



Geographic Information Systems

Program Report For Greater South Bay and Peninsula Region (Santa Clara and San Mateo Counties)

November 2016

12345 El Monte Road
Los Altos Hills, California 94022
650.949.7777

Geographic Information Science and Cartography

CIP 2010: A program that focuses on the systematic study of map-making and the application of mathematical, computer, and other techniques to the analysis of large amounts of geographic data and the science of mapping geographic information. Includes instruction in cartographic theory and map projections, computer-assisted cartography, geographic information systems, map design and layout, photogrammetry, air photo interpretation, remote sensing, spatial analysis, geodesy, cartographic editing, and applications to specific industrial, commercial, research, and governmental mapping problems.

Target Occupations‡

Cartographers and Photogrammetrists (17-1021)

Surveying and Mapping Technicians (17-3031)

‡Based on EMSI crosswalk of the Classification of Instructional Programs (CIP) codes with Standard Occupational Classification (SOC) codes as published by the U.S. Department of Education.

In 2016, the number of Geographic Information Science and Cartography jobs in the target occupations in Santa Clara and San Mateo Counties totaled 476. The Bureau of Labor Statistics (BLS) expects the total number of positions to increase by almost 6% over the next three years.

Occupation Summary for Geographic Information Systems

476 Jobs (2016)¹ 33% below National average ²	5.7% % Change (2016-2019)³ Nation: 0.9%	\$31.25/hr Median Hourly Earnings Nation: \$22.62/hr
-----------------------------------------------------------------------------------------	------------------------------------------------------------------------	--------------------------------------------------------------------------

¹Based on total number of jobs for target occupations in Santa Clara and San Mateo Counties.

²Represents occupation density as compared to national average (national average=1).

³Based on turnover and new jobs.

Target occupations that are mapped to the Geographic Information Systems program are disaggregated to see which occupations are projected to see the highest number of annual openings (Cartographers and Photogrammetrists), highest percentage rate of growth over the next three years (Cartographers and Photogrammetrists), and the highest median hourly earnings (Cartographers and Photogrammetrists). While Cartographers and Photogrammetrists are expected to experience job growth (10%), these occupations are more represented and concentrated in our region (Santa Clara and San Mateo Counties) compared to the national average.

Occupation	2016 Jobs	Annual Openings	Median Hourly Earnings	Growth (2016 - 2019)	Location Quotient (2016)
Surveying and Mapping Technicians	328	8	\$28.56/hr	3.66%	0.56
Cartographers and Photogrammetrists	148	10	\$37.14/hr	10.14%	1.13

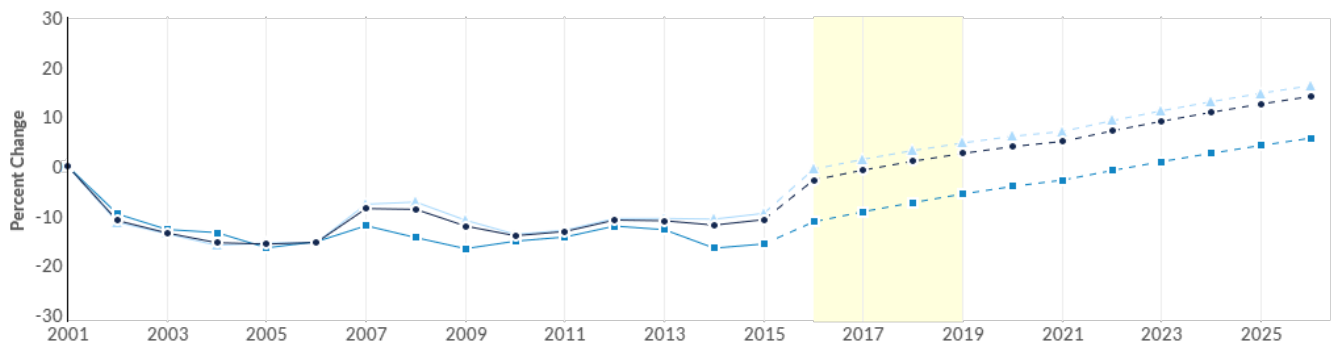
Growth in the Geographic Information Systems occupations show how each occupation is projected to increase in jobs over the next three years. A growth of about 6% is expected in the next three years for Geographic Information Systems.

Growth for Geographic Information Science and Cartography

476 2016 Jobs	503 2019 Jobs	27 Change (2016-2019)	5.7% % Change (2016-2019)
-------------------------	-------------------------	---------------------------------	-------------------------------------

Occupation	2016 Jobs	2019 Jobs	Change	% Change
Cartographers and Photogrammetrists (17-1021)	148	163	15	10%
Surveying and Mapping Technicians (17-3031)	328	340	12	4%

Regional Trends

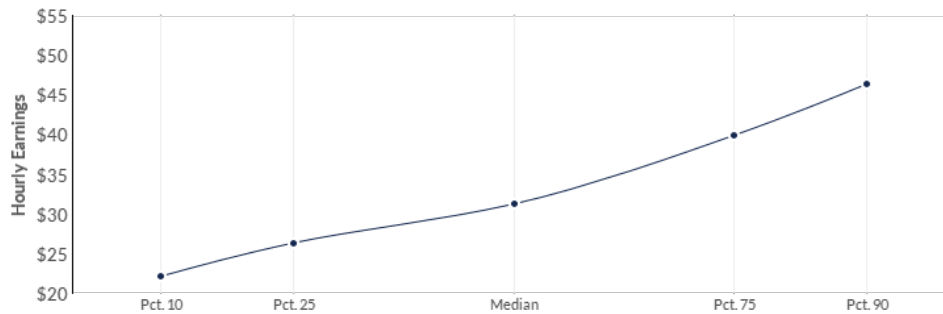


Region	2016 Jobs	2019 Jobs	Change	% Change
● Region	476	503	27	5.7%
● San Mateo County, CA	89	95	6	6.7%
● Santa Clara County, CA	387	408	21	5.4%

The percentile earnings table shows the range the Geographic Information Systems occupations earn in the region. While the median earnings are around \$31/hour, wages can range from below \$26/hour to above \$39/hour. Each of the target occupations' range in wages is also displayed.

Percentile Earnings for Geographic Information Systems

\$26.34/hr 25th Percentile Earnings	\$31.25/hr Median Earnings	\$39.92/hr 75th Percentile Earnings
-----------------------------------------------	--------------------------------------	-----------------------------------------------





Occupation	25th Percentile Earnings	Median Earnings	75th Percentile Earnings
Cartographers and Photogrammetrists (17-1021)	\$30.59	\$37.14	\$46.54
Surveying and Mapping Technicians (17-3031)	\$24.40	\$28.56	\$36.89



Target Occupations Demographics

The demographics among those employed in Geographic Information Systems occupations in Santa Clara and San Mateo Counties for 2016 show that are a majority of male (85%) and about a quarter are between the ages of 45-54 (24%) and a majority are White (74%).








Occupation Gender Breakdown

Gender	2016 Jobs	2016 Percent	
Males	406	85.2%	
Females	71	14.8%	

Occupation Age Breakdown

Age	2016 Jobs	2016 Percent	
14-18	3	0.6%	
19-24	25	5.2%	
25-34	108	22.6%	
35-44	107	22.5%	
45-54	113	23.7%	
55-64	90	19.0%	
65+	31	6.4%	

Occupation Race/Ethnicity Breakdown

Race/Ethnicity	2016 Jobs	2016 Percent	
White	351	73.7%	
Hispanic or Latino	60	12.6%	
Asian	42	8.7%	
Black or African American	10	2.2%	
Two or More Races	10	2.1%	
American Indian or Alaska Native	2	0.4%	
Native Hawaiian or Other Pacific Islander	1	0.2%	

Industries Employing Geographic Information System Occupations

A number of industries in Santa Clara and San Mateo Counties employ those trained in Geographic Information Science and Cartography and its related occupations. The following table represents a regional industry breakdown of the number of Geographic Information Science and Cartography positions employed, the percentage of Geographic Information Science and Cartography employed by industry and the Geographic Information Science and Cartography jobs represent within all jobs by each industry. While Engineering Services employed 31% of all regional Geographic Information System positions in 2016, Geographic Information Science and Cartography occupations composed a minority of jobs in that industry (1%).

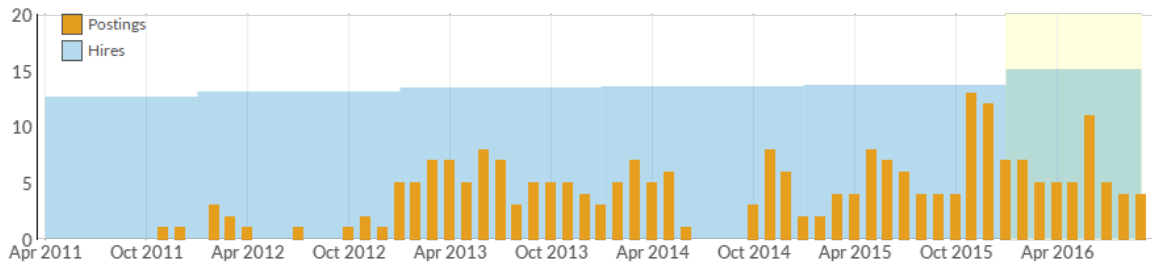
Industries Employing Geographic Information System Occupations

Industry	Occupation Group Jobs in Industry (2016)	% of Occupation Group in Industry (2016)	% of Total Jobs in Industry (2016)
Engineering Services	145	30.5%	1.0%
Architectural Services	77	16.1%	3.8%
Local Government, Excluding Education and Hospitals	70	14.7%	0.2%
Surveying and Mapping (except Geophysical) Services	29	6.1%	4.2%
Landscape Architectural Services	19	4.0%	3.8%

In an average month, there were 6 unique (internet) job postings for Geographic Information System jobs, and 15 actually hired from January 2016 to September 2016. This means there was approximately 2 hires for every 1 unique (internet) job posting for occupations in Geographic Information Systems. In cases where there were hires but no job postings, it suggests that the internet may not be the primary way that job openings for these occupations are advertised.

Job Postings vs. Hires

6	15
Avg. Monthly Postings (Jan 2016 - Sep 2016)	Avg. Monthly Hires (Jan 2016 - Sep 2016)



Occupation	Avg Monthly Postings (Jan 2016 - Sep 2016)	Avg Monthly Hires (Jan 2016 - Sep 2016)
Surveying and Mapping Technicians	4	10
Cartographers and Photogrammetrists	2	5

The top five relevant hard and soft skills employers list in Geographic Information System job posting descriptions are listed below. The “Postings with Skill” column is the total amount of (internet) job postings that mention the skills listed below. These numbers may be higher than the average monthly postings from above, because this number includes duplicated (internet) job postings. The “Relevance Score” gauge relevance of the skill by indicating the frequency in which this skill is being mentioned in (internet) job postings for Geographic Information System compared to all other (internet) job postings.

Most Relevant Hard Skills

Skill	Relevance Score	Postings with Skill
MeshLab	127,332.18	3
Map Projection	10,939.14	5
Cadastre	8,127.55	3
Quantum GIS (QGIS)	6,230.28	4
Optical Fiber Cable	4,653.90	5

Most Relevant Soft Skills

Skill	Relevance Score	Postings with Skill
Scheduling (Project Management)	0.21	5

Appendix A - Data Sources and Calculations

Location Quotient

Location quotient (LQ) is a way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation. It can reveal what makes a particular region unique in comparison to the national average.

Occupation Data

Emsi occupation 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.

CareerBuilder/Emsi Job Postings

Job postings are collected from various sources and processed/enriched by Careerbuilder to provide information such as standardized company name, occupation, skills, and geography. Emsi performs additional filtering and processing to improve compatibility with Emsi data.

State Data Sources

This report uses state data from the following agencies: California Labor Market Information Department