation technology students who received a degree, certificate, or attained apprenticeship journey status, 45% reported a median change in earnings, and 68% attained a living wage.

Exhibit 13. Regional metrics for the TOP code related to drone technology

Metric	Aeronautical and Aviation Technology 095000
Students Who Got a Degree or Certificate or Attained Apprenticeship Journey Status	23
Number of Students Who Transferred	*
Job Closely Related to Field of Study	*
Median Change in Earnings	45%
Attained a Living Wage	68%
* denotes data not available.	

Conclusion

The entry-level wages of the two occupations exceed the SCV/SML subregion's average living wage. There were 133 job postings in the past six months for occupations related to drone technology in the subregion. Analysis of skills and certification requirements in job postings indicates:

- The top baseline skill is communication, and the top specialized skill is aviation regulations.
- The top software skill is Microsoft Office.
- The top certification is a driver's license.

There is an undersupply of trained workers, a shortage of 94 in the SCV/SML subregion and 110 in the region.

Recommendation

Based on these findings, it is recommended that Taft College work with the college's advisory board, and local industry in the development of programs to address the shortage of drone technology in the region.

Appendix A: Methodology & Data Sources

Data Sources

Labor market and educational supply data compiled in this report derive from a variety of sources. Data were drawn from external sources, including the Economic Modeling Specialists, Inc., the California Community Colleges Chancellor's Office Management Information Systems Data Mart and the National Center for Educational Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS). Below is the summary of the data sources found in this study.

Data Type	Source
Labor Market Information/Population Estimates and Projections/Educational Attainment	Economic Modeling Specialists, Intl. (EMSI). EMSI occupational employment data are based on final EMSI industry data and final EMSI staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level EMSI earnings by industry: economicmodeling.com.
Typical Education Level and On-the-job Training	Bureau of Labor Statistics (BLS) uses a system to assign categories for entry-level education and typical on-the-job training to each occupation for which BLS publishes projections data: https://www.bls.gov/emp/tables/educational-attainment.htm.
Labor Force, Employment and Unemployment Estimates	California Employment Development Department, Labor Market Information Division: labormarketinfo.edd.ca.gov.
Job Posting and Skills Data	Burning Glass: burning-glass.com/.
Additional Education Requirements/ Employer Preferences	The O*NET Job Zone database includes over 900 occupations as well as information on skills, abilities, knowledge, work activities and interests associated with specific occupations: onetonline.org.

Key Terms and Concepts

Annual Job Openings: Annual openings are calculated by dividing the number of years in the projection period by total job openings.

Education Attainment Level: The highest education attainment level of workers age 25 years or older.

Employment Estimate: The total number of workers currently employed.

Employment Projections: Projections of employment are calculated by a proprietary Economic Modeling Specialists, Intl. (EMSI) formula that includes historical employment and economic indicators along with national, state and local trends.

Living Wage: The cost of living in a specific community or region for one adult and no children. The cost increases with the addition of children.

Occupation: An occupation is a grouping of job titles that have a similar set of activities or tasks that employees perform.

Percent Change: Rate of growth or decline in the occupation for the projected period; this does not factor in replacement openings.

Replacements: Estimate of job openings resulting from workers retiring or otherwise permanently leaving an occupation. Workers entering an occupation often need training. These replacement needs, added to job openings due to growth, may be used to assess the minimum number of workers who will need to be trained for an occupation.

Total Job Openings (New + Replacements): Sum of projected growth (new jobs) and replacement needs. When an occupation is expected to lose jobs, or retain the current employment level, number of openings will equal replacements.

Typical Education Requirement: represents the typical education level most workers need to enter an occupation.

Typical On-The-Job Training: indicates the typical on-the-job training needed to attain competency in the skills needed in the occupation.