

LABOR MARKET ANALYSIS

FOR PROGRAM RECOMMENDATION



FOR LABOR MARKET RESEARCH

NORTH FAR NORTH

DRONE OPERATORS (UAS/UAV) IN THE GREATER SACRAMENTO SUBREGION

NORTH FAR NORTH

DECEMBER 2024

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Introduction

The North Far North Center of Excellence for Labor Market Research prepared this report to provide an analysis of regional labor market demand and supply data related to drones, which are aircraft that fly without a human pilot onboard. Drones, also called unmanned aerial vehicles (UAVs) or unmanned aircraft systems (UAS), are operated by individuals known as drone or remote pilots.

In 2015, the Federal Aviation Administration (FAA) began requiring that all commercial drone pilots have a Remote Pilot Certificate, in accordance with their Small UAS rule Part 107. A Remote Pilot Certificate, or Part 107, license demonstrates that holders understand the regulations, operating requirements, and procedures to safely fly drones. To obtain this license, first-time pilots must pass an aeronautical knowledge exam and apply to the FAA to obtain a remote pilot license.¹ Incumbent pilots that currently hold a FAA 14 CFR Part 61 Certificate and have completed a flight review within the last 24 months are eligible to obtain a Remote Pilot Certificate after completing an online training course.² In addition to a Part 107 license, all UAVs, except those that weigh 0.55 pounds or less, must be registered with the FAA.³

According to FAA data, there are 6,824 Part 107 pilots registered within the seven-county Greater Sacramento region, with an additional 907 registrants in the 15-county Far North region.⁴

Summary of Findings

Based on currently available data, there appears to be a need for regional drone operators in the Greater Sacramento region. However, it is difficult to quantify this need. The COE (as well as other COEs) uses a projected value, the number of annual job openings, to quantify demand for an occupation. There are no specific occupations dedicated to drone operator jobs. And, while certain drone-related jobs role may fit into other occupations, not all jobs within that occupation may require drone-related skills. As a result, traditional labor market data would likely overstate the need for drone operators.

In lieu of traditional labor market data, this report relies on an analysis of online job postings from the Greater Sacramento region and the state to examine the need for drone-related jobs and skills. However, it's important to note that the number of job postings does not accurately reflect or project demand for drone-related jobs; job postings are a snapshot of employer activity related to a particular set of jobs and should be interpreted as such. This report also includes an analysis of statewide postsecondary training programs related drone operation and

¹ https://www.faa.gov/uas/commercial_operators/become_a_drone_pilot

² Ibid.

³ https://www.faa.gov/uas/getting_started/register_drone

⁴ https://www.faa.gov/foia/electronic_reading_room/uas/cy-2023-quarter-3-geographic-listing-hobbyist-non-hobbyist-small-unmanned-aircraft-systems

technology.

The key findings are as follows:

- From December 2023 to November 2024, 93 employers in the Greater Sacramento subregion posted 356 drone-related job openings online, with a median advertised hourly wage of \$41.97.
 - An analysis of advertised salaries indicates that employers are offering compensation for drone-related jobs well above the living wage. In the Greater Sacramento region, the median advertised hourly wage for these positions is \$41.97, significantly exceeding the living wage of \$21.17 per hour for a single adult in Sacramento County.
 - Thirty-seven percent of drone-related job postings (132 postings) were in the manufacturing sector, where roles typically do not require a drone piloting license. Most of the remaining postings were concentrated in three sectors: public administration (68 postings), professional, scientific, and technical services (48 postings), and information (15 postings).
 - The top five job titles with the most drone-related job postings include photographers, air interdiction agents, manufacturing test technicians, environmental scientists, and material handlers.
 - Sixty-five percent of drone-related job postings in the Greater Sacramento region were concentrated in five major occupational groups: architecture and engineering (65 postings, 18%), transportation and material moving (61 postings, 17%), arts, design, entertainment, sports, and media (40 postings, 11%), production (39 postings, 11%), and management (27 postings, 8%).
- In the last 12 months, there were more than 6,000 online job postings for drone-related jobs across the state.
 - Although most drone-related job postings were concentrated in Southern California and the Bay Area, the Sacramento area ranked seventh among the top 10 metropolitan statistical areas (MSAs) with the highest number of these postings.
 - Across the state, most drone-related job postings came from two sectors: professional, scientific, and technical services (1,622 postings) and manufacturing (1,489 postings).
- Statewide, 20 California Community Colleges offer programs related to drones. However, none of these programs are in the North Far North region.
 - Collectively, these programs confer an average of 127 awards (certificates and degrees) annually. However, this figure may overestimate the supply of graduates

entering the drone workforce, as the awards are reported by TOP code, which encompasses multiple programs, including those unrelated to drones.

Recommendation

The North Far North Center of Excellence recommends that Sacramento City College move forward with a new program development related to drones.

New Program Recommendation		
Move forward with the new program.	Proceed with caution	A new program is not recommended.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Occupational Demand

The United States Bureau of Labor Statistics (BLS) has not yet classified a specific occupation for drones and drone technology within its Standard Occupational Classification (SOC) system. Consequently, traditional labor market data, including demand and earnings, is unavailable for drone-related jobs. However, a closely related occupation, Commercial Pilots, has been identified. A labor market analysis for this occupation was conducted in September 2024 and is available [here](#).

To assess the demand for drone pilots in the Greater Sacramento region, this report analyzes online job postings to identify drone-related roles and employer preferences for drone piloting knowledge, skills, and abilities. This report also provides an overview of drone programs offered at community colleges across California. While four-year and other non-community college institutions may offer drone programs and courses, there is no comprehensive way to collect detailed course and program data for these institutions; for this reason, this report focuses on available data from the community college system.

Job Postings

About Job Postings Analysis

This section of the report analyzes recent data from online job postings. Online job postings may provide additional insight into recent changes in the labor market that are not captured by historical trends. However, job postings are not the same as labor market demand; demand is based on projected annual openings.

There are several limitations to analyzing and interpreting online job postings. Employers may post a position multiple times to increase the number of job applicants. Job postings may remain online after a business chooses not to fill a position. Employers may advertise one post to fill multiple vacancies. And not all jobs are posted online.

Job posting analyses should be used to inform community college curriculum development and to identify potential employers for targeted experiential learning opportunities.

Job Postings Overview

An online job posting search was conducted to identify regional demand for drone pilots in the Greater Sacramento region. Keyword, job title, occupation, and employer filters were applied to ensure that the information included in this report is specific to drone piloting positions.

In the last 12 months, there were 356 jobs posted online for drone-related positions from 93 employers with a median hourly advertised salary of \$41.97 per hour across the Greater Sacramento subregion (Exhibit 1). Job posting data comes from Lightcast's Job Postings Analytic tool and represents unique advertisements newly posted online between December

2023 through November 2024.

Exhibit 1. Drone-related online job postings, Dec 2023 - Nov 2024

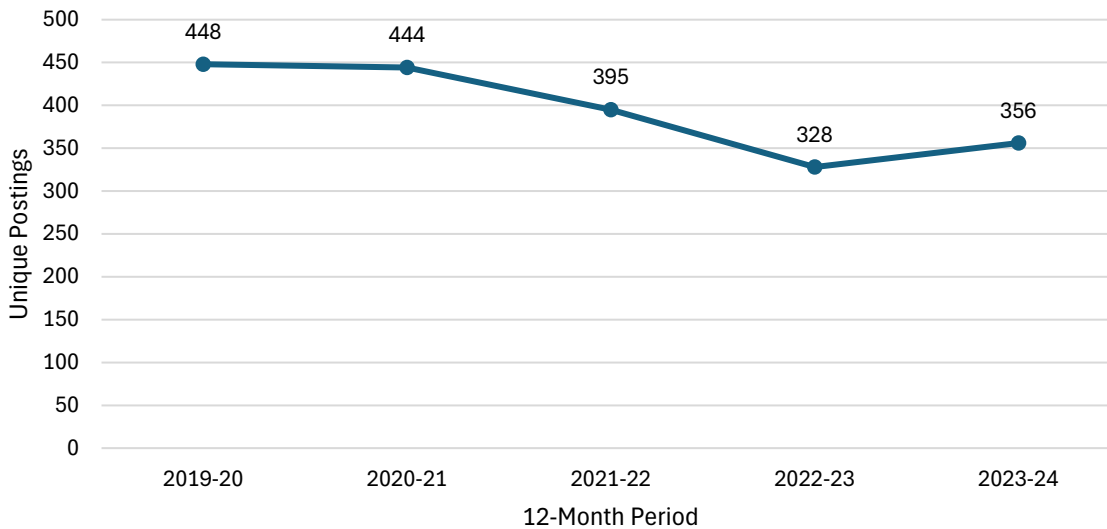


Source: Lightcast job postings analysis.

*Annual salary calculation assumes full time employment of 40 hours per week or 2,080 hours a year.

Since 2019, drone-related job postings have decreased by 20.5%, primarily due to the pandemic, which caused significant declines in job posting activity at regional, state, and national levels. However, a comparison of the most recent 12 months with the previous period reveals a positive trend, with drone-related job postings rising by 8% compared to the 2022-23 period (Exhibit 2).

Exhibit 2. Annual job postings for drone-related jobs, Greater Sacramento, 2019-2024



Source: Lightcast job postings analysis.

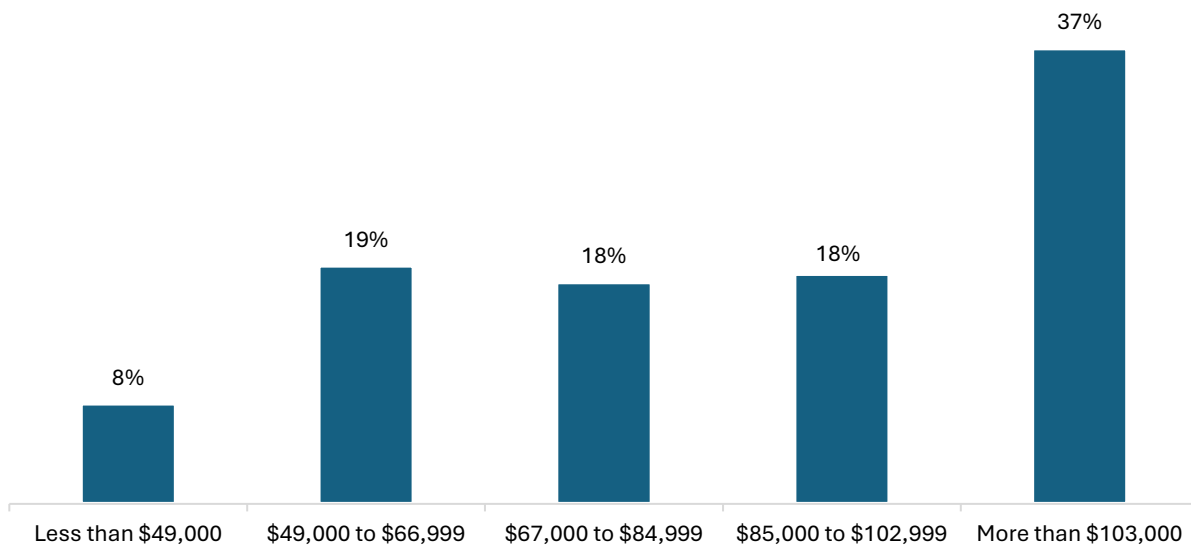
Advertised Salary

Exhibits 3 and 4 show online job advertise salaries for drone-related jobs across Greater Sacramento. More than 80% of job postings (or, 298) included salary data, and the figures are calculated to reflect full-time, annual employment. The median hourly salary for drone-related

jobs across Greater Sacramento is \$41.97 per hour; this equates to \$87,298 annually (Exhibit 1).

Analysis of job posting salaries suggest that local employers are willing to pay drone-related positions an hourly salary greater than the living wage (Exhibit 3). The median hourly salary for drone-related positions is \$41.97 while the hourly living wage for a single working adult living in Sacramento County is \$21.17 (or \$43,264 annually). Ninety-two percent of drone-related job postings pay at least \$49,000 annually.

Exhibit 3. Distribution of advertised salaries for drone-related job postings, Greater Sacramento, Dec 2023-Nov 2024



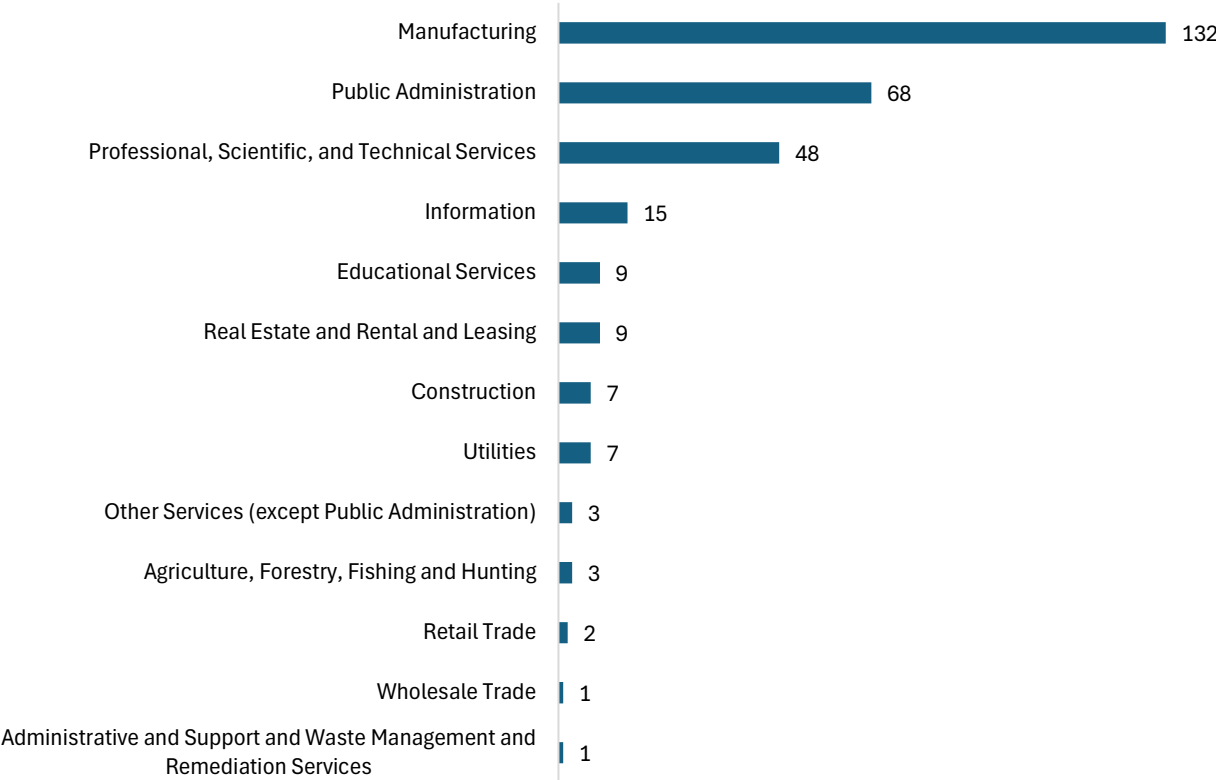
Source: Lightcast job postings analysis.

Employers and Job Titles

Greater Sacramento drone-related job postings come from numerous industries and employers and have a wide range of job titles due to the variety of applications and settings in which drones are used. To provide insight into the types of industries in which employers advertise drone-related jobs, exhibit 4 displays the number of job postings by major industry sector.

Nearly three-quarters of drone-related job postings are found in the first four sectors, including manufacturing (with 37% of job postings), public administration (19%), professional, scientific and professional services (13%), and information (4%).

Exhibit 4. Drone-related job postings by industry sector, Greater Sacramento, Dec 2023 - Nov 2024



Source: Lightcast job postings analysis.

Exhibit 5 highlights a selection of companies with the highest number of drone-related job postings in Greater Sacramento, organized by major industry sectors. This list is not exhaustive; for a complete list, please reach out to the NFN COE.

Exhibit 5. Drone-related job postings by company, Greater Sacramento, Dec 2023 - Nov 2024

Industry Sector	Company	Job Postings
Manufacturing	Kratos Defense & Security Solutions	61
	Crane	44
	Teledyne Technologies	39
Professional, Scientific, and Technical Services	Bowman Consulting Group	12
	RES Group (Renewable Energy Systems) *	4
	Bkf Engineers	2
Public Administration	United States Department of Homeland Security	43
	County of El Dorado	8
	State of California	8
Information	Nexstar Media Group	5
	CBS Broadcasting	3
	The Sacramento Bee	2
Educational Services	University of California	8
	Los Rios Community College District	1
Real Estate and Rental and Leasing	Zillow Group	3
	CoStar Group	2
	Big Block Realty North	1

Construction	V3 Electric	2
	Kitchell	2
	DPR Construction	1
Utilities	California Department of Water Resources (DWR)	6
	Sacramento Municipal Utility District (SMUD)	1
Other Services	Blue Sky Photography	3
Agriculture, Forestry, Fishing and Hunting	Corteva Agriscience	2
	Forester's Co-Op (Forestry and GIS Consulting)	1
All Other Industry Sectors	<i>All Other Employers</i>	92
Totals		356

Source: Lightcast job postings analysis.

*Listed as RES Agency in Lightcast job postings

Exhibit 6 showcases the variety of job titles linked to drone-related postings. Job titles provide insights into the types of positions held by drone operators. Notable roles include photographers/videographers (24 postings combined), Air Interdiction Agents (19 postings combined), manufacturing technicians (11 postings), and environmental scientists (10 postings).

Exhibit 6. Drone-related job titles, Greater Sacramento, Dec 2023 - Nov 2024

Job Title	Job Postings
Photographers	15
Air Interdiction Agents (AIA)	14
Manufacturing Test Technicians	11
Environmental Scientists	10
Material Handlers	6
Air Interdiction Agents (AIA)*	5
Project Engineers	5
Drone Pilots	5
CNC Mill Machinists	5
Deputy District Attorneys	5
Transportation Surveyors	5
Real Estate Photographers	5
CNC Machinists	5
Surveyor Associates	4
Pilot Operators	4
Videographers/Photographers	4
Survey Technicians	4
Quality Engineers	4

Site Surveyors	4
Manufacturing Engineers	3
<i>All Other Job Titles</i>	233
Totals	356

Source: Lightcast job postings analysis.

*Listed as "commuter assistants" in job postings data.

While some job titles suggest the nature of the work, others require further explanation. Below are additional details for selected job titles:

- **Photographer:** These positions are typically associated with media and real estate companies. Photographers use drones to capture images and shoot videos.
- **Air Interdiction Agents (AIA):** These are law enforcement officers with the U.S. Department of Homeland Security (DHS). AIA officers operate various aircraft, including airplanes, helicopters, and unmanned aerial systems (UAS), to detect, prevent, and interdict threats to the United States.
- **Manufacturing Test Technicians:** This manufacturing production role is employed by Teledyne Technologies, a company specializing in the development of civilian and military solutions related to aviation, communication, electronic warfare, industrial applications, missiles and UAVs, radar, satellite communications (SATCOM), space, and test and measurement.
- **Environmental Scientists:** These roles use drones for a variety of tasks including data collection and aerial imagery analysis. Exact use depends on the employer and job duties.
- **Deputy District Attorney:** This position, from El Dorado County's local government, involves utilizing drone technology to present cases to juries as part of the El Dorado County District Attorney's office.
- **Transportation Surveyors:** Surveyors with CALTRANS use modern tools, including UAV, bathymetric boats, LiDAR, GNSS receivers, and robotic total stations to research, measure, and record surveys.

Occupational Alignment

This section of the report attempts to identify key occupations associated with drone-related job titles in the Greater Sacramento region. As stated in the Occupational Demand section of this report, there is no specific occupation for drones and drone technology within the Bureau of Labor Statistic’s Standard Occupational Classification (SOC) system. As such, drone-related jobs align with multiple occupations.

Exhibit 7 shows the major occupational groups with the most-drone related job postings in Greater Sacramento. The top five groups account for 65% of all drone-related job postings in the last 12 months and include architecture and engineering occupations; transportation and material moving occupations; arts, design, entertainment, sports, and media occupations; production occupations; and management occupations.

Exhibit 7. Drone-related jobs by major occupational group, Greater Sacramento, Dec 2023 - Nov 2024

Major Occupation (SOC) Group	Job Postings	Share of Job Postings
Architecture and Engineering Occupations	65	18%
Transportation and Material Moving Occupations	61	17%
Arts, Design, Entertainment, Sports, and Media Occupations	40	11%
Production Occupations	39	11%
Management Occupations	27	8%
Computer and Mathematical Occupations	22	6%
Business and Financial Operations Occupations	19	5%
Installation, Maintenance, and Repair Occupations	17	5%
Life, Physical, and Social Science Occupations	16	4%
Office and Administrative Support Occupations	11	3%
Protective Service Occupations	6	2%
Educational Instruction and Library Occupations	4	1%

Sales and Related Occupations	4	1%
Legal Occupations	3	1%
Healthcare Practitioners and Technical Occupations	2	1%
Construction and Extraction Occupations	2	1%
Community and Social Service Occupations	1	0%
Personal Care and Service Occupations	1	0%
<i>All Other Occupational Groups</i>	16	4%
Totals	356	100%

Source: Lightcast job postings analysis.

Exhibit 8 provides an overview of detailed occupations and job titles within the top five occupational groups with the most drone-related job postings. The selected job titles, sourced from job postings data, are listed in parentheses. As this list is not exhaustive, please contact the NFN for additional information.

Exhibit 8. Occupational group and detail occupation with sampled job titles (in parentheses), Greater Sacramento, Dec 2023 - Nov 2024

Detailed Occupation	Job Postings
<i>Architecture and Engineering Occupations</i>	
Surveyors (" <i>Transportation Surveyors</i> ")	18
Industrial Engineers (" <i>Quality Engineer</i> ")	16
Engineering Technologists and Technicians, Except Drafters, All Other (" <i>Manufacturing Test Technician</i> ")	11
<i>Transportation and Material Moving Occupations</i>	
Commercial Pilots (" <i>Air Interdiction Agent</i> ")	27
Airline Pilots, Copilots, and Flight Engineers (" <i>Pilot Operator</i> ")	23

Laborers and Freight, Stock, and Material Movers, Hand (<i>"Material Handlers"</i>)	8
<i>Arts, Design, Entertainment, Sports, and Media Occupations</i>	
Photographers (<i>"Real Estate Photographers"</i>)	29
Camera Operators, Television, Video, and Film (<i>"Videographers"</i>)	5
Audio and Video Technicians (<i>"Audiovisual Specialists"</i>)	3
<i>Production Occupations</i>	
Machinists (<i>"CNC Mill Machinists"</i>)	12
Inspectors, Testers, Sorters, Samplers, and Weighers (<i>"Quality Management System Specialists"</i>)	7
Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic (<i>"Precision Grinder"</i>)	6
<i>Management Occupations</i>	
Marketing Managers (<i>"Media Marketing Managers"</i>)	5
General and Operations Managers (<i>"Field Manager"</i>)	3
Industrial Production Managers (<i>"Value Stream Manager"</i>)	2

Source: Lightcast job postings analysis.

Skills, Education, and Work Experience

Exhibit 9 identifies the top 10 specialized, transversal, and digital skills most frequently sought by local employers hiring for drone-related positions. These skills appeared most often in drone-related job postings. Specialized skills are typically specific to a particular occupation or role. Transversal skills, often referred to as employability skills (or common skills by Lightcast), are foundational abilities that span industries and occupations, encompassing a blend of interpersonal and soft skills. Digital skills include software proficiency, programming expertise, and technical capabilities essential for operating in a technology-focused world.

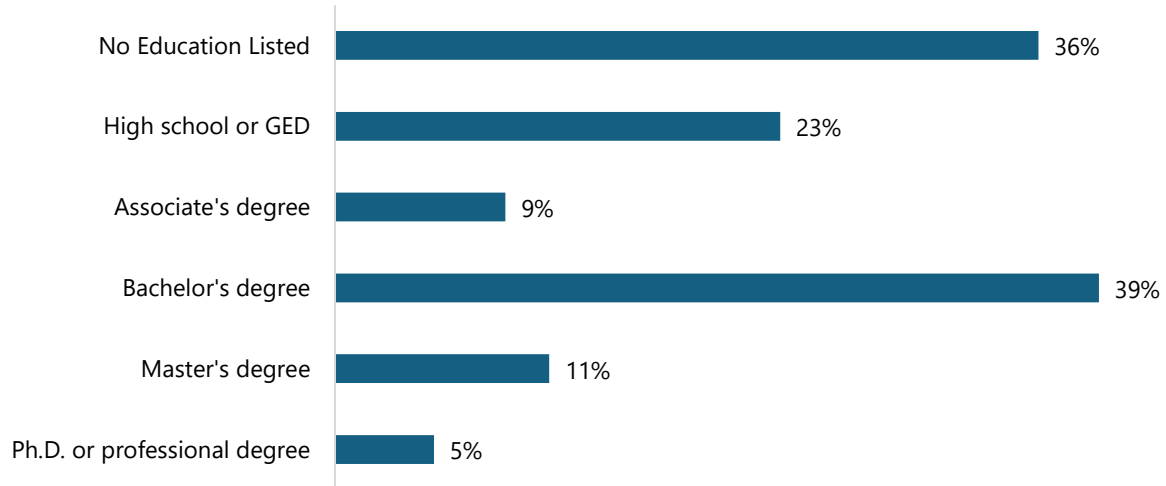
Exhibit 9. Most in-demand skills for drone-related jobs, Greater Sacramento, Dec 2023 - Nov 2024

Specialized Skills	Common or Transversal Skills	Digital Skills
<ul style="list-style-type: none"> • Unmanned Aerial Systems (UAS) • Data Analysis • Aviation • Lean Manufacturing • Federal Aviation Administration • International Traffic in Arms Regulations • Project Management • Tooling • Contraband Detection and Control • Law Enforcement Operations 	<ul style="list-style-type: none"> • Communication • Operations • Management • Leadership • Detail Oriented • Troubleshooting (Problem Solving) • Writing • Problem Solving • Customer Service • Planning 	<ul style="list-style-type: none"> • Microsoft Office Suite • IBM WebSphere MQ • Geographic Information Systems (GIS) • G-Codes • ArcGIS (GIS Software) • Computer Aided Three-Dimensional Interactive Application (CATIA) • Python (Programming Language) • MATLAB • Microsoft Project • C (Programming Language)

Source: Lightcast job postings analysis.

Exhibit 10 shows the employer-preferred minimum level of education for drone-related job postings across the Greater Sacramento subregion. Despite more than one-third of job postings not including an education preference, educational levels are nearly evenly distributed across two categories: up to an associate degree (32%) and bachelor's degree (39%). Job postings requiring advanced levels of education, such as a master's degree or doctorate, are associated with jobs for engineers, lawyers, managers, scientists, and surveyors.

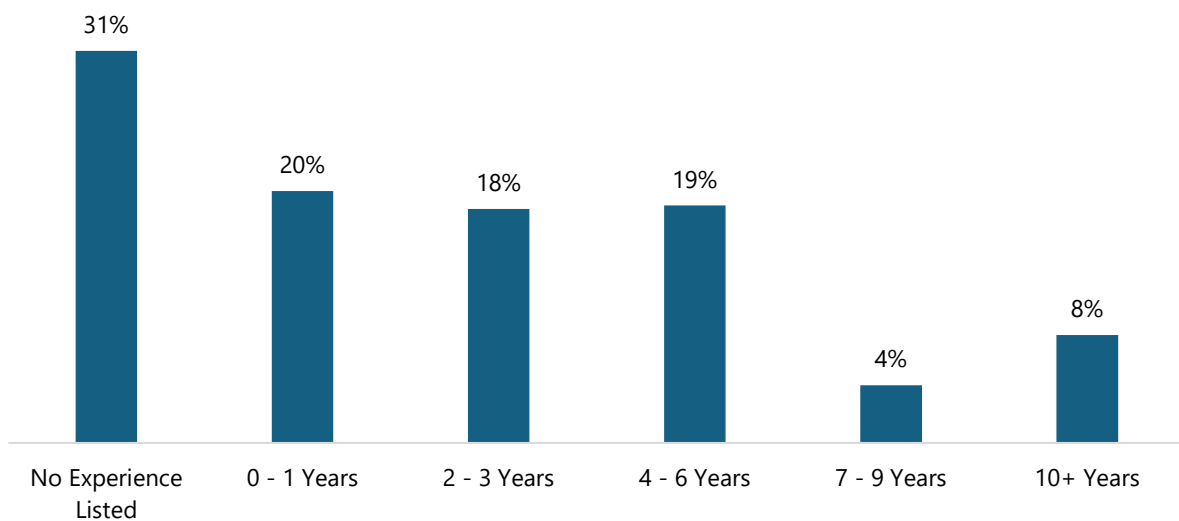
Exhibit 10. Employer-preferred education levels for drone-related jobs, Greater Sacramento, Dec 2023 - Nov 2024



Source: Lightcast job postings analysis.

Exhibit 11 illustrates the preferred minimum experience levels for drone-related job postings in the Greater Sacramento subregion. Among these postings, 20% required no more than one year of work experience, while 18% sought candidates with up to three years of experience.

Exhibit 11. Employer-preferred experience levels for drone-related jobs, Greater Sacramento, Dec 2023 - Nov 2024



Source: Lightcast job postings analysis.

Certifications

Exhibit 12 highlights the certifications most frequently requested by local employers for drone-related jobs across Greater Sacramento. Although the Federal Aviation Administration (FAA) mandates a Remote Pilot Certificate for commercial drone pilots, this certification was mentioned in relatively few job postings. Specifically, up to 58 out of 356 drone-related job postings referenced drone pilot certificate, pilot licensing and certification, or FAA certification.

Other piloting and aviation-related certifications also appeared in job postings, often as additional qualifications to a commercial pilot license. These include Instrument Rating (IR; mentioned in 45 postings), Multi-Engine Land (MEL; 43 postings), Airline Transport Pilot license (43 postings), and Certified Flight Instructor (CFI; 41 postings). While these certifications were mentioned less frequently, they suggest that some employers are seeking candidates with a wider range of piloting experience beyond drone operations.

Exhibit 12. Certifications for drone-related job postings, Greater Sacramento, Dec 2023 - Nov 2024

Certification	Job Postings with Certification
Drone Pilot Certificate	47
FAA Instrument Rating	45
Multi-Engine Land (MEL)	43
Airline Transport Pilot License	43
Certified Flight Instructor	41
Pilot Licensing and Certification	6
Federal Aviation Administration (FAA) Certification	5
Commercial Pilot License	2

Source: Lightcast job postings analysis.

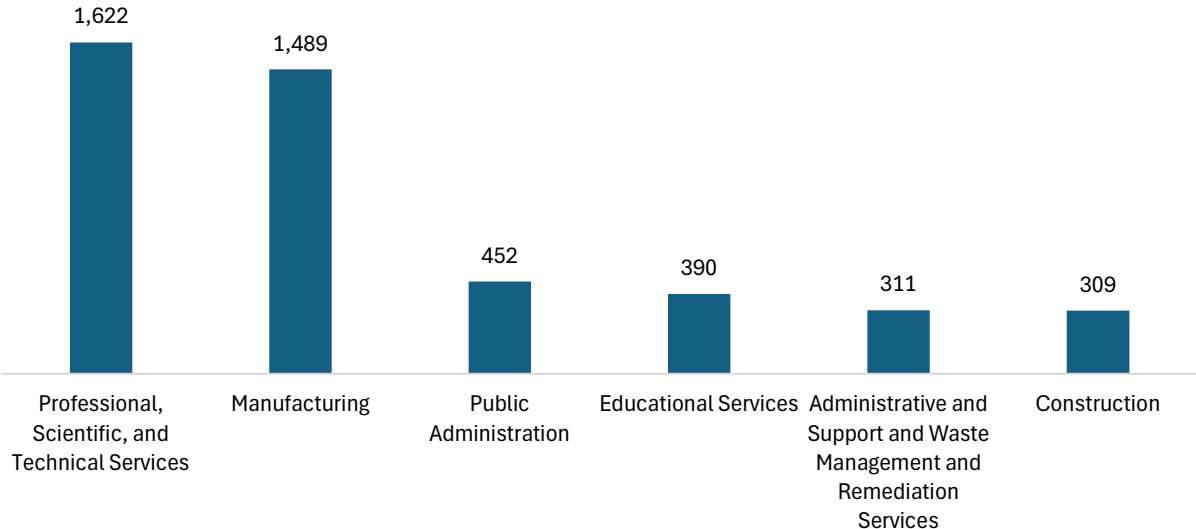
Drone-Related Jobs in California

This section of the report provides an analysis of drone-related job postings across California to better understand applications of drone technology, such as agriculture, construction and surveying, geographic information systems, and protective services. This data provides a snapshot of statewide drone-related job activities, based on information contained in job postings, and is intended to highlight areas of application.

To conduct this portion of the analyses, the original job postings search from drone-related keyword was expanded to include all online advertisements posted online in California over the last 12 months. Between December 2023 and November 2024, there were more than 6,000 advertisements posted online for drone-related jobs across the state.

Exhibit 13 displays the industry sectors with the most drone-related job postings in California.

Exhibit 13. Top industry sectors for drone-related job postings, California, Dec 2023-Nov 2024



Source: Lightcast job postings analysis.

An analysis of the location of the job postings revealed that demand for drone-related jobs is geographically concentrated in the Bay Area and the southern part of the state (Exhibit 14). Slightly more than 75% of the state’s drone-related job postings were found in five metropolitan statistical areas (MSAs): Los Angeles-Long Beach-Anaheim (2,435 postings), San Diego-Chula Vista-Carlsbad (931 postings), San Francisco-Oakland-Fremont (731 postings), San Jose-Sunnyvale-Santa Clara (620 postings), and Oxnard-Thousand Oaks-Ventura (377 postings).⁵ The

⁵ "Job Postings by Location," Lightcast 2024.4.

Sacramento-Roseville-Folsom MSA ranks number seven in the top 10 for statewide locations with the most drone-related job postings.⁶

Exhibit 14 displays the top 10 employers, occupations, and job titles most closely associated with drone-related job postings across California.

Exhibit 14. Top 10s for drone-related job postings, California, Dec 2023-Nov 2024

Employers	Occupations	Job Titles
United States Department of Homeland Security	Software Developers	Air Interdiction Agents
General Atomics	Computer Occupations, All Other	Flight Test Engineers
AeroVironment	Commercial Pilots	Survey Technicians
Anduril Industries	Airline Pilots, Copilots, and Flight Engineers	Drone Pilots
Shield Ai	Aerospace Engineers	Customs and Border Protection Officers
Crane	Photographers	Operating Engineers
Allied Universal	Surveyors	Videographers
Kaiser Permanente	Mechanical Engineers	Software Engineers
Cal State La University Auxiliary Services	Industrial Engineers	Site Surveyors
California State University	Camera Operators, Television, Video, and Film	Drone Operators

Source: Lightcast job postings analysis.

⁶ Ibid.

Drone Applications

This section of the report provides an overview of commercial applications of drones.

Agriculture

Drones play a role in agriculture by collecting data for precision farming and assisting with tasks such as seed dispersal and crop fertilization.⁷ Corteva Agriculture, a multinational company with a location in the Greater Sacramento region, uses drones to monitor crop conditions.⁸

Geographic Information Systems

The geographic information systems (GIS) industry greatly benefits from drone technology, as UAVs make geospatial data collection more affordable and accessible.⁹ These drones are typically equipped with advanced sensors capable of capturing detailed imagery and LiDAR data, facilitating the creation of accurate 3D models and topographic maps. This capability is particularly beneficial for urban planning, environmental monitoring, and infrastructure development within the Sacramento region.

In the Greater Sacramento region, employers such as Forester's Co-Op, a forestry and GIS consulting firm based in Placer County, are searching to hire a GIS Analyst (I/II) with a drone piloting license to carry out its mission.

Manufacturing

Drone-related manufacturing jobs are typically focused on developing and building UAS/UAV. In the Greater Sacramento region, most of these job postings come from Kratos, Crate, Teledyne, and the Sierra Nevada Corporation. These jobs do not typically require a Part 107 license.

Public Safety & Law Enforcement

Police, fire, and legal agencies utilize drone technologies for various operational purposes in public safety and law enforcement. Applications include UAS deployment for surveillance, first response, search and rescue, and the reconstruction of accident and crime scenes.¹⁰

Drone-related job posting analysis in Greater Sacramento revealed two unique applications of drone technology:

Virtual Jury View: The El Dorado County District Attorney's Office utilizes drones to support case presentations to juries, providing virtual views of crime scenes.¹¹

Drones as First Responders (DFR): Flying Lion, Inc. offers UAS (Unmanned Aircraft Systems)

⁷ <https://enterprise-insights.dji.com/blog/drones-in-agriculture>

⁸ <https://www.corteva.com/resources/blog/the-art-of-precision-agriculture.html>

⁹ <https://ellipsis-drive.com/blog/drones-and-their-impact-on-gis-mapping/>

¹⁰ <https://www.axon.com/resources/police-drones>

¹¹ https://www.mtdemocrat.com/news/drone-technology-makes-jury-duty-a-hot-ticket/article_d67dc89e-69f2-54f5-81fd-d59f3adf29ef.html

services through its DFR program, which differs from traditional public safety uses. Instead of deploying drones after officers or public safety personnel arrive on-site, DFR programs launch UAVs from fixed locations immediately upon receiving an emergency call.¹² Flying Lion supports public safety agencies by providing implementation assistance, training, and staffing for these programs.¹³

Real Estate

Drone technology is widely used in real estate marketing, enabling agents to showcase properties from unique angles. This allows prospective buyers to see not only the house, roof, and yard but also the surrounding neighborhood and views.¹⁴

Key real estate employers utilizing drone technology in the Greater Sacramento region include Big Block Realty North, CoStar Group, and Zillow.

Surveying and Construction

Drones are utilized in surveying and construction due to their ability to produce high-resolution images and highly accurate data more quickly and cost-effectively than traditional methods.¹⁵

In the Greater Sacramento region, 28 drone-related job postings were identified in the fields of surveying and construction. Examples from the job posting data include:

UAS for Transportation Surveys: Transportation surveyors with the U.S. Department of Transportation utilize UAS technology for various surveying tasks.

Renewable Energy Inspections: The RES Group employs UAS to inspect wind turbines, which can reach heights of 300 to 500 feet, as part of their asset management, operations and maintenance, and repair services for renewable energy systems.^{16, 17}

¹² <https://www.police1.com/police-products/police-drones/calif-pd-launches-drone-as-a-first-responder-program>

¹³ <https://flyinglioninc.com/drones-first-responders-dfr/>

¹⁴ <https://www.nar.realtor/drones>

¹⁵ <https://wingtra.com/drone-mapping-applications/surveying-gis/>

¹⁶ <https://www.res-group.com/us/resources/news/res-acquires-global-blade-inspection-and-condition-monitoring-company-to-bolster-its-operations-maintenance-service-offering/>

¹⁷ <https://www.energy.gov/eere/articles/wind-turbines-bigger-better>

Postsecondary Training

Community College Programs

Just as there is no dedicated occupation for drone operators, there is no specific TOP code for drone programs in California Community College System.¹⁸ Consequently, these programs are distributed across multiple TOP codes.

To identify drone-related training programs offered by California Community Colleges, the NFN COE conducted a search for drone-related program titles using the Chancellor's Office Curriculum Inventory (COCI). The search yielded 36 drone-related training programs, including 33 active programs, 2 inactive programs, and 1 newly approved program. Exhibit 15 provides a comprehensive list of drone-related programs available at California Community Colleges as of December 4, 2024.

Over one-third of these programs fall under two TOP codes: 0950.00*Aeronautical and Aviation Technology and 1012.00*Applied Photography.

Exhibit 15. California Community College drone-related training programs, 2024

Region	College	Local Title	TOP Code	Award
Bay Area	Diablo Valley	Drone Technology	2206.10* Geographic Information Systems	Certificate 8<16 units
	Gavilan	Drone/Unmanned Aircraft Systems (UAS) Technology (Inactive)	0950.00* Aeronautical and Aviation Technology	Associate Degree (Inactive)
	Gavilan	Drone/Unmanned Aircraft Systems (UAS) Technology (Inactive)	0950.00* Aeronautical and Aviation Technology	Certificate 16<30 units (Inactive)
	Las Positas	Drone Photography, Mapping, and Piloting	1012.00* Applied Photography	Noncredit
	Los Medanos	Basic Drone Piloting	0950.00* Aeronautical and Aviation	Noncredit

¹⁸ There are two CIP codes related to drones: [49.0109 Remote Aircraft Pilot](#) and [36.0207 Remote Aircraft Pilot \(Personal\)](#).

Region	College	Local Title	TOP Code	Award
			Technology	
	Santa Rosa	Drone Studies: Applied Drone Operation	0614.60* Computer Graphics and Digital Imagery	Certificate 8<16 units
Central Valley/ Mother Lode	Fresno City	Drone Operations	1012.00* Applied Photography	Certificate 8<16 units
	Merced	Drone Technology	4930.13 Academic Guidance	Certificate 8<16 units
	Merced	Drone Media	0702.00* Computer Information Systems	Certificate 8<16 units
	Modesto	Drone Technician	0799.00* Other Information Technology	Certificate 8<16 units
Inland Empire/ Desert	Mt. San Antonio	Drone Camera Operator	1012.00* Applied Photography	Associate Degree
	Mt. San Jacinto	Drone Applications in Geospatial Information Science	2206.10* Geographic Information Systems	Certificate 16<30 units
Los Angeles	Citrus	Drone Technology	3099.00* Other Commercial Services	Noncredit
	Glendale	Drone Photography	1012.00* Applied Photography	Certificate 8<16 units
Orange County	Cypress	UAS Drone Basic	3020.20* Piloting	Certificate 16<30 units
	Cypress	UAV/UAS Drone Photography and Video	1012.00* Applied Photography	Certificate 8<16 units

Region	College	Local Title	TOP Code	Award
	Cypress	UAS Drone	3020.20* Piloting	Associate Degree
	Cypress	UAS Drone Advanced	3020.20* Piloting	Certificate 30<60 units
	Fullerton	Drone Business and Entrepreneurship	0506.40* Small Business and Entrepreneurship	Certificate 8<16 units
	Fullerton	Drone Journalism	0602.00* Journalism	Certificate 16<30 units
	Fullerton	Drone and Autonomous Systems	0950.00* Aeronautical and Aviation Technology	Associate Degree
	Orange Coast	Drone Photography	1012.00* Applied Photography	Certificate 8<16 units
	Orange Coast	Basic Drone Imaging Skills	0614.00* Digital Media	Certificate 16<30 units
	Orange Coast	Drone Videography	0612.20* Film Production	Certificate 8<16 units
	Santa Ana	Drone Technology	0799.00* Other Information Technology	Certificate 8<16 units
	Santa Ana	Introduction to Drone Pilot	0604.20* Television (including combined TV/Film/Video)	Noncredit
	Santa Ana	Drone Cinematography	0604.20* Television (including combined TV/Film/Video)	Certificate 16<30 units

Region	College	Local Title	TOP Code	Award
	Santiago Canyon	Drone Operation and Photography, CC	1012.00* Applied Photography	Noncredit
San Diego/ Imperial	Grossmont	Drone Cinematography	0950.00* Aeronautical and Aviation Technology	Noncredit
	Grossmont	Drone Mapping	0950.00* Aeronautical and Aviation Technology	Noncredit
	Palomar	Drone Operator I	0612.20* Film Production	Certificate 8<16 units
	Palomar	Getting Started with Drone Careers and Safety	2206.10* Geographic Information Systems	Noncredit
	Palomar	Drone Applications and Technologies	0614.00* Digital Media	Associate Degree
	Palomar	Drone Operations	2206.10* Geographic Information Systems	Certificate 16<30 units
	Southwestern	Drone Technology and Applications	3020.20* Piloting	Certificate 16<30 units
	Southwestern	Drone Technology and Applications	0302.00 Environmental Studies	Noncredit

Source: California Community Colleges The Chancellor's Office Curriculum Inventory System (COCI).

Exhibit 16 shows a three-year average of annual awards conferred by community college drone-related programs, suggesting an overall supply to meet workforce demand for drone-related jobs. Between 2020-21 and 2022-23, community colleges conferred an average of 127 awards per year in drone-related programs. Please note that because community college TOP codes house multiple local programs, this figure is likely to overestimate the supply of workers for drone-related jobs.

Exhibit 16. Average annual awards in community college drone-related programs, 2020-21 through 2022-23

College	Program Type - TOP6	Award Type	3-Yr Average
Citrus	Other Commercial Services-309900	Noncredit	8
Cypress	Piloting-302020	Associate Degree	9
Cypress	Piloting-302020	Certificate 30<60 units	13
Cypress	Piloting-302020	Certificate 16<30 units	19
Diablo Valley	Geographic Information Systems-220610	Certificate 6<18 units	7
Fresno City	Applied Photography-101200	Certificate 8<16 units	24
Gavilan	Aeronautical and Aviation Technology-095000	Associate Degree	3
Gavilan	Aeronautical and Aviation Technology-095000	Certificate 16<30 units	14
Glendale	Applied Photography-101200	Certificate 8<16 units	5
Las Positas	Applied Photography-101200	Noncredit	1
Los Medanos	Aeronautical and Aviation Technology-095000	Noncredit	7
Merced	Academic Guidance-493013	Certificate 8<16 units	1
Merced	Computer Information Systems-070200	Certificate 8<16 units	3

Mt San Antonio	Applied Photography-101200	Associate Degree	12
Mt. San Jacinto	Geographic Information Systems-220610	Certificate 16<30 units	2
Orange Coast	Film Production-061220	Certificate 8<16 units	0
Palomar	Digital Media-061400	Associate Degree	6
Palomar	Film Production-061220	Certificate 8<16 units	1
Palomar	Geographic Information Systems-220610	Certificate 16<30 units	7
Palomar	Geographic Information Systems-220610	Noncredit	--
Santa Ana	Television (including combined TV/Film/Video)-060420	Certificate 16<30 units	3
Southwestern	Piloting-302020	Certificate 16<30 units	3
Totals			127

Source: California Community Colleges Chancellor's Office Management Information Systems Data Mart, Program Awards.

Other Postsecondary Training Programs

Two CIP codes pertain to drones: 49.0109 - Remote Aircraft Pilot and 36.0207 - Remote Aircraft Pilot (Personal). While these CIP codes exist, the NFN COE could not locate any non-community college postsecondary training programs focused on drone technology within the state. This does not necessarily indicate that such programs are absent; rather, drone training is likely offered by institutions that do not participate in federal student financial aid programs. Drone-related training outside the community college system is likely provided by private organizations on a fee-for-service basis.

APPENDIX A. METHODOLOGY AND SOURCES

This report includes occupations identified by using the Center of Excellence TOP-to-CIP-to-SOC crosswalk and the O*Net OnLine education crosswalk. This report's findings were primarily determined with labor market and educational supply data from the Bureau of Labor Statistics (BLS), Lightcast, and the California Community Colleges Chancellor's Office.

Data sources include:

"The Chancellor's Office Curriculum Inventory System (COCI)." California Community Colleges Curriculum Inventory (COCI). 2024. <https://coci2.ccctechcenter.org/>.

Glasmeier, Amy K. "Living Wage Calculator." Living Wage Calculator. 2024. <https://livingwage.mit.edu/>.

Integrated Postsecondary Education Data System (IPEDS). National Center for Education Statistics. U.S. Department of Education. <https://nces.ed.gov/ipeds/>.

Labor Market Information Division. California Employment Development Department. <https://labormarketinfo.edd.ca.gov/>.

Lightcast 2024.4; QCEW Employees, Non-QCEW Employees, and Self-Employed. <https://lightcast.io/>.
(Notes: Occupational employment data are based on final Lightcast industry data and final Lightcast 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)).

Management Information Systems (MIS) Data Mart. California Community Colleges Chancellor's Office. <https://datamart.cccco.edu/>.

O*NET OnLine. U.S. Department of Labor/Employment and Training Administration (DOL ETA). <https://www.onetonline.org/>.

The Self-Sufficiency Standard for California. The Center for Women's Welfare at the University of Washington. 2024. <http://www.selfsufficiencystandard.org/>

"Taxonomy of Programs." California Community Colleges Chancellor's Office. May 2023, 7th Edition. <https://www.cccco.edu/-/media/CCCCO-Website/docs/curriculum/final-top-code-manual-2023edit-4-a11y.pdf?la=en&hash=28074BFE9915B49A7688B8BDEF0DB7E55FEB3A2C>

"TOP-CIP-SOC Crosswalk." Centers of Excellence for Labor Market Research. June 2021 Edition. <http://coecc.net/>

Appendix B. FAA Part 107 Registrations

Exhibit A1. Federal Aviation Administration Part 107 Registrations by County¹⁹

Subregion	County	Number of Part 107 Registrations
Far North	Butte	247
	Colusa	7
	Del Norte	25
	Glenn	14
	Humboldt	180
	Lake	60
	Lassen	16
	Mendocino	50
	Modoc	3
	Plumas	20
	Shasta	175
	Sierra	2
	Siskiyou	52
	Tehama	43
	Trinity	13
Far North Total		907
Greater Sacramento	El Dorado	3,678
	Nevada	201
	Placer	558
	Sacramento	1,947
	Sutter	76
	Yolo	287
	Yuba	77
Greater Sacramento Total		6,824
North Far North Grand Total		7,731

Source: Federal Aviation Administration, Geographic Listing of Hobbyist & Non-hobbyist Small Unmanned Aircraft Systems (sUAS) Registry Enrollments & Registrants.

¹⁹ https://www.faa.gov/foia/electronic_reading_room/uas/cy-2023-quarter-3-geographic-listing-hobbyist-non-hobbyist-small-unmanned-aircraft-systems

Appendix C. Lightcast Keyword Search Terms

Keywords

- "autonomous pilot"
- drone
- "drone operator"
- "drone pilot"
- "part 107"
- "part 107 license"
- "part 107 pilot"
- UAV
- UAS
- "unmanned aerial system"
- "unmanned aerial vehicle"
- "unmanned aircraft system"
- "unmanned aircraft vehicle"

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COVID-19 Statement: This report includes employment projection data produced by Lightcast (formerly EMSI). Employment projections are developed using models based on historical data, which in this set of projections covers the period through 2021. Most input data, therefore, precedes the pandemic. Employment projections are long-term projections intended to capture structural changes in the economy, not cyclical fluctuations. As such, projections data are not intended to capture the impacts of the recession that began in February 2020. Cyclical fluctuations, like recessions, impact projections when they become part of the historical data set.

Important Disclaimer: All representations included in this report have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. Efforts have been made to qualify and validate the accuracy of the data and the reported findings; however, neither the Centers of Excellence, COE host District, nor California Community Colleges Chancellor's Office are responsible for applications or decisions made by recipient community colleges, or their representatives based upon components or recommendations contained in this study.

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