

**Program Endorsement Brief: 0935.00/Electro-Mechanical Technology,  
0956.70/Industrial and Occupational Safety and Health , 0602.00/Journalism  
Autonomous Systems Certificate  
Unmanned Aerial Systems Piloting Certificate  
Drone Journalism Certificate**

Orange County Center of Excellence, December 2020

**Summary Analysis**

<b>Program Endorsement:</b>	<b>Endorsed: All Criteria Met</b>	<input checked="" type="checkbox"/>	<b>Endorsed: Some Criteria Met</b>	<input type="checkbox"/>	<b>Not Endorsed</b>	<input type="checkbox"/>
<b>Program Endorsement Criteria</b>						
<b>Supply Gap:</b>	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>		
<b>Living Wage: (Entry-Level, 25<sup>th</sup>)</b>	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>		
<b>Education:</b>	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>		
<b>Emerging Occupation(s)</b>						
Yes <input checked="" type="checkbox"/>			No <input type="checkbox"/>			

The Orange County Center of Excellence for Labor Market Research (COE) prepared this report to provide Los Angeles/Orange County regional labor market supply and demand data related to five middle-skill occupations **that employ the use of drones**: *Electro-Mechanical and Mechatronics Technologists and Technicians (17-3024)*, *Surveying and Mapping Technicians (17-3031)*, *Photographers (27-4021)*, *Police and Sheriff's Patrol Officers (33-3051)*, and *First-Line Supervisors of Construction Trades and Extraction Workers (47-1011)*. Middle-skill occupations typically require some postsecondary education, but less than a bachelor's degree.<sup>1</sup> Since **drone technology** programs include drone piloting and image capture skills within the fields of maintenance, surveying and mapping, photography public safety, and construction, this report also includes an analysis of online job postings that request drone piloting knowledge and skills. This report is intended to help determine whether there is demand in the local labor market that is not being met by the supply from community college programs that align with the relevant occupations."

Based on the available data, there appears to be a supply gap for these occupations that employ the use of drones. These occupations all have entry-level wages above the living wage in both Los Angeles and Orange Counties, and the education level is congruent with community college programming. **However, it is worth noting that while a certificate in drone technology may add to a student's skill set, this certificate alone most likely will not satisfy the entry-level educational**

<sup>1</sup> The COE classifies middle-skill jobs as the following:

- All occupations that require an educational requirement of some college, associate degree or apprenticeship;
- All occupations that require a bachelor's degree, but also have more than one-third of their existing labor force with an educational attainment of some college or associate degree; or
- All occupations that require a high school diploma or equivalent or no formal education, but also require short- to long-term on-the-job training where multiple community colleges have existing programs.

**requirement for these occupations. Due to all of the traditional LMI criteria being met, albeit overstated, the COE endorses these proposed programs. Reasons include:**

**Demand:**

- **Supply Gap Criteria** - Over the next five years, there is projected to be **6,688 jobs available annually** in the LA/OC region due to new job growth and replacements, **which is more than the 3 awards conferred annually by educational institutions in the region.**
  - However, while the occupations in this report may employ the use of drones, they do not *require* drone knowledge; therefore, **the demand does not represent jobs in the LA/OC region that rely heavily on drone skills.**
  - There were **579 online job postings that listed keywords related to drones in the past 12 months.** The top titles for these job postings were: C/C++ Software Engineers, Summer Technology Instructor, Architectural Photographer, Sales Consultant, Repair Technician, Photographer, Drone Operator, and UAV Air Vehicle Operator.
- **Living Wage Criteria** – Within Orange County, **a majority (86%) of the annual job openings** for these five occupations have entry-level **wages above the county’s living wage (\$17.36).**<sup>2</sup>
- **Educational Criteria** - Within the LA/OC region, **98% of the annual job openings** for these occupations typically **require a high school diploma.**
  - Furthermore, **31.6% of First-Line Supervisors of Construction Trades and Extraction Workers and 47.8% of Police and Sheriff’s Patrol Officers (a combined 78% of the annual openings) working in the field have completed some college or an associate degree.**

**Supply:**

- While **4 community colleges** in the region issue awards related to drone technology, only one college, Cypress, has conferred awards over the past three years. There was an average of **3 awards conferred annually** between 2016 and 2019.
  - Programs offered at the three other colleges were approved in 2018 or later. Based on the approval dates, **no awards for these programs could have been awarded during the three years used to calculate supply.**
  - It is worth noting that while a certificate in drone technology may add to a student’s skill set, **this certificate alone most likely will not satisfy the entry-level educational requirement for these occupations.**
  - However, there are **19 other TOP Codes that do train students specifically for the five occupations in this report: Electro-Mechanical and Mechatronics Technologists and Technicians (17-3024), Surveying and Mapping Technicians (17-3031), Photographers (27-4021), Police and Sheriff’s Patrol Officers (33-3051), and**

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<sup>2</sup> Living wage data was pulled from California Family Needs Calculator on 12/8/2020. For more information, visit the California Family Needs Calculator website: <https://insightcced.org/2018-family-needs-calculator/>.

*First-Line Supervisors of Construction Trades and Extraction Workers (47-1011). Therefore, the number of awards granted for programs related to these three occupations is understated.*

- Because there is no single Classification of Instructional Programs (CIP) code related to drone technology, and because there is not a central database of programs for these institutions, **it is not possible to quantify non-community college supply for drone-related programs.**
  - However, there are **38 CIP Codes that do train students specifically for the five occupations in this report.**

### **Occupational Demand**

Exhibit 1 shows the five-year occupational demand projections for these three middle-skill occupations that employ the use of drones. In Los Angeles/Orange County, the number of jobs related to these occupations is projected to increase by 4% through 2024. There will be more than 6,680 job openings per year through 2024 due to new job growth and replacements.

However, it is important to consider that additional educational awards may be necessary for employment within these occupations. For instance, a student who is pursuing a job as a Police or Sheriff’s Patrol Officer may need to complete an award in a TOP Code related to public safety, such as Administration of Justice (2105.00) or Police Academy (2105.50). **While a certificate in Drone Technology may add to a student’s skill set, this certificate alone may not satisfy the entry-level educational requirement for these occupations.** It is also important to note that these occupations do not require the use of drone technology; therefore, in terms of occupations that rely heavily on the use of drones, the demand data in Exhibit 1 is overstated.

*This report includes employment projection data by Emsi which uses EDD information. 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. To the extent that a recession or labor shock, such as the economic effects of COVID-19, can cause long-term structural change, it 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. Therefore, the projections included in this report do not take the impacts of COVID-19 into account.*

**Exhibit 1: Occupational demand in Los Angeles and Orange Counties<sup>3</sup>**

<b>Geography</b>	<b>2019 Jobs</b>	<b>2024 Jobs</b>	<b>2019-2024 Change</b>	<b>2019-2024 % Change</b>	<b>Annual Openings</b>
Los Angeles	51,483	53,519	2,036	4%	4,976
Orange	16,514	17,288	774	5%	1,712
<b>Total</b>	<b>67,996</b>	<b>70,807</b>	<b>2,810</b>	<b>4%</b>	<b>6,688</b>

<sup>3</sup> Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

## **Wages**

The labor market endorsement in this report considers the entry-level hourly wages for these three middle-skill occupations that employ the use of drone technology in Orange County as they relate to the county's living wage. Los Angeles County wages are included below in order to provide a complete analysis of the LA/OC region. Detailed wage information, by county, is included in Appendix A.

**Orange County**—The majority (86%) of annual openings for these occupations have entry-level wages above the living wage for one adult (\$17.36 in Orange County).<sup>4</sup> Only one occupation, Photographers, has entry-level wages below the living wage. Typical entry-level hourly wages are in a range between \$12.57 and \$40.75. Experienced workers can expect to earn wages between \$37.32 and \$57.09, which are higher than the living wage estimate. Orange County's average wages are below the average statewide wage of \$43.12 for these occupations.

**Los Angeles County**—The majority (81%) of annual openings for these occupations have entry-level wages above the living wage for one adult (\$15.04 in Los Angeles County). Only one occupation, Photographers, have entry-level wages below the living wage. Typical entry-level hourly wages are in a range between \$13.20 and \$44.27. Experienced workers can expect to earn wages between \$35.95 and \$61.95, which are higher than the living wage estimate. Los Angeles County's average wages are above the average statewide wage of \$43.12 for these occupations.

## **Job Postings**

There were 579 online job postings that listed drones in the job description over the past 12 months. The top occupations that listed drones in their job postings were: Photographers; Software Developers, Applications; Commercial Pilots; Vocational Education Teachers, Postsecondary; and Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products. The top titles for these job postings were: C/C++ Software Engineers, Summer Technology Instructor, Architectural Photographer, Sales Consultant, Repair Technician, Photographer, Drone Operator, and UAV Air Vehicle Operator. The top skills were: customer service, photography, scheduling, software development, C++, software engineering, videography, and repair. The top three employers, by number of job postings, in the region were: General Atomics, Acara Solutions, and Northrop Grumman.

*It is important to note that the job postings data included in this section reflects online job postings listed in the past 12 months and does not yet demonstrate the impact of COVID-19. While employers have generally posted fewer online job postings since the beginning of the pandemic, the long-term effects are currently unknown.*

## **Educational Attainment**

The Bureau of Labor Statistics (BLS) lists a high school diploma or equivalent as the typical entry-level education for Survey and Mapping Technicians, Photographers, Police and Sheriffs Patrol Officers, and First-Line Supervisors of Construction Trades and Extraction Workers, and an associate degree as the typical entry-level education for Electro-Mechanical Technicians. Within

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<sup>4</sup> Living wage data was pulled from California Family Needs Calculator on 12/8/2020. For more information, visit the California Family Needs Calculator website: <https://insightcced.org/2018-family-needs-calculator/>.

the LA/OC region, the majority of annual job openings (98%) typically require a high school diploma.

The national-level educational attainment data indicates between 31.6% and 56.9% of workers in the field have completed some college or an associate degree. Furthermore, 31.6% of First-Line Supervisors of Construction Trades and Extraction workers and 47.8% of Police and Sheriff's Patrol Officers (a combined 78% of the annual openings) working in the field have completed some college or an associate degree. Of the 49% of job postings that mentioned drones or related keywords listing a minimum education requirement in Los Angeles/Orange County, 52% (146) requested a bachelor's degree, 37% (104) requested a high school diploma, and 7% (19) requested an associate degree.

**Educational Supply**

**Community College Supply**—Exhibit 3, shows the community colleges in the LA/OC region that offer programs related to drone technology. According to the Chancellor's Office Curriculum Inventory (COCI), there are four community colleges in the region that currently offer drone technology-related programs: Cypress, Fullerton, Mt. San Antonio, and Orange Coast.

**Exhibit 3: Regional community college awards (certificates and degrees), 2016-2019**

TOP Code/Title	Local Program Name	College	Award Type	COCI Approval Date
0935.00/Electro-Mechanical Technology	Autonomous Systems Development	Fullerton	Local Certificate	7/15/2019
1012.00/Applied Photography	UAV/UAS Drone Photography and Video	Cypress	Certificate	1/17/2017
	Drone Camera Operator	Mt. San Antonio	Associate degree	8/31/2018
3020.00/ Aviation and Airport Management and Services	Unmanned Aircraft Systems	Orange Coast	Certificate	6/21/2019
3020.20/Piloting	UAV/UAS	Cypress	Associate degree	1/29/2017
	UAV/UAS Advanced	Cypress	Certificate	1/17/2017
	UAV/UAS Basic	Cypress	Certificate	1/17/2017
	Unmanned Aircraft System	Mt. San Antonio	Associate degree	3/10/2020
	Unmanned Aircraft Systems	Mt. San Antonio	Certificate	4/20/2020

In addition to the programs listed in Exhibit 3, there were four other program recommendation requests related to drone technology from regional community colleges over the past 12 months. Exhibit 4, on the following page, shows the three-year average number of awards conferred by community colleges in drone-technology related programs. Because awards data is collected and

organized by TOP code and colleges can list multiple programs under the same TOP code, awards conferred under these TOP codes may not be specifically related to drone technology.

However, by comparing MIS Data Mart and COCI data, awards listed under the same TOP Code can be disaggregated based on the number of units the certificate requires. For example, Cypress College has eight programs listed under the Piloting TOP Code (3020.20). Only one of these programs, UAV/UAS Advanced, requires “18 or greater semester units”, so all awards conferred under this unit designation and TOP code are related to drones. Though this method is more accurate than listing the number of awards for all programs in a given TOP code, there are still limitations. For example, Cypress offers two AS Degree programs, UAV/UAS and Commercial Pilot under the 3020.20 TOP code. Since these programs have the same award type, it is not possible to disaggregate the number of awards conferred in each program with Data Mart data.

It is also important to consider that all of these programs were approved in 2017 or later. Some programs, such as Unmanned Aircraft Systems at Orange Coast, were approved in 2019. Based on the approval dates, no awards for these programs could have been awarded during the three years used to calculate supply. Since awards were not conferred for these programs, those colleges and programs are not included in Exhibit 4.

While a certificate in drone technology may add to a student’s skill set, this certificate alone most likely will not satisfy the entry-level educational requirement for these occupations. The five occupations in the report (*Electro-Mechanical and Mechatronics Technologists and Technicians* [17-3024], *Surveying and Mapping Technicians* [17-3031], *Photographers* [27-4021], *Police and Sheriff’s Patrol Officers* [33-3051], and *First-Line Supervisors of Construction Trades and Extraction Workers* [47-1011]) are trained for by 19 other TOP Codes. Since these TOP Codes are not included in the supply data for drone technology, the supply total is greatly understated.

**Exhibit 4: Regional community college awards (certificates and degrees), 2016-2019**

TOP Code	Program	College	2016-2017 Awards	2017-2018 Awards	2018-2019 Awards	3-Year Award Average
1012.00	Applied Photography	Cypress	-	-	2	0
		<b>OC Subtotal</b>	-	-	<b>2</b>	<b>0</b>
		<b>Subtotal/Average</b>	-	-	<b>2</b>	<b>0</b>
3020.20	Piloting	Cypress	-	-	8	3
		<b>OC Subtotal</b>	-	-	<b>8</b>	<b>3</b>
		<b>Subtotal/Average</b>	-	-	<b>8</b>	<b>3</b>
<b>Supply Total/Average</b>			-	-	<b>10</b>	<b>3</b>

**Non-Community College Supply**—It is important to consider the supply from four-year institutions in the region that provide training programs related to drone technology. However, because there is no single Classification of Instructional Programs (CIP) code related to drone technology, and because there is not a central database of programs for these institutions, it is not possible to quantify non-community college supply for drone-related programs. However, there are 38 CIP Codes that do train students specifically for the five occupations included in this report.

**Appendix A: Occupational demand and wage data by county**

**Exhibit 5. Orange County**

<b>Occupation (SOC)</b>	<b>2019 Jobs</b>	<b>2024 Jobs</b>	<b>5-Yr Change</b>	<b>5-Yr % Change</b>	<b>Annual Openings</b>	<b>Entry-Level Hourly Earnings (25th Percentile)</b>	<b>Median Hourly Earnings</b>	<b>Experienced Hourly Earnings (75th Percentile)</b>
Electro-Mechanical and Mechatronics Technologists and Technicians (17-3024)	386	380	(6)	(2%)	38	\$23.45	\$29.85	\$37.32
Surveying and Mapping Technicians (17-3031)	401	421	20	5%	53	\$28.48	\$38.82	\$47.43
Photographers (27-4021)	2,185	2,249	65	3%	241	\$12.57	\$23.38	\$41.17
Police and Sheriffs Patrol Officers (33-3051)	5,757	6,004	247	4%	458	\$40.75	\$50.47	\$57.09
First-Line Supervisors of Construction Trades and Extraction Workers (47-1011)	7,784	8,233	449	6%	923	\$29.70	\$38.45	\$49.01
<b>Total</b>	<b>6,381</b>	<b>6,637</b>	<b>256</b>	<b>4%</b>	<b>519</b>			

### Exhibit 6. Los Angeles County

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Electro-Mechanical and Mechatronics Technologists and Technicians (17-3024)	659	629	(30)	(5%)	63	\$22.55	\$28.73	\$35.95
Surveying and Mapping Technicians (17-3031)	824	869	45	5%	109	\$28.08	\$38.38	\$47.10
Photographers (27-4021)	8,427	8,673	245	3%	937	\$13.20	\$24.01	\$42.40
Police and Sheriffs Patrol Officers (33-3051)	26,048	27,069	1,021	4%	2,053	\$44.27	\$54.87	\$61.95
First-Line Supervisors of Construction Trades and Extraction Workers (47-1011)	15,525	16,280	755	5%	1,814	\$25.95	\$34.42	\$44.84
<b>Total</b>	<b>51,483</b>	<b>53,519</b>	<b>2,036</b>	<b>4%</b>	<b>4,976</b>			

### Exhibit 7. Los Angeles and Orange Counties

Occupation (SOC)	2019 Jobs	2024 Jobs	5-Yr Change	5-Yr % Change	Annual Openings
Electro-Mechanical and Mechatronics Technologists and Technicians (17-3024)	1,045	1,009	(36)	(3%)	101
Surveying and Mapping Technicians (17-3031)	1,225	1,290	64	5%	162
Photographers (27-4021)	10,612	10,922	310	3%	1,178
Police and Sheriffs Patrol Officers (33-3051)	31,805	33,073	1,268	4%	2,511
First-Line Supervisors of Construction Trades and Extraction Workers (47-1011)	23,309	24,513	1,204	5%	2,736
<b>Total</b>	<b>67,996</b>	<b>70,807</b>	<b>2,810</b>	<b>4%</b>	<b>6,688</b>

## Appendix B: Keywords used in Burning Glass search

- UAV operator
- UAV pilot
- unmanned aircraft system operator
- unmanned aerial vehicle operator
- drone operator
- unmanned aerial system operator
- unmanned aircraft vehicle operator
- autonomous pilot
- drone operations
- aerial cinematography
- UAV technician
- UAS mechanic
- UAS Operator
- UAS pilot
- unmanned aircraft system pilot
- unmanned aerial vehicle pilot
- drone pilot
- unmanned aerial system pilot
- unmanned aircraft vehicle pilot
- drone technician
- drone photography
- UAS technician
- UAV mechanic
- drone videographer

## Appendix C: Sources

- O\*NET Online
- Labor Insight/Jobs (Burning Glass)
- Economic Modeling Specialists, International (Emsi)
- Bureau of Labor Statistics (BLS)
- Employment Development Department, Labor Market Information Division, OES
- California Community Colleges Chancellor's Office Management Information Systems (MIS)
- California Family Needs Calculator, Insight Center for Community Economic Development
- Chancellor's Office Curriculum Inventory (COCI 2.0)

For more information, please contact:

Jesse Crete, Ed. D, Director  
Center of Excellence, Orange County  
[crete\\_jesse@rsccd.edu](mailto:crete_jesse@rsccd.edu)

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