C·O·E CENTERS OF EXCELLENCE FOR LABOR MARKET RESEARCH

Labor Market Assessment: 0957.30 - Surveying *Agricultural Drone Technology*

Los Angeles Center of Excellence, June 2022

Summary

Program Endorsement:	Endorsed: All Criteria Met ☒	Endorsed: Some Criteria Met ☐	Not Endorsed ☐

Program Endorsement Criteria		
Supply Gap:	Yes ☑	No ☐
Living Wage: (Entry-Level, 25th)	Yes ☑	No ☐
Education:	Yes ☑	No ☐
Emerging Occupation(s)		
Yes ☑		*No* ☐

The Los Angeles Center of Excellence for Labor Market Research (LA COE) prepared this report to provide regional labor market supply and demand data related to three middle-skill occupations:

- *Cartographers and photogrammetrists* (17-1021);
- *Electro-mechanical and mechatronics technologists and technicians* (17-3024); and
- *Surveying and mapping technicians* (17-3031)

and two emerging occupations: *geographic systems technicians* (15-1199.05), and *precision agriculture technicians* (19-4099.02). Middle-skill occupations typically require some postsecondary education, but less than a bachelor's degree.[1] 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. **It is important to note that knowledge and/or use of drone technology is not necessary for employment in these occupations of interest, but should be thought of as an additional skillset that will strengthen our students' employment prospects. Since the field of agricultural drone technology is emerging, it is unclear whether or not there is demand in the local job market for workers in these occupations who also have the ability to work with drones.**

Based on the available data, there appears to be a supply gap for these occupations in the region. Furthermore, entry-level wages exceed the self-sufficiency standard wage in both Los Angeles and Orange counties, and the majority of annual openings for the occupations in this

[1] 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.

report typically require an associate degree or high school diploma. **Therefore, due to all of the criteria being met, the LA COE endorses this proposed program.** Detailed reasons include:

Demand:

- ***Supply Gap Criteria –*** Over the next five years, there is projected to be **278 jobs available annually** in the region due to retirements and workers leaving the field, **which is more than the 103 awards conferred annually** by educational institutions in the region.
    - However, the SOC codes in this report do not necessarily require the use or knowledge of drone technology. Since these occupations do not necessarily require the use of drones for agricultural purposes, **the number of annual job openings is likely overstated.**
    - Over the past 12 months, there were **33 online job postings for the occupations of interest that also desired employees with knowledge of drone technology.** The highest number of job postings were for site survey technicians, flight test technicians, and calibration technicians.
- ***Living Wage Criteria –***Within Los Angeles County, all three occupations have entry-level wages **above** the self-sufficiency standard hourly wage ($18.10/hour).[2]
- ***Educational Criteria –***Within the greater LA/OC region, **83% of the annual job openings** for the occupations of interest **typically require an associate degree or high school diploma.**
    - While the national-level educational attainment data indicates between 23% and 56% of workers in the field have completed some college or an associate degree, the two occupations with the majority of the annual openings **(*electro-mechanical and mechatronics technologists and technicians*** and ***surveying and mapping technicians)*** have at least **51% of workers in in the field who have completed some college or an associate degree.**

Supply:

- There are **7 community colleges** in the greater LA/OC region that issue awards related to the occupations of interest, conferring an average of **92 awards annually** between 2017 and 2020.
- Between 2016 and 2019, there was an average of **11 awards conferred annually** in related training programs by non-community college institutions **throughout** the greater LA/OC region.

Occupational Demand

Exhibit 1 shows the five-year occupational demand projections for the occupations of interest. In the greater Los Angeles/Orange County region, the number of jobs related to these occupations is projected to decrease by 1% through 2025. However, there will be nearly 300 job openings per year through 2025 due to workers leaving the field and retirements. It is important to note

Self-Sufficiency Standard wage data was pulled from The Self-Sufficiency Standard Tool for California on 6/8/2022. For more information, visit: http://selfsufficiencystandard.org/california.

that while these occupations may be related to agriculture and/or drone technology, knowledge, skill, and/ability to operate a drone is not necessarily a requirement for these occupations. Therefore, the data in Exhibit 1 is likely overstated for drone technicians in the agricultural field.

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 full impact of COVID-19 on projections of industry and occupational employment. Therefore, the projections included in this report do not take the full impacts of COVID-19 into account.

Exhibit 1: Occupational demand in Los Angeles and Orange Counties[3]

Geography	2020 Jobs	2025 Jobs	2020-2025 Change	2020-2025 % Change	Annual Openings
Los Angeles	1,700	(31)	(2%)	918	184
Orange	865	866	0	0%	95
Total	**2,596**	**2,566**	**(31)**	**(1%)**	**278**

Wages

The labor market endorsement in this report considers the entry-level hourly wages for occupations of interest in Los Angeles County as they relate to the county's self-sufficiency standard wage. Orange County wages are included below in order to provide a complete analysis of the greater LA/OC region. Detailed wage information, by county, is included in Appendix A.

Los Angeles County—All three occupations in this report have entry-level wages **above** the self-sufficiency standard wage for one adult ($18.10 in Los Angeles County). Typical entry-level hourly wages are in a range between $23.49 and $38.63. Experienced workers can expect to earn wages between $38.04 and $52.76, which are higher than the self-sufficiency standard.

Orange County—All three occupations have entry-level wages **above** the self-sufficiency standard wage for one adult ($20.63 in Orange County). Typical entry-level hourly wages are in a range between $24.40 and $35.84. Experienced workers can expect to earn wages between $39.39 and $49.47, which are higher than the self-sufficiency standard.

Job Postings

There were 1,337 online job postings related to the occupations of interest listed in the past 12 months. Exhibit 2 displays the number of job postings by occupation. The majority of job postings (67%) were for *electro-mechanical technicians* (67%), followed by *mapping technicians* (10%) and *robotics technicians* (10%). The highest number of job postings were for calibration technicians, electro-mechanical assemblers, electronic technicians, instrument technicians, and site survey

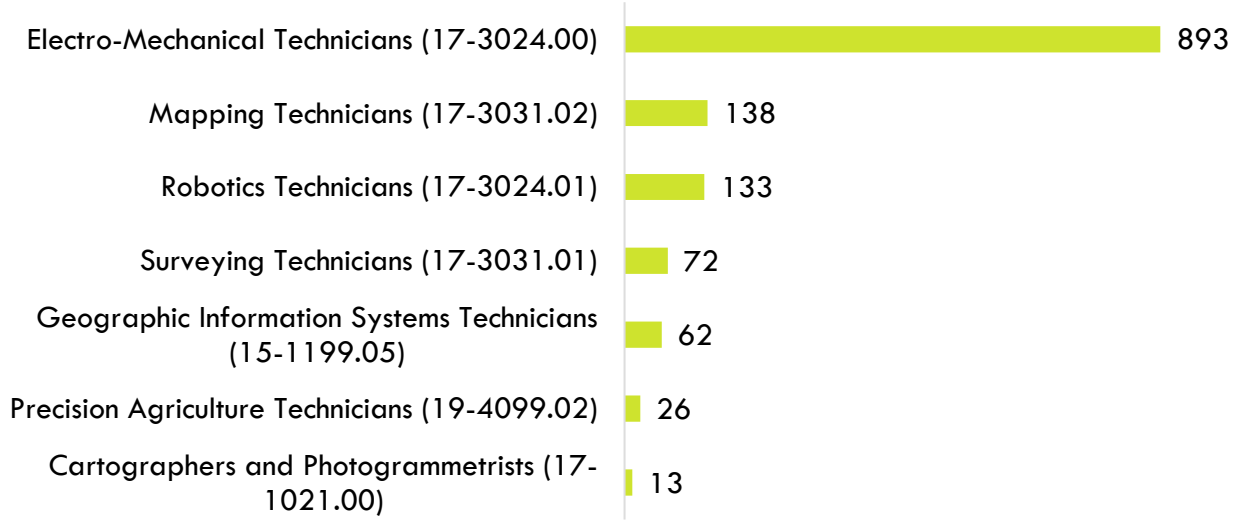
[3] Five-year change represents new job additions to the workforce. Annual openings include new jobs and replacement jobs that result from retirements and separations.

technicians. The top skills were repair, calibration, soldering, wiring, and schematic diagrams. The top employers, by number of job postings, in the region were: Northrop Grumman and L3Harris.

Of these 1,337 job postings, **33 job postings mentioned the use of drones and/or unmanned aerial vehicles (UAVs).** The top titles among these job postings were for site survey technicians, flight test technicians, and calibration technicians. The top skills were customer contact/service, electrical systems, site surveys, and project planning and development skills. The top employers, by number of job postings, in the region were Sunrun, Vivint Solar, 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 full 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.

Exhibit 2: Job postings by occupation (last 12 months)



Educational Attainment

The Bureau of Labor Statistics (BLS) lists the following typical entry-level education levels for the occupations in this report:

- **Bachelor's degree:** *Cartographers and photogrammetrists*
- **Associate degree:** *Electro-mechanical and mechatronics technologists and technicians*
- **High school diploma or equivalent:** *Surveying and mapping technicians*

In the greater LA/OC region, the majority of annual job openings (83%) typically require either an associate degree or high school diploma. While the national-level educational attainment data indicates between 23% and 56% of workers in the field have completed some college or an associate degree, the two occupations with the majority of the annual openings (*electro-mechanical and mechatronics technologists and technicians* and *surveying and mapping technicians)* have at least 51% of workers in in the field who have completed some college or an associate degree. Of the 62% of related job postings listing a minimum education requirement in the greater Los Angeles/Orange County region, 64% (528) requested high school or vocational

training, 17% (137) requested an associate degree, and 19% (161) requested a bachelor's degree.

Educational Supply

Community College Supply—Exhibit 3 shows the three-year average number of awards conferred by community colleges in programs that have historically trained for the occupations of interest. The colleges with the most completions in the region are: Santiago Canyon, Rio Hondo, and Cypress.

Exhibit 3: Regional community college awards (certificates and degrees), 2017-2020

TOP Code	Program	College	2017-18 Awards	2018-19 Awards	2019-20 Awards	3-Year Average
0935.00	Electro-Mechanical Technology	Orange Coast	3	2	-	2
		Santa Ana	-	1	8	3
		OC Subtotal	**3**	**3**	**8**	**5**
Supply Subtotal/Average			**3**	**3**	**8**	**5**
0957.30	Surveying	East LA	4	-	-	1
		LA Subtotal	**4**	**-**	**-**	**1**
		Santiago Canyon	46	64	44	51
		OC Subtotal	**46**	**64**	**44**	**51**
Supply Subtotal/Average			**50**	**64**	**44**	**53**
2206.10	Geographic Information Systems	LA Pierce	-	7	2	3
		Rio Hondo	36	19	15	23
		LA Subtotal	**36**	**26**	**17**	**26**
		Cypress	12	8	4	8
		OC Subtotal	**12**	**8**	**4**	**8**
Supply Subtotal/Average			**48**	**34**	**21**	**34**
Supply Total/Average			**101**	**101**	**73**	**92**

Non-Community College Supply—For a comprehensive regional supply analysis, it is also important to consider the supply from other institutions in the region that provide training programs for the occupations of interest. Exhibit 4 shows the annual and three-year average number of awards conferred by these institutions in programs crosswalked to the community college programs listed in Exhibit 3. Due to different data collection periods, the most recent three-year period of available data is from 2016 to 2019. Between 2016 and 2019, four-year colleges in the region conferred an average of 11 awards annually in related training programs.

Exhibit 4: Regional non-community college awards, 2016-2019

CIP Code	Program	Institution	2016-17 Awards	2017-18 Awards	2018-19 Awards	3-Year Average
45.0702	Geographic Information Science and Cartography	Mount Saint Mary's University	-	6	1	2
		University of Southern California	-	16	11	9
		Supply Total/Average	**-**	**22**	**12**	**11**

Community College Drone Programs

There are currently seven community colleges in the LA/OC region offering drone programs, coded across nine different TOPs.

Exhibit 5: Drone programs in the LA/OC region

College	Program Title	TOP Code	Award
Citrus	Drone Technology	3099.00 Other Commercial Services	Noncredit program
Cypress	UAV/UAS Drone Photography and Video	1012.00 Applied Photography	C of A 8 - 16 units
	UAS Drone Basic	3020.20 Piloting	C of A 16 - 30 units
	UAS Drone Advanced	3020.20 Piloting	C of A 30 - 60 units
	UAS Drone	3020.20 Piloting	A.S. Degree
Fullerton	Drone Journalism	0602.00 Journalism	C of A 16 - 30 units
Glendale	Drone Photography	1012.00 Applied Photography	C of A 8 - 16 units
Mt. San Antonio	Drone Camera Operator	1012.00 Applied Photography	A.S. Degree
	Unmanned Aircraft System	3020.20 Piloting	A.S. Degree
	Unmanned Aircraft Systems	3020.20 Piloting	C of A 8 - 16 units
Orange Coast	Drone Videography	0612.20 Film Production	C of A 8 - 16 units
	Basic Drone Imaging Skills	0614.00 Digital Media	C of A 16 - 30 units
	Drone Photography	1012.00 Applied Photography	C of A 8 - 16 units
	Unmanned Aircraft Systems	3020.00 Aviation and Airport Management and Services	C of A 8 - 16 units
Santa Ana	Drone Cinematography	0604.20 Television (including combined TV/Film/Video)	C of A 16 - 30 units
	Drone Technology	0799.00 Other Information Technology	C of A 8 - 16 units

Appendix A: Occupational demand and wage data by county

Exhibit 6. Los Angeles County

Occupation (SOC)	2020 Jobs	2025 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Cartographers and Photogrammetrists (17-1021)	381	392	12	3%	35	$38.63	$46.04	$52.76
Electro-Mechanical and Mechatronics Technologists and Technicians (17-3024)	507	464	(43)	(8%)	45	$23.49	$30.16	$38.04
Surveying and Mapping Technicians (17-3031)	844	843	(0)	(0%)	104	$29.75	$40.86	$48.84
Total	**1,731**	**1,700**	**(31)**	**(2%)**	**184**	**-**	**-**	**-**

Exhibit 7. Orange County

Occupation (SOC)	2020 Jobs	2025 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Entry-Level Hourly Earnings (25th Percentile)	Median Hourly Earnings	Experienced Hourly Earnings (75th Percentile)
Cartographers and Photogrammetrists (17-1021)	147	149	2	1%	13	$35.84	$42.76	$49.04
Electro-Mechanical and Mechatronics Technologists and Technicians (17-3024)	293	280	(13)	(4%)	27	$24.40	$31.27	$39.39
Surveying and Mapping Technicians (17-3031)	425	437	11	3%	55	$30.43	$41.56	$49.47
Total	**865**	**866**	**0**	**0%**	**95**	**-**	**-**	**-**

Exhibit 8. Los Angeles and Orange Counties

Occupation (SOC)	2020 Jobs	2025 Jobs	5-Yr Change	5-Yr % Change	Annual Openings	Typical Entry-Level Education
Cartographers and Photogrammetrists (17-1021)	528	541	13	2%	48	Bachelor's degree
Electro-Mechanical and Mechatronics Technologists and Technicians (17-3024)	800	744	(55)	(7%)	72	Associate degree
Surveying and Mapping Technicians (17-3031)	1,269	1,280	11	1%	159	High school diploma or equivalent
Total	**2,596**	**2,566**	**(31)**	**(1%)**	**278**	**-**

Appendix B: Sources

- O*NET Online
- Labor Insight/Jobs (Burning Glass)
- Economic Modeling Specialists, International (Emsi)
- Bureau of Labor Statistics (BLS)
- California Employment Development Department, Labor Market Information Division, OES
- California Community Colleges Chancellor's Office Management Information Systems (MIS)
- Self-Sufficiency Standard at the Center for Women's Welfare, University of Washington
- Chancellor's Office Curriculum Inventory (COCI 2.0)

For more information, please contact:

Luke Meyer, Director
Los Angeles Center of Excellence
lmeyer7@mtsac.edu

C·O·E
CENTERS OF EXCELLENCE
FOR LABOR MARKET RESEARCH