Market Demand Study

Unmanned Aircraft Integration in U.S. Market

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Executive Summary

Unmanned aircraft system (UAS) integration into the U.S. economy will have a tremendous impact on economic development and job creation. Job growth will stretch into many sectors related to the production and operation of UAS, computer networking and security to support UAS, and field specialists and technicians across a myriad of industries that utilize UAS. Colleges across the nation offering programs specializing in UAS report placements as pilots, mechanics, technicians, agricultural surveyors and analysts, industrial inspectors, firefighters, border patrol agents, law enforcement officers, emergency responders, aerial photographers, and environmental researchers. Given the wide range of applications associated with UAS technology, there is not a single occupational category that measures the market demand for those entering this field. To understand the potential for employment related to UAS integration, this study focuses on three dimensions of the issue: industry adoption of UAS, FAA registrations of UAS, and metrics of specific occupations that support the operation and utilization of UAS.

Globally, the largest sector of UAS integration is related to industrial inspections, followed by real estate, agriculture, insurance, and government. The growth in the registration of small commercial UAS aircraft is projected to remain high over the next few years, with an estimated 828,000 UAS aircraft by 2024. The growth in larger commercial UAS (over 55 pounds) is expected to double between 2019 and 2024, reaching an estimated 407 registrations. Estimated flights in the national airspace system (NAS) are also projected to double over this period, reaching 16,280 in 2024, with additional agricultural applications flying below the controlled airspace.

In focusing on specific occupations as categorized by the Bureau of Labor Statistics (BLS), care was taken to select a range of profiles covering computer systems and network security, applications related to geospatial scientists and technicians, forestry and agricultural applications, and aircraft and airfield technicians and specialists. For each occupational category, 21 in all, a profile is provided relating to educational requirements, earning potential, and employment prospects. The data is displayed at the national level but is also available at the state level through O*Net Online.

Many of the positions requiring an Associate of Art's Degree or a Bachelor's Degree, particularly related to computer systems and network analysts, have strong employment numbers and command high salaries. Based on data collected from job incumbents through O*Net OnLine, most median salaries in the computer field are above $80,000. Current employment numbers are strong across the computer occupations and geospatial and geographic information occupations, with solid annual growth projected between 5% and 11%.

I. Introduction

Unmanned Aircraft System (UAS) integration into the U.S. economy will have a tremendous impact on economic development and job creation, impacting many sectors of the economy. UAS integration is most significant in industrial inspections, real estate, agriculture, insurance, and government. Given the wide range of applications related to UAS integration, there is not a single category of employment that represents the market demand for those entering this field. To understand the potential for employment related to UAS integration, this study focuses on three dimensions of the issue: industry adoption of UAS, FAA registrations of UAS, and metrics of specific occupations that support the operation and utilization of UAS. Based on the Bureau of Labor Statistics (BLS) standard occupational categories, care was taken to select a range of profiles that support both the technology and utilization of UAS across various industries.

Section II of the report looks at the current UAS markets globally by usage, and the projected growth in FAA registrations of recreational and commercial UAS in the United States. Section III considers the impact of UAS on employment opportunities by focusing on a range of specific occupational categories most impacted by UAS integration. Data collected from job incumbents and occupational experts through O*Net OnLine includes job descriptions, sample job titles, educational attainment, median wage and salary, and employment projections. The report highlights national trends, with state level data available on O*Net OnLine. The raw data is also provided in the appendix for closer analysis.

II. UAS Usage and Registrations

The UAS industry is regarded as the most dynamic growth sector of the global aerospace industry. Globally, the top UAS markets by industry include industrial inspections, real estate/aerial photography, agriculture, insurance, and government. UAS are used to inspect roads and bridges, inspect oil pipelines, survey crops, patrol borders, assess damage in insurance claims, monitor traffic patterns, enforce environmental law, shoot footage for movies, provide disaster relief, to name but a few of the current applications. UAS continues to expand into freight, medical supplies delivery, and food delivery. In addition to the commercial users, recreational usage has expanded, accounting for a majority of UAS owners.

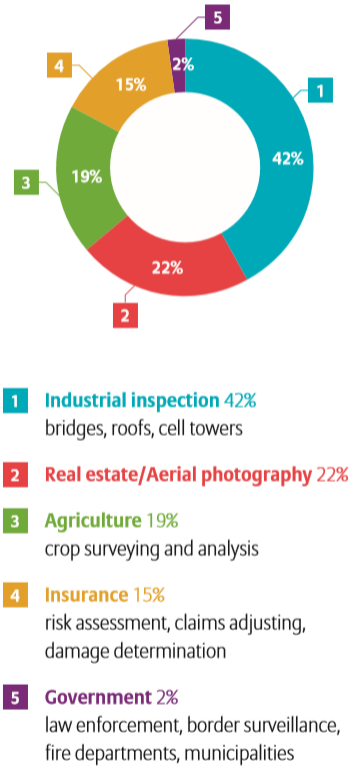

Figure 1: UAS Usage by Industry, Source Allianz Global Corporation and Specialty (2016)

Recreational/Model Small UAS FAA Registrations

Small UAS (sUAS) are defined as between .55 and 55 pounds. As of Dec. 21, 2015, they require registration with the FAA (with a temporary halt between May 2017 and Dec. 2017 due to an order from the U.S. Court of Appeals in Washington D.C.).

As of Dec. 2019, there were almost 990,000 recreational sUAS registered with the FAA, averaging about 9,000 registrations per month during 2019.

Figure 2: Recreational sUAS Registration, Source FAA (2019)

The distribution of sUAS recreational registrations are spread across the country, with a denser ownership corresponding to the population density of the U.S. Based on the 990,000 registered recreational operators, the FAA estimates there are approximately 1.32 million recreational aircraft operators in practice.

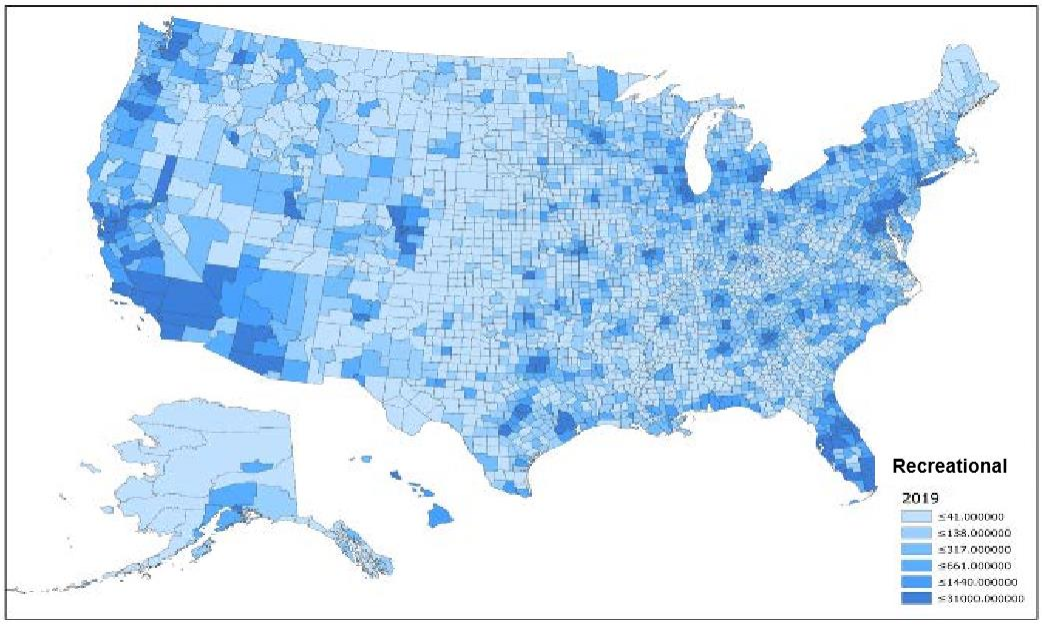

Figure 3:Recreational sUAS Registration Distribution, Source FAA (2019)

Commercial/Non-Model sUAS FAA Registrations

As of Dec. 2019, over 385,000 sUAS were registered by commercial users, averaging around 10,100 registrations per month in 2019. The FAA anticipates the growth in this sector will remain high over the next few years, projecting around 828,000 aircraft in 2024.

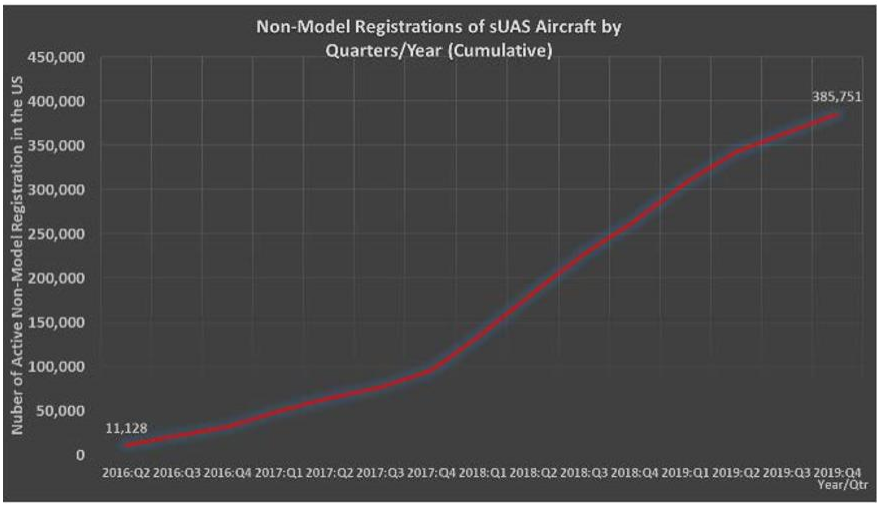

Figure 4: Commercial sUAS Registration, Source FAA (2019)

The spatial distribution of commercial sUAS registrations corresponds to the distribution of economic activity across the nation as seen below in figure 5.

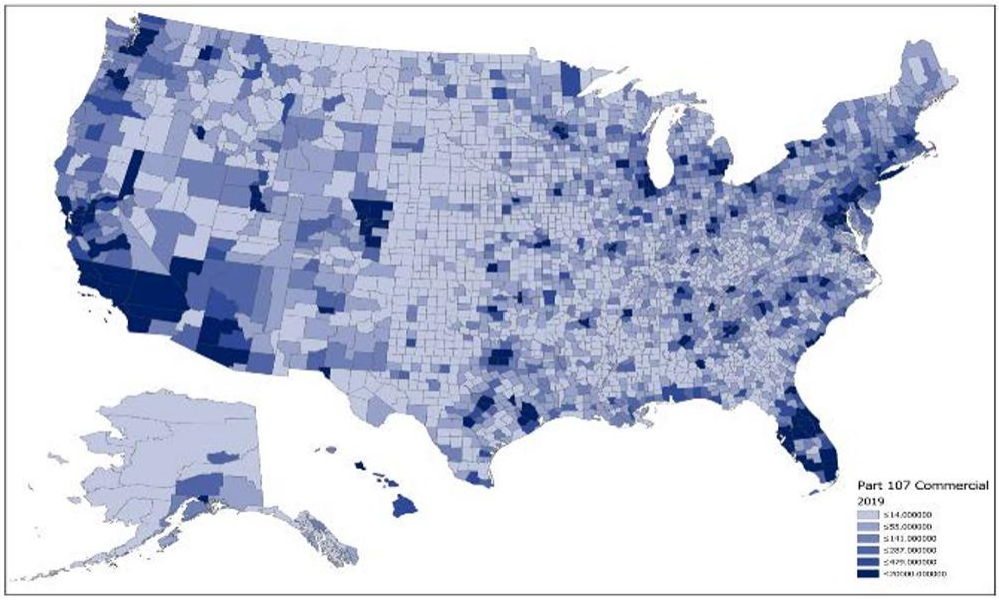

Figure 5: Commercial sUAS Registration Distribution, Source FAA (2019)

Larger UAS FAA Registrations

Larger UAS (lUAS) are defined as unmanned aircraft over 55 pounds. Many of these aircraft are utilized by federal agencies: Dept. of Defense, Homeland Security, Dept. of Interior, Dept. of Energy, Dept. of Agriculture, NASA, state and local government, and academia. lUAS are expected to increase to 407 by 2024 with the expansion of military and civilian aircraft.

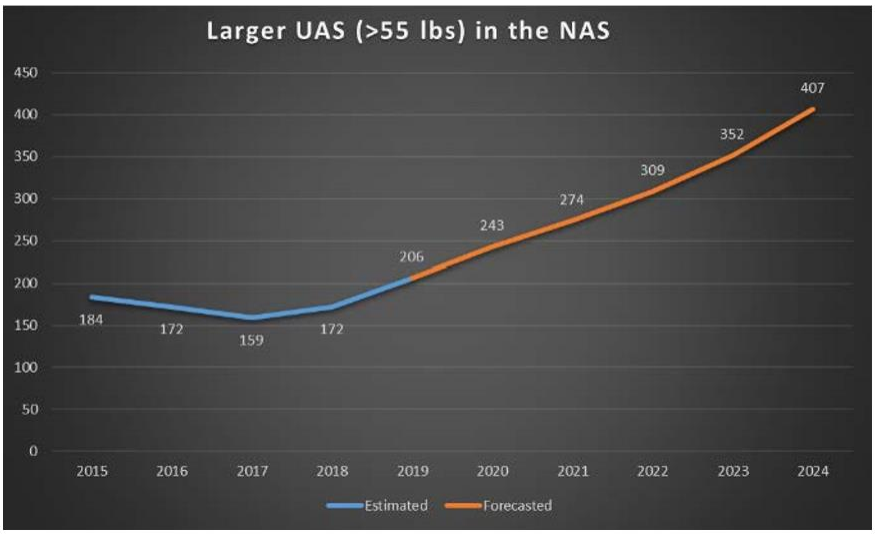

Figure 6: Commercial lUAS Registration, Source FAA (2019)

The number of lUAS flights is expected to increase to 16,280 in 2024, with an additional number of flights for agricultural applications operating below controlled airspace.

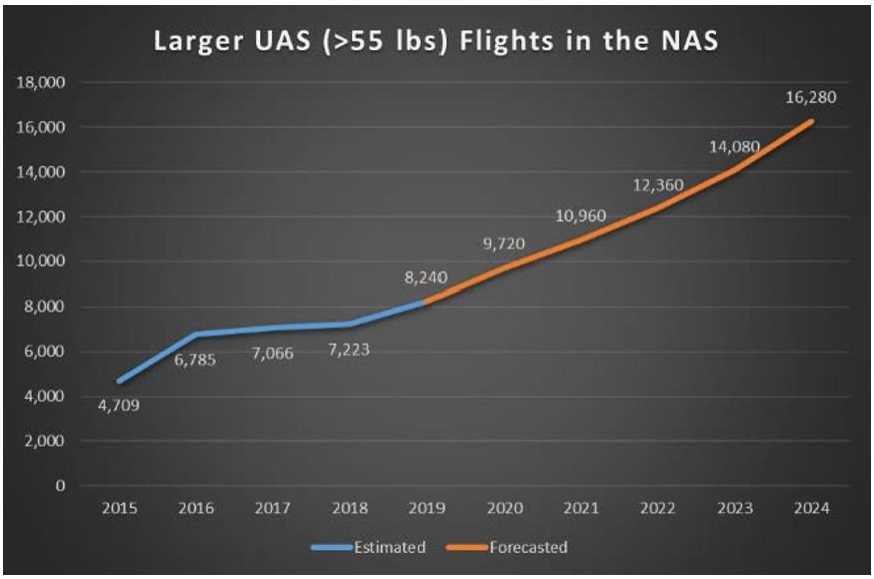

Figure 7: Commercial lUAS Flights in NAS, Source FAA (2019)

III. Market Demand Analysis

UAS integration into the U.S. economy will have a tremendous impact on economic development and job creation. Job growth will stretch into many sectors related to the production, operation, computer networking and security, and field specialists and technicians across a myriad of industries and applications. An economic impact study conducted by AUVSI (2013) estimates that UAS integration will contribute $82.1 billion to the nation's economy related to agriculture, public safety, and other activities in the period 2015-2025, creating 103,776 new jobs.

The following section highlights various job profiles impacted by UAS integration. These profiles are based on the standard occupational codes developed by the Bureau of Labor Statistics, using the O*NET-SOC taxonomy with data collected from job incumbents or occupation experts. O*NET OnLine, sponsored by the U.S. Department of Labor, Employment & Training Administration, and developed by the National Center for O*NET Development, includes job descriptions, sample job titles, educational attainment, median wage and salary, and employment projections.

Specific occupational profiles were selected from the larger categories of:
11-0000 Management
15-0000 Computer and Mathematics
17-0000 Architecture and Engineering
19-0000 Life, Physical, and Social Science
33-0000 Protective Service
45-0000 Farming, Fishing, and Forestry
49-0000 Installation, Maintenance, and Repair
53-0000 Transportation and Material Moving.

Table 1 presents the occupation descriptions and sample job titles of the 21 occupational profiles deemed most impacted by UAS integration. Figures 8-12 illustrate the educational attainment, median salary, and employment prospects of the survey respondents in each occupation. Tables 3-5 in the appendix provide the raw data for closer analysis.

Employment Profiles

*Table 1: Occupation Profiles, Source On*Net OnLine*

SOC Code*	Occupation Profile
11-3021.00	**Computer and Information Systems Managers**
	Description: *Plan, direct, or coordinate activities in such fields as electronic data processing, information systems, systems analysis, and computer programming.*
	Job Titles: *Chief Technology Officer, Information Technology Systems Director, Management Information Systems Director*

SOC Code*	Occupation Profile
15-1121.00	**Computer Systems Analysts**
	Description: *Analyze science, engineering, business, and other data processing problems to develop and implement solutions to complex applications problems, system administration issues, or network concerns. Perform systems management and integration functions, improve existing computer systems, and review computer system capabilities, workflow, and schedule limitations. May analyze or recommend commercially available software.*
	Job Titles: *Applications Analyst, Data Processing Systems Analyst , Information Systems Analyst , Systems Architect*
15-1122.00	**Information Security Analysts**
	Description: *Plan, implement, upgrade, or monitor security measures for the protection of computer networks and information. Assess system vulnerabilities for security risks and propose and implement risk mitigation strategies. May ensure appropriate security controls are in place that will safeguard digital files and vital electronic infrastructure. May respond to computer security breaches and viruses.*
	Job Titles: *Computer Security Specialist, IT Risk Specialist, Network Security Analyst*
15-1142.00	**Network and Computer Systems Administrators**
	Description: *Install, configure, and maintain an organization's local area network (LAN), wide area network (WAN), data communications network, operating systems, and physical and virtual servers. Perform system monitoring and verify the integrity and availability of hardware, network, and server resources and systems. Review system and application logs and verify completion of scheduled jobs, including system backups. Analyze network and server resource consumption and control user access. Install and upgrade software and maintain software licenses. May assist in network modeling, analysis, planning, and coordination between network and data communications hardware and software.*
	Job Titles: *Network Analyst, Network Coordinator, Wide Area Network Administrator*
15-1143.00	**Computer Network Architects**
	Description: *Design and implement computer and information networks, such as local area networks (LAN), wide area networks (WAN), intranets, extranets, and other data communications networks. Perform network modeling, analysis, and planning, including analysis of capacity needs for network infrastructures. May also design network and computer security measures. May research and recommend network and data communications hardware and software.*
	Job Titles: *Computer Network Engineer, Network Designer, Network Developer*
15-1152.00	**Computer Network Support Specialists**
	Description: *Analyze, test, troubleshoot, and evaluate existing network systems, such as local area networks (LAN), wide area networks (WAN), cloud networks, servers, and other data communications networks. Perform network maintenance to ensure networks operate correctly with minimal interruption.*
	Job Titles: *Network Diagnostic Support Specialist, Network Support Technician, Network Technician*

SOC Code*	Occupation Profile
15-1199.02	**Computer Systems Engineers/Architects**
	Description: *Design and develop solutions to complex applications problems, system administration issues, or network concerns. Perform systems management and integration functions.*
	Job Titles: *Architect, Electronic Data Interchange System Developer (EDI System Developer), Information Technology Architect (IT Architect), Network and Infrastructure Engineer, Network Engineer, Research Systems Architect, Solution Architect, System Architect, Systems Consultant, Systems Engineer*
15-1199.04	**Geospatial Information Scientists and Technologists**
	Description: *Research or develop geospatial technologies. May produce databases, perform applications programming, or coordinate projects. May specialize in areas such as agriculture, mining, health care, retail trade, urban planning, or military intelligence.*
	Job Titles: *Geographic Information System Analyst (GIS Analyst), GIS Administrator, GIS Coordinator, GIS Director, GIS Manager, GIS Specialist, Geospatial Intelligence Subject Matter Expert, Geospatial Program Management Officer, Resource Analyst*
15-1199.05	**Geographic Information Systems Technicians**
	Description: *Assist scientists, technologists, or related professionals in building, maintaining, modifying, or using geographic information systems (GIS) databases. May also perform some custom application development or provide user support.*
	Job Titles: *Geographic Information Systems Analyst (GIS Analyst), GIS Coordinator, GIS Specialist, GIS Technician, Technical Support Specialist*
17-1021.00	**Cartographers and Photogrammetrists**
	Description: *Collect, analyze, and interpret geographic information provided by geodetic surveys, aerial photographs, and satellite data. Research, study, and prepare maps and other spatial data in digital or graphic form for legal, social, political, educational, and design purposes. May work with Geographic Information Systems (GIS). May design and evaluate algorithms, data structures, and user interfaces for GIS and mapping systems*.
	Job Titles: *Aerial Photogrammetrist, Cartographer, Cartographic Designer, Compiler, Digital Cartographer, Mapper, Photogrammetric Technician, Photogrammetrist, Stereo Compiler, Stereoplotter Operator*
17-3031.01	**Surveying Technicians**
	Description: *Adjust and operate surveying instruments, such as the theodolite and electronic distance-measuring equipment, and compile notes, make sketches and enter data into computers.*
	Job Titles: *Chainman, Engineering Assistant, Engineering Technician, Instrument Man (I-Man), Instrument Operator, Instrument Person, Rodman, Survey Crew Chief, Survey Party Chief, Survey Technician*
17-3031.02	**Mapping Technicians**
	Description: *Calculate mapmaking information from field notes, and draw and verify accuracy of topographical maps*.
	Job titles: *Aerotriangulation Specialist, CAD Technician (Computer Aided Design Technician), Geospatial Analyst, Mapping Editor, Mapping Technician, Photogrammetric Compilation Specialist, Photogrammetric Stereo Compiler, Photogrammetric Technician, Stereoplotter Operator, Tax Map Technician*

SOC Code*	Occupation Profile
19-3092.00	**Geographers**
	Description: *Study the nature and use of areas of the Earth's surface, relating and interpreting interactions of physical and cultural phenomena. Conduct research on physical aspects of a region, including land forms, climates, soils, plants, and animals, and conduct research on the spatial implications of human activities within a given area, including social characteristics, economic activities, and political organization, as well as researching interdependence between regions at scales ranging from local to global.*
	Job Titles: *Economic Geographer, Geomorphologist, GIS Geographer, Political Geographer*
19-2099.01	**Remote Sensing Scientists and Technologists**
	Description: *Apply remote sensing principles and methods to analyze data and solve problems in areas such as natural resource management, urban planning, or homeland security. May develop new sensor systems, analytical techniques, or new applications for existing systems.*
	Job Titles: *Data Analytics Chief Scientist, Geospatial Intelligence Analyst, Professor, Remote Sensing Analyst, Remote Sensing Program Manager, Remote Sensing Scientist, Research and Development Director (R&D Director), Research Scientist, Scientist, Sensor Specialist*
19-4093.00	**Forest and Conservation Technicians**
	Description: *Provide technical assistance regarding the conservation of soil, water, forests, or related natural resources. May compile data pertaining to size, content, condition, and other characteristics of forest tracts, under the direction of foresters; or train and lead forest workers in forest propagation, fire prevention and suppression. May assist conservation scientists in managing, improving, and protecting rangelands and wildlife habitats.*
	Job Titles: *Biological Science Aide, Conservationist, County Ranger, Forest Technician, Forestry Aide, Forestry Technician, Resource Manager, Resource Specialist, Resource Technician, Timber Appraiser*
19-4099.02	**Precision Agriculture Technicians**
	Description: *Apply geospatial technologies, including geographic information systems (GIS) and Global Positioning System (GPS), to agricultural production or management activities, such as pest scouting, site-specific pesticide application, yield mapping, or variable-rate irrigation. May use computers to develop or analyze maps or remote sensing images to compare physical topography with data on soils, fertilizer, pests, or weather.*
	Job Titles: *Crop Specialist, Independent Crop Consultant, Nutrient Management Specialist, Physical Scientist, Precision Agriculture Specialist, Precision Farming Coordinator, Soil Fertility Specialist*
19-4099.03	**Remote Sensing Technicians**
	Description: *Apply remote sensing technologies to assist scientists in areas such as natural resources, urban planning, or homeland security. May prepare flight plans or sensor configurations for flight trips*.
	Job Titles: *Compiler; Digital Cartographic Technician; Geospatial Extractor, Analysis; IP/Mosaic Technician; Meteorologist Liaison; Research Associate*

SOC Code*	Occupation Profile
33-2022.00	**Forest Fire Inspectors and Prevention Specialists**
	Description: *Enforce fire regulations, inspect forest for fire hazards and recommend forest fire prevention or control measures. May report forest fires and weather conditions.*
	Job Titles: *Fire Management Officer, Fire Operations Forester, Fire Prevention Officer, Fire Prevention Technician, Fire Technician, Forest Officer, Forest Patrolman, Forestry Patrolman, Wildfire Mitigation Specialist, Wildfire Prevention Specialist*
45-2011.00	**Agricultural Inspectors**
	Description: *Inspect agricultural commodities, processing equipment, and facilities, and fish and logging operations, to ensure compliance with regulations and laws governing health, quality, and safety.*
	Job Titles: *Brand Inspector; Consumer Safety Inspector (CSI); Deputy Brand Inspector; Food Inspector; Food Sanitarian; Grain Inspector; Inspector, Food Safety and Inspection Service (Inspector, FSIS); Seed and Fertilizer Specialist; Shipping Point Inspector*
49-3011.00	**Aircraft Mechanics and Service Technicians**
	Description: *Diagnose, adjust, repair, or overhaul aircraft engines and assemblies, such as hydraulic and pneumatic systems*.
	Job Titles: *Aircraft Engine Specialist, Airframe Mechanic, Flight Test Mechanic, Helicopter Engine Mechanic*
53-2022.00	**Airfield Operations Specialists**
	Description: *Ensure the safe takeoff and landing of commercial and military aircraft. Duties include coordination between air-traffic control and maintenance personnel, dispatching, using airfield landing and navigational aids, implementing airfield safety procedures, monitoring and maintaining flight records, and applying knowledge of weather information.*
	Job Titles: *Aviation Operations Specialist, Flight Operations Coordinator*
*SOC Codes correspond to those used in O*Net	

Occupational Educational Levels

Figure 8 displays the educational attainment as reported by respondents currently working in the field. A majority of those in the computer field typically report having an Associate of Arts (AA) or Bachelor's Degree (BA). The computer system managers and engineers/architects, and geospatial information scientists and technologists typically hold a BA or Master's Degree (MA). Technicians, on the other hand, typically report lower levels of educational attainment, which vary by position. Likewise, a majority of forestry and agricultural inspectors, and aircraft mechanics and service technicians hold a High School Diploma (HS), some college, or an AA degree. Airfield operation specialists tend to hold an AA or BA degree. The highest education is associated with remote sensing scientists and technicians, and geographers.

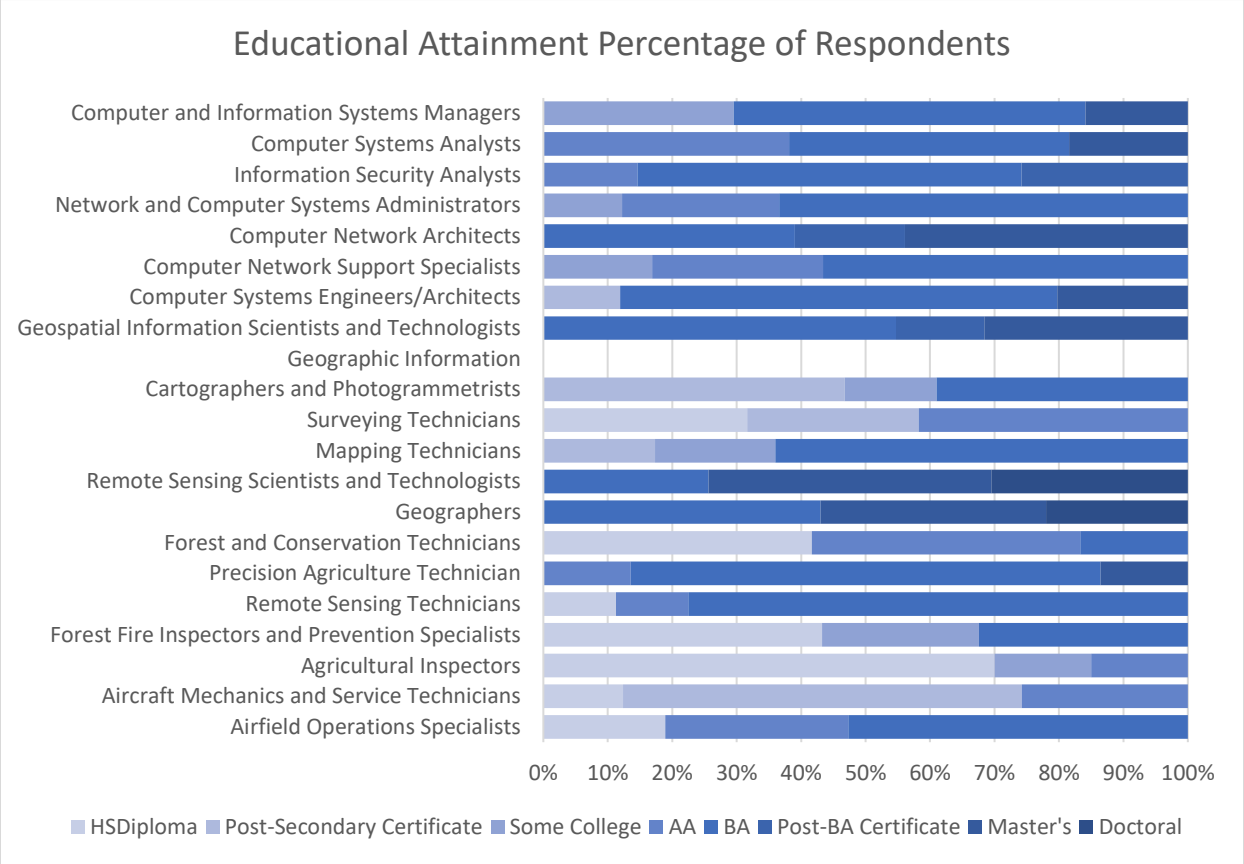

*Figure 8: Educational Attainment, Source O*Net OnLine*

Geographic Information educational data not available.

Median Salary

The median salary as reported by survey respondents, to a large degree, reflects the reported level of educational attainment. Managers report the highest median salary of $146,360. In the computer field, most median salaries are above $80,000. The computer network support specialists report the lowest median salary in this group, but also have the lowest reported educational attainment. The computer network architects report a median salary of $112,690 and have the highest educational attainment of the computer occupation sector. Technicians and inspectors typically earn upwards of $45,000. Aircraft mechanics and service technicians report a median salary of $64,000, while holding a HS diploma, some college, or an AA degree. This is higher than the airfield operations specialist, with a median salary of $52,650 in which 39% report having a BA degree.

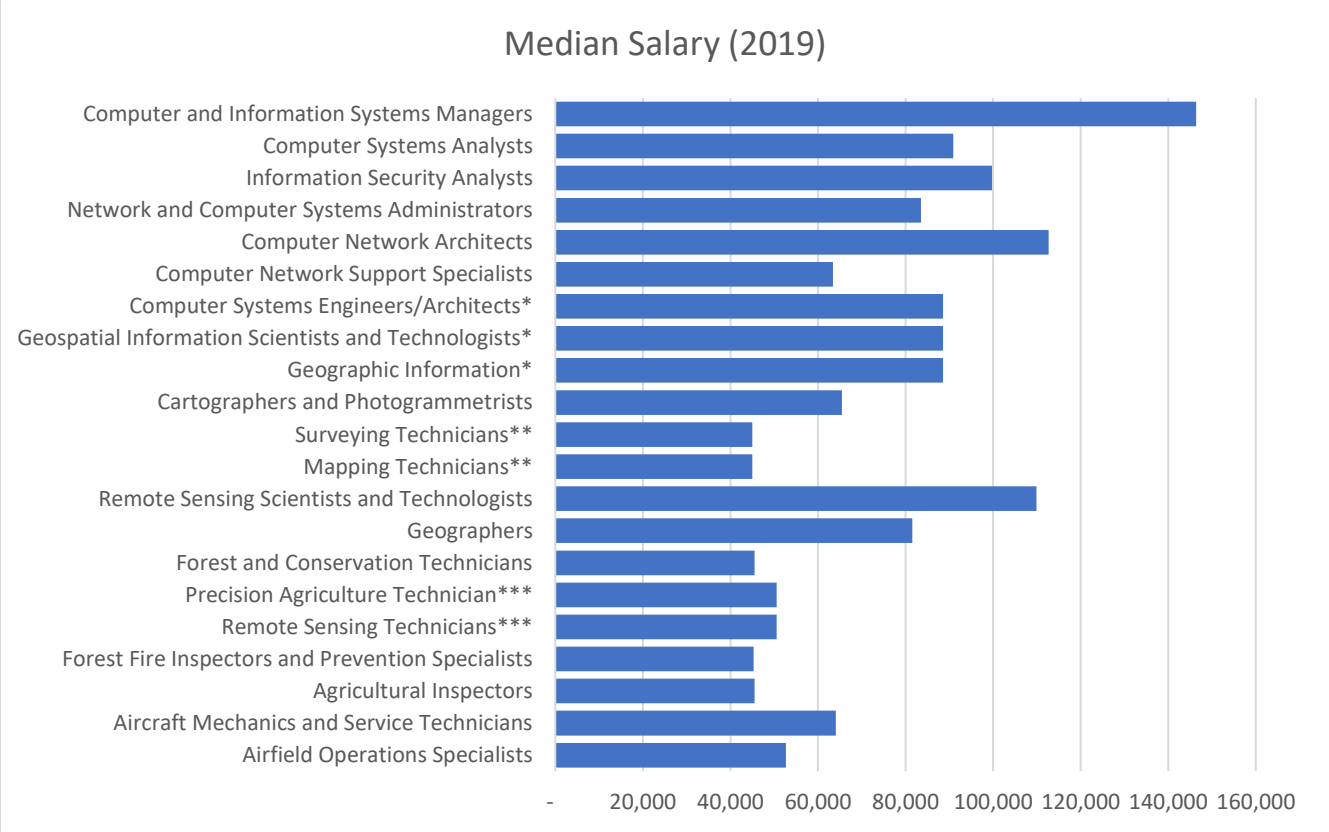

*Figure 9: Median Salary, Source O*Net OnLine*

*Median wage and employment data for Computer Occupations, All Other.

**Median wage and employment data for Surveying and Mapping Technicians

***Median wage and employment data for Life, Physical, and Social Science Technicians, All Other.

Employment Levels

Current employment numbers are strong across the computer occupations and geospatial and geographic information occupations. The more narrowly defined occupations are naturally smaller in scale, but also present strong growth areas.

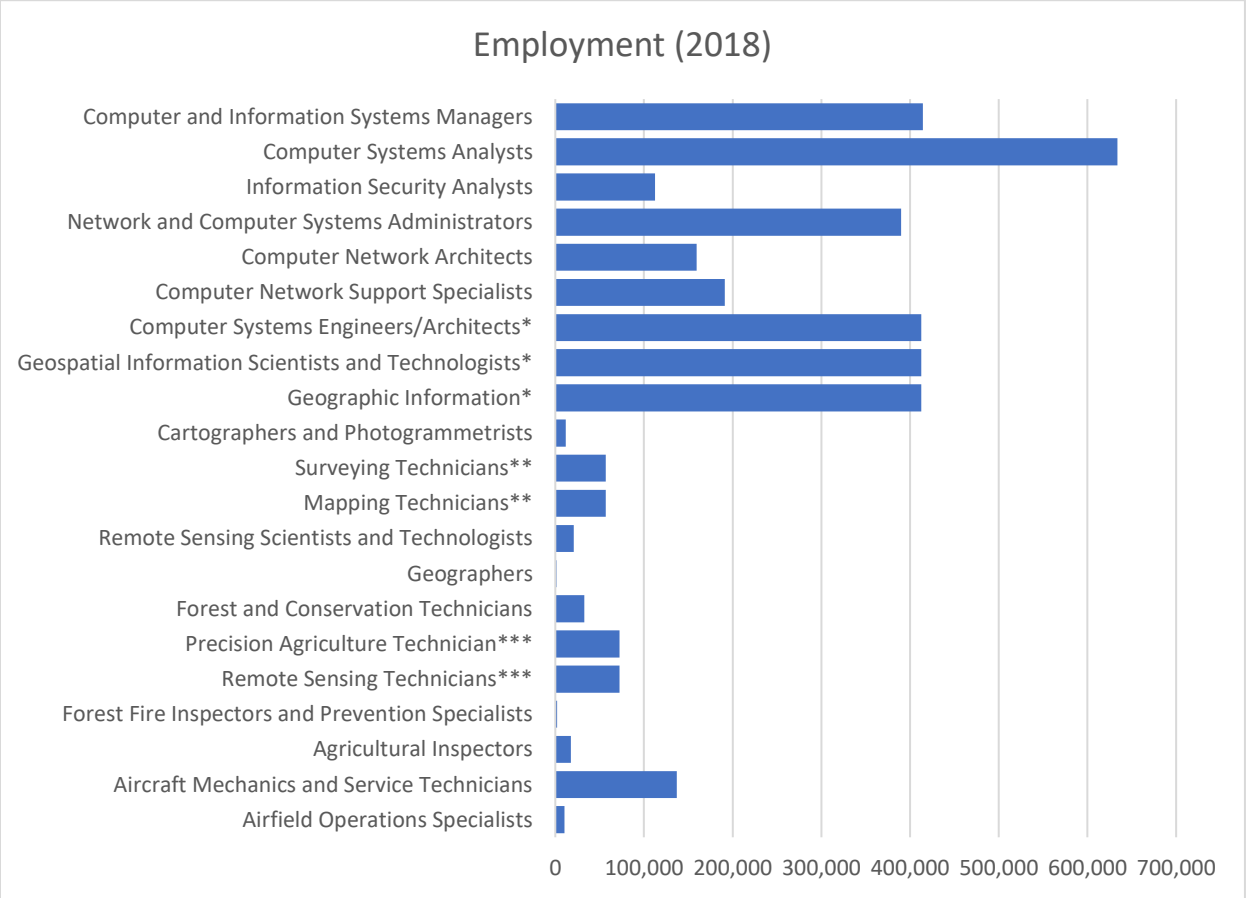

*Figure 10: Employment Level 2018, Source O*Net OnLine*

*Median wage and employment data for Computer Occupations, All Other.

**Median wage and employment data for Surveying and Mapping Technicians

***Median wage and employment data for Life, Physical, and Social Science Technicians, All Other.

Annual Job Openings

Projected job openings represent the estimated openings due to growth and replacement over the period 2018-2028. Computer Systems Managers and Computer Systems Analysts have the highest projected annual job openings, with 38,800 and 53,400 respectively. The catchall category of "all other" computer occupations is projected to add 35,700 jobs annually over the ten-year period. The number of openings in the various fields tend to reflect the smaller overall size the respective occupational category.

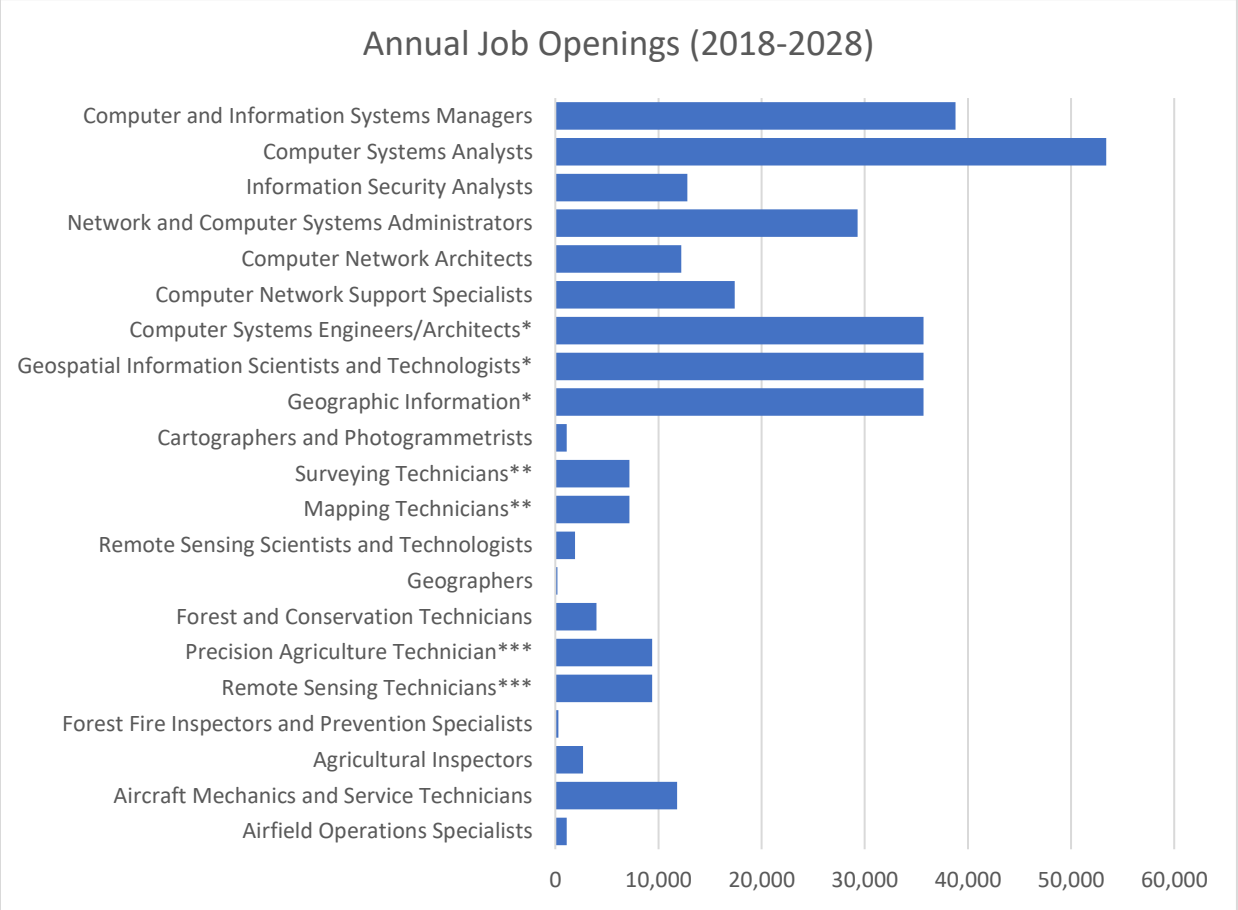

*Figure 11: Annual Job Openings 2018-2028, Source O*Net OnLine*

*Median wage and employment data for Computer Occupations, All Other.

**Median wage and employment data for Surveying and Mapping Technicians

***Median wage and employment data for Life, Physical, and Social Science Technicians, All Other.

Annual Growth

The projected growth represents the estimated change in total employment over the period 2018-2028. The projected annual growth rate is solid across the computer occupations, with a significant uptick in one of the smaller categories, information security analysts, with projected annual growth of 11%. Some of the smaller field areas, cartographers and photogrammetrists, and forest fire inspectors and prevention specialists, are also projected to grow at 11%. The social science technicians (precision agriculture and remote sensing) show solid growth at 7%, along with the survey and mapping technicians at 5%. Some of the areas showing somewhat weaker growth potential at just 3% include remote sensing scientists and technologists, geographers, and aircraft mechanics and technicians. Forest and conservation technicians are projected to grow at a meager 2% annually.

*Figure 12: Annual Job Growth 2018-2028, Source O*Net OnLine*

*Median wage and employment data for Computer Occupations, All Other.

**Median wage and employment data for Surveying and Mapping Technicians

***Median wage and employment data for Life, Physical, and Social Science Technicians, All Other.

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V. Appendix

Highlighted Occupation Profiles and SOC Codes

*Table 2: SOC Code and Occupation Profile, Source O*Net OnLine*

SOC Code	SOC Category	Occupation Profile
11-3021.00	Management	Computer and Information Systems Managers
15-1121.00	Computer and Mathematics	Computer Systems Analysts
15-1122.00	Computer and Mathematics	Information Security Analysts
15-1142.00	Computer and Mathematics	Network and Computer Systems Administrators
15-1143.00	Computer and Mathematics	Computer Network Architects
15-1152.00	Computer and Mathematics	Computer Network Support Specialists
15-1199.02	Computer and Mathematics	Computer Systems Engineers/Architects*
15-1199.04	Computer and Mathematics	Geospatial Information Scientists and Technologists*
15-1199.05	Computer and Mathematics	Geographic Information*
17-1021.00	Architecture and Engineering	Cartographers and Photogrammetrists
17-3031.01	Architecture and Engineering	Surveying Technicians**
17-3031.02	Architecture and Engineering	Mapping Technicians**
19-2099.01	Life, Physical, and Social Science	Remote Sensing Scientists and Technologists
19-3092.00	Life, Physical, and Social Science	Geographers
19-4093.00	Life, Physical, and Social Science	Forest and Conservation Technicians
19-4099.02	Life, Physical, and Social Science	Precision Agriculture Technician***
19-4099.03	Life, Physical, and Social Science	Remote Sensing Technicians***
33-2022.00	Protective Service	Forest Fire Inspectors and Prevention Specialists
45-2011.00	Farming, Fishing, and Forestry	Agricultural Inspectors
49-3011.00	Installation, Maintenance, and Repair	Aircraft Mechanics and Service Technicians
53-2022.00	Transportation and Material Moving	Airfield Operations Specialists

*Median wage and employment data for Computer Occupations, All Other.

**Median wage and employment data for Surveying and Mapping Technicians

***Median wage and employment data for Life, Physical, and Social Science Technicians, All Other.

Educational Levels Percentage of Respondents

Table 3 displays the educational attainment as reported by respondents currently working in the field.

*Table 3: Educational Attainment, Source O*Net OnLine*

Occupation Profile	HS Diploma	Post-Secondary	Some College	AA	BA	Post-BA Certificate	Master's	Doctoral
Computer and Information Systems Managers			26%		48%		14%	
Computer Systems Analysts				29%	33%		14%	
Information Security Analysts				13%	53%	23%		
Network and Computer Systems Administrators			10%	20%	52%			
Computer Network Architects					32%	14%	36%	
Computer Network Support Specialists			14%	22%	47%			
Computer Systems Engineers/Architects		10%			57%		17%	
Geospatial Information Scientists and Technologists					52%	13%	30%	
Geographic Information*								
Cartographers and Photogrammetrists		36%	11%		30%			
Surveying Technicians	25%	21%		33%				
Mapping Technicians		13%	14%		48%			
Remote Sensing Scientists and Technologists					21%		36%	25%
Geographers					43%		35%	22%
Forest and Conservation Technicians	35%			35%	14%			
Precision Agriculture Technician				11%	59%		11%	
Remote Sensing Technicians	9%			9%	62%			
Forest Fire Inspectors and Prevention Specialists	32%		18%		24%			
Agricultural Inspectors	56%		12%	12%				
Aircraft Mechanics and Service Technicians	12%	60%		25%				
Airfield Operations Specialists	14%			21%	39%			

* Not Available

Median Salary

Table 4 displays the median salary as reported by respondents currently working in the field.

*Table 4: Median Wage and Salary, Source O*Net OnLine*

Occupation Profile	Median Wage 2019)	Median Salary (2019)
Computer and Information Systems Managers	$42.57	$146,360
Computer Systems Analysts	$43.71	$90,920
Information Security Analysts	$47.95	$99,730
Network and Computer Systems Administrators	$40.15	$83,510
Computer Network Architects	$54.18	$112,690
Computer Network Support Specialists	$30.51	$63,460
Computer Systems Engineers/Architects*	$42.57	$88,550
Geospatial Information Scientists and Technologists*	$42.57	$88,550
Geographic Information*	$42.57	$88,550
Cartographers and Photogrammetrists	$31.47	$65,470
Surveying Technicians**	$21.64	$45,010
Mapping Technicians**	$21.64	$45,010
Remote Sensing Scientists and Technologists	$52.84	$109,910
Geographers	$39.20	$81,540
Forest and Conservation Technicians	$21.87	$45,500
Precision Agriculture Technician***	$24.30	$50,550
Remote Sensing Technicians***	$24.30	$50,550
Forest Fire Inspectors and Prevention Specialists	$21.77	$45,270
Agricultural Inspectors	$21.87	$45,490
Aircraft Mechanics and Service Technicians	$30.81	$64,090
Airfield Operations Specialists	$25.31	$52,650

*Median wage and employment data for Computer Occupations, All Other.

**Median wage and employment data for Surveying and Mapping Technicians

***Median wage and employment data for Life, Physical, and Social Science Technicians, All Other.

Employment and Growth Projections

Table 5 displays the employment and growth projects estimated by occupation experts in the field.

*Table 5: Employment and Growth Projections, Source O*Net OnLine*

Occupation Profile	Employment (2018)	Annual JobOpenings (2018-228)	Annual Growth (2018-2028)
Computer and Information Systems Managers	414,400	38,800	11%
Computer Systems Analysts	633,900	53,400	9%
Information Security Analysts	112,300	12,800	11%
Network and Computer Systems Administrators	389,900	29,300	5%
Computer Network Architects	159,300	12,200	5%
Computer Network Support Specialists	191,300	17,400	6%
Computer Systems Engineers/Architects*	412,800	35,700	10%
Geospatial Information Scientists and Technologists*	412,800	35,700	10%
Geographic Information*	412,800	35,700	10%
Cartographers and Photogrammetrists	11,800	1,100	11%
Surveying Technicians**	56,800	7,200	5%
Mapping Technicians**	56,800	7,200	5%
Remote Sensing Scientists and Technologists	20,900	1,900	3%
Geographers	1,500	200	3%
Forest and Conservation Technicians	32,700	4,000	2%
Precision Agriculture Technician***	72,400	9,400	7%
Remote Sensing Technicians***	72,400	9,400	7%
Forest Fire Inspectors and Prevention Specialists	2,200	300	11%
Agricultural Inspectors	17,700	2,700	4%
Aircraft Mechanics and Service Technicians	136,900	11,800	3%
Airfield Operations Specialists	10,200	1,100	7%

*Median wage and employment data for Computer Occupations, All Other.

**Median wage and employment data for Surveying and Mapping Technicians

***Median wage and employment data for Life, Physical, and Social Science Technicians, All Other.

Note: Projected growth represents the estimated change in total employment over the period. Projected job openings represent openings due to growth and replacement.