

AVIATION AND DRONE TECH

2023 Supply & Demand Analysis Overview

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MINNESOTA STATE
Transportation Center of Excellence

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Introduction and Sector Overview

This report highlights the importance of the Aviation and Drone Technology career pathway for Minnesota’s Transportation Industry. Professionals in Aviation and Drone Technology work in diverse roles from piloting, air traffic controlling, and aircraft maintenance technician, as well as designing, servicing, or piloting drones.¹ In all, about 9,370 people work in Aviation and Drone Technology roles in Minnesota as of the second quarter of 202—a 6.8% increase (593 workers) from a year prior.

Overall employment in Minnesota has grown by nearly 60,301 workers (2.0%) between the second quarter of 2022 and the second quarter of 2023, and the five-year forecast growth is flat at 0.0% and 1,756 expansion of employment as of the most current baseline forecasts. During this time frame, Aviation and Drone Technology employment is also anticipated to be flat in Minnesota (0.0% annually) and employment declining by about 19 total jobs. Total baseline demand for Aviation and Drone Technology talent is anticipated to be around 4,559 professionals needed to fill positions due to job exits and transfers, such as retirements and job changes.

Transportation Pathways in Minnesota – Baseline Forecast, 2023Q2¹

Occupation	Current					5-Year History		5-Year Baseline Forecast				
	Empl	Avg Ann Wages ²	LQ	Unempl	Unempl Rate	Empl Change	Ann %	Total Demand	Exits	Transfers	Empl Growth	Ann % Growth
Automotive Technology Pathway	20,884	\$68,300	0.97	236	1.1%	-586	-0.6%	9,072	3,184	5,828	60	0.1%
Aviation and Drone Technology Pathway	9,370	\$125,500	0.87	135	1.5%	69	0.1%	4,559	1,602	2,976	-19	0.0%
Collision Repair Pathway	7,307	\$52,800	1.10	227	3.1%	188	0.5%	3,442	1,213	2,305	-77	-0.2%
Diesel Equipment and Truck Pathway	12,161	\$64,200	1.01	153	1.3%	152	0.3%	5,635	1,954	3,724	-43	-0.1%
Marine and Power Sports Pathway	4,284	\$48,700	0.84	159	3.7%	68	0.3%	2,574	926	1,673	-25	-0.1%
Truck Driving Pathway*	97,603	\$51,800	0.95	3,280	3.3%	2,561	0.5%	61,265	26,466	33,538	1,261	0.3%
Transportation Occupations	133,108	\$60,700	0.93	3,418	2.6%	3,212	0.5%	73,669	27,527	45,162	981	0.1%
Total - All Occupations	3,075,767	\$66,100	1.00	87,730	2.9%	11,603	0.1%	1,746,576	727,900	1,016,920	1,756	0.0%

*This pathway includes School Bus Driver careers as of 2022, which were not included in the 2020 or 2021 estimates of career pathway employment or demand.

Source: [JobsEQ®](#)

Data as of 2023Q2 unless noted otherwise

Note: Figures may not sum due to rounding.

1. Data based on a four-quarter moving average unless noted otherwise.

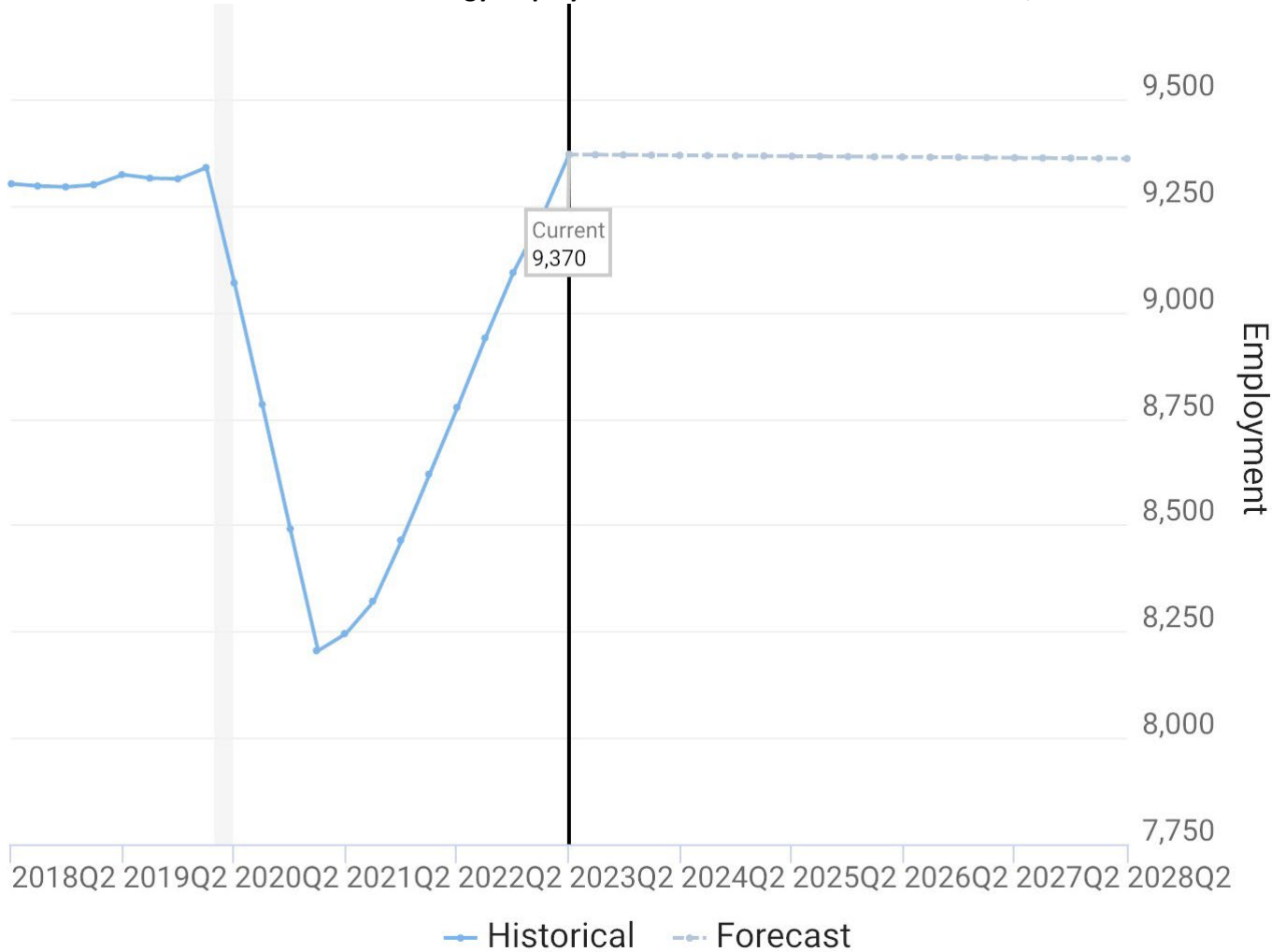
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¹ Drone Technology careers were added to the Aviation Pathway in this report, but were not included in the prior 2020 version of this report. Another way that this pathway has been described in other reports is Aviation and Drone Technology Pathway.

Minnesota saw a strong job market throughout 2023 and elevated recruitment among employers across most sectors. As the available talent pool was exhausted, unemployment rates dropped dramatically across critical roles and in many scenarios demand far outpaced talent supply. Forecasting future needs under current conditions with an eye to anticipated talent pipelines into Aviation and Drone Technology careers suggest that there may be shortages of talent across a large share of occupations in this career pathway unless more talent decides to enter the field. The pathway forecast has soured slightly from 2022's estimates, with no change in overall employment forecast by the second quarter of 2028. However, overall employment volumes have reached pre-pandemic levels as of 2023Q2 estimates.

Aviation and Drone Technology Employment Forecast Under Baseline Scenario, Minnesota



Source: JobsEQ®, Data as of 2023Q2, The shaded areas of the graph represent national recessions.

Source: RealTime Talent analysis of Chmura Economics JobsEQ®, <http://www.chmuraecon.com/jobseq/>. Job Posting Trends section uses data from Gartner TalentNeuron Plan, accessed 1/10/2024 at talentneuronplan.gartner.com Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2023Q4 dataset accessed at analyst.lightcast.io

Industry/Occupation Mix

Aviation and Drone Technology talent is primarily concentrated in the Scheduled Air Transportation Industry (38.4%) but are critical to a wide range of air transportation and aerospace industries in Minnesota, beginning to rise to the pre-pandemic volumes of Aviation and Drone Technology talent employment.

Top Industry Distribution for Aviation and Drone Technology Pathway Occupations in Minnesota

NAICS Code	Industry Title	CURRENT		10-YEAR DEMAND				Total Demand
		% of Occ Empl	Empl	Avg Ann Wages	Exits	Transfers	Empl Growth	
4811	Scheduled Air Transportation	38.4%	3,595	\$157,100	1,372	2,649	-22	3,998
4881	Support Activities for Air Transportation	10.3%	968	\$81,400	315	565	12	892
5413	Architectural, Engineering, and Related Services	4.8%	447	\$105,600	123	208	-3	329
3345	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	3.8%	356	\$111,300	98	166	-17	247
4812	Nonscheduled Air Transportation	3.8%	353	\$127,700	140	272	7	420
5511	Management of Companies and Enterprises	3.7%	350	\$120,600	119	219	21	359
9261	Administration of Economic Programs	3.5%	330	\$148,200	111	221	-11	321
3364	Aerospace Product and Parts Manufacturing	2.9%	271	\$77,000	95	157	-38	215
5613	Employment Services	2.7%	255	\$72,000	81	137	-12	206
4921	Couriers and Express Delivery Services	2.5%	234	\$126,800	83	160	28	271
6219	Other Ambulatory Health Care Services	1.8%	169	\$94,400	65	125	-5	185
9211	Executive, Legislative, and Other General Government Support	1.2%	110	\$100,900	35	67	-3	99
5417	Scientific Research and Development Services	1.1%	104	\$119,300	29	50	4	83
9231	Administration of Human Resource Programs	1.0%	90	\$120,000	27	48	1	76
5415	Computer Systems Design and Related Services	0.9%	87	\$120,100	26	44	12	82
3391	Medical Equipment and Supplies Manufacturing	0.9%	86	\$102,700	22	38	1	61
3344	Semiconductor and Other Electronic Component Manufacturing	0.9%	82	\$107,000	22	37	2	62
6115	Technical and Trade Schools	0.9%	82	\$131,500	32	61	-2	92
9221	Justice, Public Order, and Safety Activities	0.8%	76	\$119,200	23	42	-3	62
5419	Other Professional, Scientific, and Technical Services	0.8%	74	\$98,200	22	39	8	70
-	All Others	13.3%	1,251	-	364	644	-15	993

Source: JobsEQ®
 Data as of 2023Q2. Note that occupation-by-industry wages represent adjusted national data and may not be consistent with regional, all-industry occupation wages shown elsewhere in JobsEQ.
 Note: Figures may not sum due to rounding.

Talent Demand Detail

Employment and Wage Overview

Of all occupations found in the Aviation and Drone Technology pathway, the specific occupations of Aircraft Systems Assemblers, Air Traffic Controllers, Airline Pilots, and Aircraft Cargo Handling Supervisors are uniquely concentrated in Minnesota to a higher degree than seen in the nation overall. On average, Aviation careers pay about \$125,500 per year—about \$59,400 higher than the average wage statewide across all positions. There is significant variation in average wages across this field, with Airline Pilots with the highest average wages at \$185,700 compared to Aircraft Structure, Surfaces, Rigging, and Systems Assemblers at \$60,700 annually.

SOC	Occupation	Current					5-Year Baseline Forecast				
		Empl	Avg Ann Wages ²	LQ	Unempl	Unempl Rate	Total Demand	Exits	Transfers	Empl Change	Ann % Change
53-2011	Airline Pilots, Copilots, and Flight Engineers	2,437	\$185,700	1.37	23	0.9%	1,516	510	1,008	-2	0.0%
49-3011	Aircraft Mechanics and Service Technicians	2,146	\$83,900	0.77	26	1.3%	846	311	526	8	0.1%
17-2199	Engineers, All Other	1,868	\$118,600	0.59	11	0.6%	614	226	376	13	0.1%
53-2012	Commercial Pilots	1,079	\$142,300	1.08	10	1.0%	682	227	449	6	0.1%
53-2021	Air Traffic Controllers	553	\$153,600	1.41	20	3.5%	284	96	194	-6	-0.2%
51-2011	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	437	\$60,700	1.52	7	1.6%	193	74	132	-13	-0.6%
17-3024	Electro-Mechanical and Mechatronics Technologists and Technicians	304	\$64,500	0.49	19	5.9%	133	61	101	-29	-2.0%
53-2022	Airfield Operations Specialists	282	\$72,500	0.98	11	3.6%	151	49	100	1	0.1%
53-1041	Aircraft Cargo Handling Supervisors	170	\$65,300	1.16	2	1.2%	104	31	70	3	0.3%
49-2091	Avionics Technicians	94	\$63,700	0.24	8	7.8%	35	16	19	1	0.1%
	Aviation and Drone Technology Pathway	9,370	\$125,500	0.87	135	1.5%	4,559	1,602	2,976	-19	0.0%
	Total - All Occupations	3,075,767	\$66,100	1.00	87,730	2.9%	1,746,576	727,900	1,016,920	1,756	0.0%

Source: [JobsEQ®](#)

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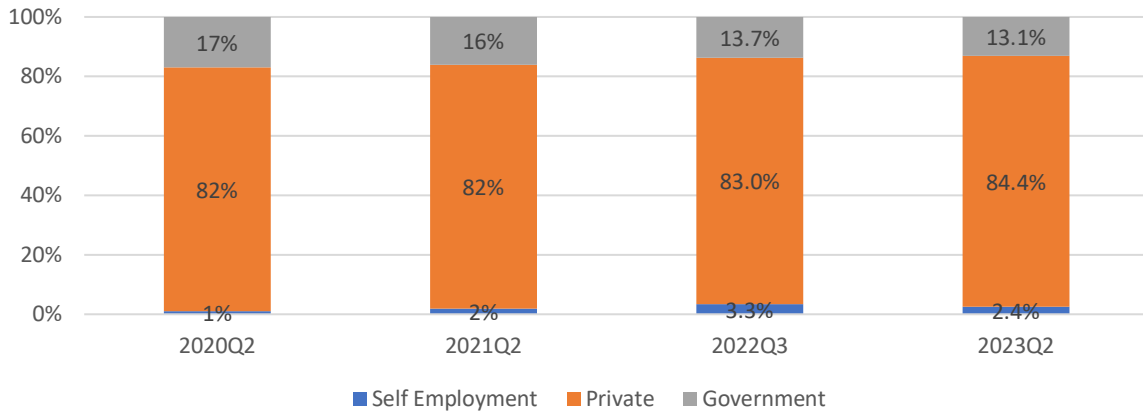
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Employment Types

About 84% of people employed in Aviation and Drone Technology careers in Minnesota work for private employers, while only about 2.4% are self-employed (a slight decrease from last year). The remaining 13.1% work for state, federal, or local government entities (mostly federal). The share employed by government agencies has declined considerably over the past few years.

Source: RealTime Talent analysis of Chmura Economics JobsEQ®, <http://www.chmuraecon.com/jobseq/>. Job Posting Trends section uses data from Gartner TalentNeuron Plan, accessed 1/10/2024 at talentneuronplan.gartner.com Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2023Q4 dataset accessed at analyst.lightcast.io

Employment Types, Minnesota 2020-2023



Wage Analysis

The Aviation and Drone Technology pathway saw wage averages increase from the prior year's estimates. However, average wages for Avionics Technicians, Aircraft Mechanics and Service Technicians, and Air Traffic Controllers saw average wages drop from the prior year's estimates. Entry-level wages in the pathways far exceed the average entry-level wages observed across all occupations statewide, paying an average of \$80,800 annually for entry-level talent.

Occupation Wages, Average Annual in Minnesota, 2023Q2

SOC	Occupation	Mean	Entry Level	Experienced	Percentiles					Education and Training		
					10%	25%	50% (Median)	75%	90%	Typical Entry-Level Education	Previous Work Experience	Typical On-the-Job Training
17-2199	Engineers, All Other	\$118,600	\$79,200	\$138,300	\$74,200	\$91,600	\$117,200	\$136,100	\$168,000	BA	None	None
17-3024	Electro-Mechanical and Mechatronics Technologists and Technicians	\$60,700	\$48,400	\$66,900	\$47,100	\$51,500	\$57,800	\$68,600	\$81,900	AS	None	None
49-2091	Avionics Technicians	\$63,700	\$39,400	\$75,900	\$32,800	\$49,100	\$62,200	\$74,200	\$94,000	AS	None	None
49-3011	Aircraft Mechanics and Service Technicians	\$83,900	\$53,400	\$99,200	\$49,300	\$62,400	\$79,300	\$118,800	\$130,000	Certificate	None	None
51-2011	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	\$64,500	\$41,800	\$75,800	\$39,400	\$47,900	\$62,700	\$80,600	\$92,900	HS/GED	None	Mod-term OJT
53-1041	Aircraft Cargo Handling Supervisors	\$65,300	\$50,000	\$72,900	\$49,400	\$51,900	\$56,900	\$86,400	\$97,800	HS/GED	< 5 years	None
53-2011	Airline Pilots, Copilots, and Flight Engineers	\$185,700	\$112,000	\$222,500	\$107,700	\$124,600	\$156,900	\$220,500	\$288,100	BA	< 5 years	Mod-term OJT
53-2012	Commercial Pilots	\$142,300	\$97,400	\$164,800	\$93,600	\$107,200	\$129,200	\$177,700	\$208,300	Certificate	None	Mod-term OJT
53-2021	Air Traffic Controllers	\$153,600	\$108,200	\$176,200	\$87,300	\$141,900	\$163,500	\$182,000	\$195,900	AS	None	Long-term OJT
53-2022	Airfield Operations Specialists	\$72,500	\$38,900	\$89,200	\$35,900	\$45,200	\$59,500	\$86,900	\$122,200	HS/GED	None	Long-term OJT
	Aviation and Drone Technology Pathway	\$125,500	\$80,800	\$147,900	\$75,800	\$92,400	\$115,000	\$153,600	\$186,900			
	Total - All Occupations	\$66,100	\$32,800	\$82,700	\$30,300	\$37,500	\$51,700	\$77,900	\$113,000			

Source: [JobsEQ®](#)

Wage data represent the average for all Covered Employment

Source: RealTime Talent analysis of Chmura Economics JobsEQ®, <http://www.chmuraecon.com/jobseq/>. Job Posting Trends section uses data from Gartner TalentNeuron Plan, accessed 1/10/2024 at talentneuronplan.gartner.com Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2023Q4 dataset accessed at analyst.lightcast.io

Wages in the Aviation and Drone Technology pathway vary across the three regions of Rural Greater Minnesota, Urban Greater Minnesota, and the 7-County MSP Metro. The MSP Metro region has the highest wages across experience levels and percentiles, offering higher wages than the state overall as well. While entry-level wages in Rural Greater Minnesota and Urban Greater Minnesota are close, wages vary across percentiles and the average wage as well.

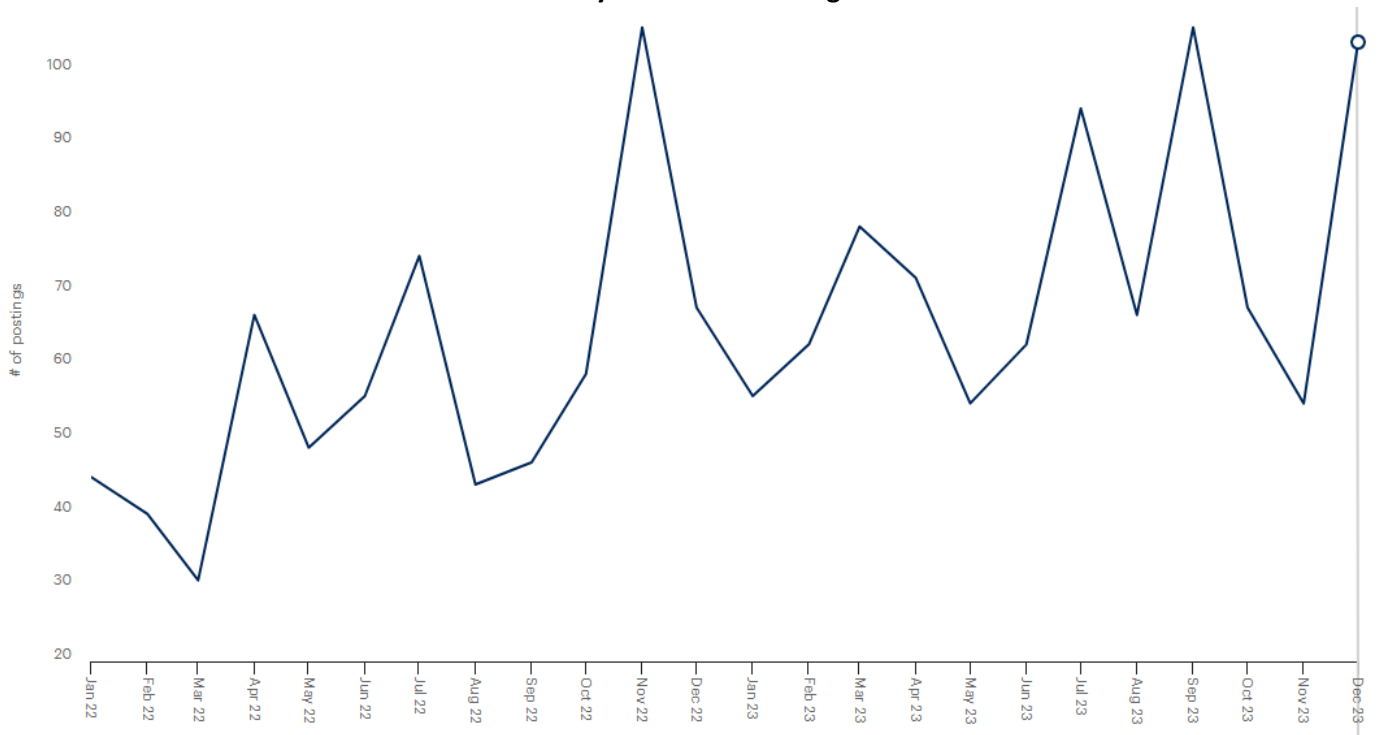
Aviation and Drone Technology Pathway Wages, 2023Q2

Region	Empl Count	Mean	Entry Level	Experienced	Percentiles				
					10%	25%	50% (Median)	75%	90%
Rural Greater	824	\$96,900	\$65,400	\$112,700	\$61,200	\$74,700	\$91,300	\$119,700	\$139,800
Urban Greater	826	\$106,300	\$66,100	\$126,300	\$60,900	\$77,700	\$101,300	\$128,700	\$157,700
7-County Metro	7,434	\$131,300	\$85,300	\$154,300	\$80,700	\$96,200	\$119,600	\$160,800	\$194,600
Minnesota	9,370	\$125,500	\$80,800	\$147,900	\$75,800	\$92,400	\$115,000	\$153,600	\$186,900

Job Posting Trends

Data in this section focuses on jobs newly advertised between January 1 and December 31, 2023 in Aviation and Drone Technology roles across Minnesota. Volume of total job postings, employer types (direct versus staffing), and top employers by unique job posting volumes comes from Gartner TalentNeuron; industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2023Q4 dataset. There were 873 new jobs advertised in Aviation careers during this timeframe, a more modest increase of 27% (from 2022) in comparison to last year's 135% increase from the prior 12-month period (2021). Volume of positions advertised by staffing and temp agencies in the Aviation and Drone Technology pathway grew at a slightly lower rate than those of direct employers. Posted wages increased to an average of \$22.46 per hour (compared to \$19.66 per hour in 2022), and there was about 1 hire per every 1 unique job postings advertised based on Lightcast estimates.

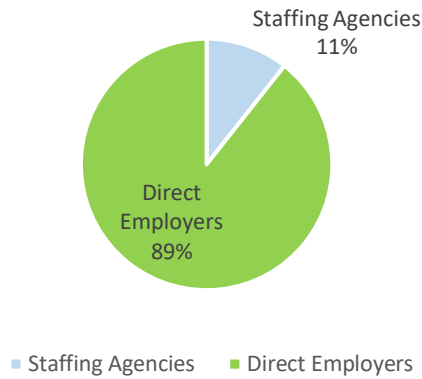
Volume of Career Pathway Online Job Postings in 2022 and 2023



Top Employers by Volume of New Job Postings, With Change from Prior Year

Employer	Percent Change between 2022 and 2023
1. Army	181%
2. Navy	New Entrant
3. U.S. Customs & Border Protection	-31%
4. Delta Air Lines	-36%
5. Signature Aviation	-26%
6. SAIC	167%
7. StandardAero	78%
8. Department of the Air Force	-17%
9. Federal Aviation Administration	-20%
10. Circus Aircraft Corporation	-29%

New Job Postings Advertised in Minnesota by Employer Type

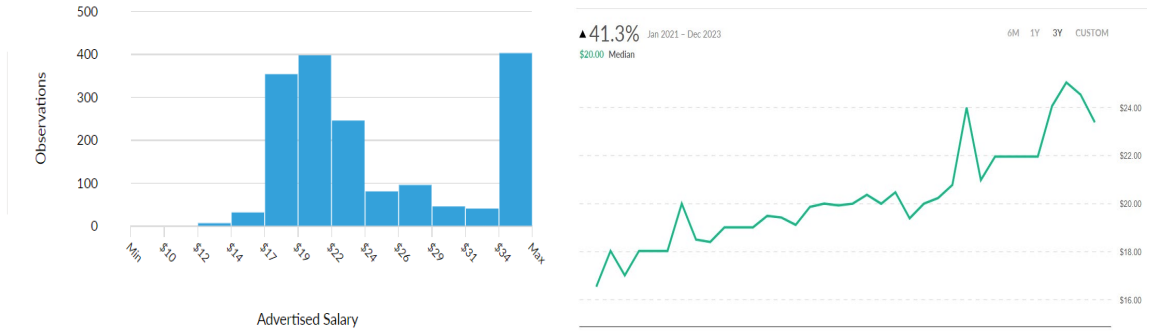


New Job Postings by Industry or Employer Type

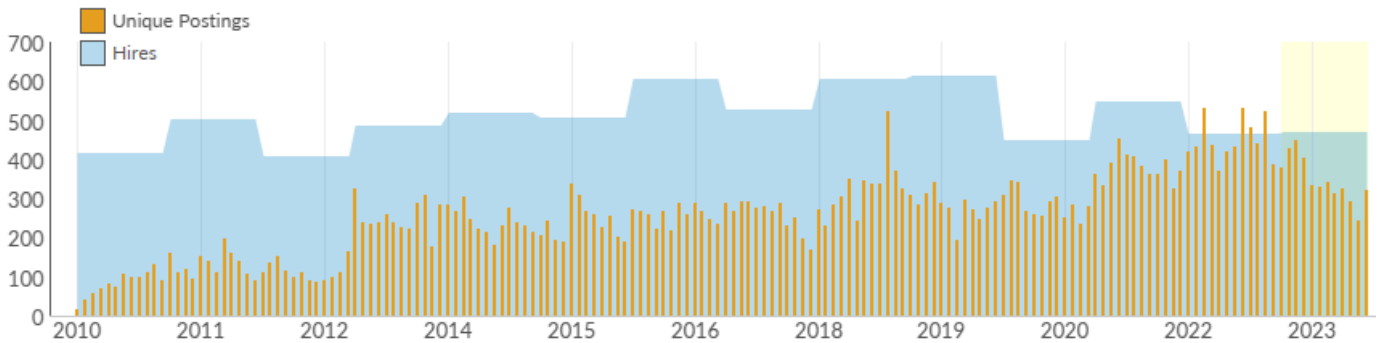
Industry	Total/Unique (Jan 2023 - Dec 2023)	Posting Intensity	Median Posting Duration
Employment Placement Agencies	1,242 / 714	2 : 1	23 days
Motorcycle, ATV, and All Other Motor Vehicle Dealers	577 / 238	2 : 1	22 days
Temporary Help Services	260 / 149	2 : 1	20 days
Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	766 / 99	8 : 1	28 days
Farm and Garden Machinery and Equipment Merchant Wholesalers	185 / 93	2 : 1	20 days
Surgical Appliance and Supplies Manufacturing	177 / 69	3 : 1	31 days
Industrial and Commercial Fan and Blower and Air Purification Equipment Manufacturing	182 / 59	3 : 1	31 days
Lumber, Plywood, Millwork, and Wood Panel Merchant Wholesalers	87 / 59	1 : 1	28 days
Engineering Services	129 / 58	2 : 1	25 days
Direct Health and Medical Insurance Carriers	110 / 53	2 : 1	40 days

Pathway Advertised Salary Range

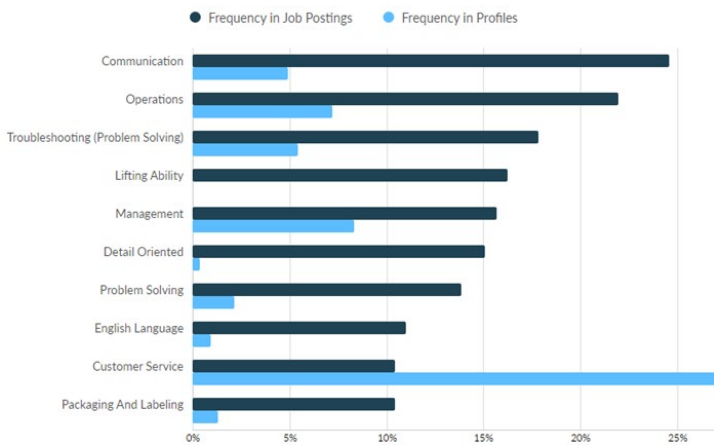
\$22.46/hr
Median Advertised Salary



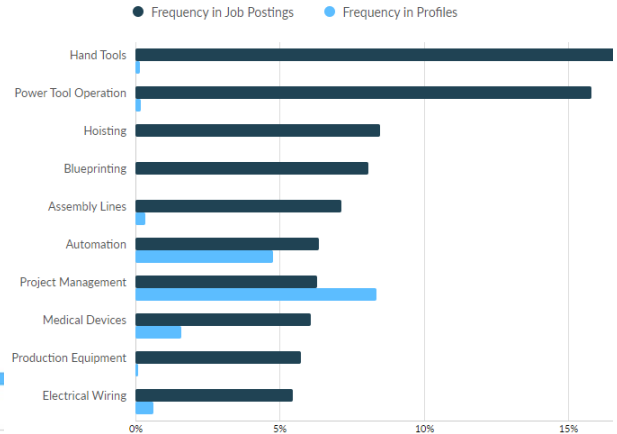
Monthly Ratio of Unique Job Postings to Estimated Hires



Top Common Skills



Top Specialized Skills



Source: RealTime Talent analysis of Chmura Economics JobsEQ®, <http://www.chmuraecon.com/jobseq/>. Job Posting Trends section uses data from Gartner TalentNeuron Plan, accessed 1/10/2024 at talentneuronplan.gartner.com Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2023Q4 dataset accessed at analyst.lightcast.io

Top Certifications and Qualifications

Qualification	Postings with Qualification
Valid Driver's License	286
Airframe & Powerplant (A&P) Certificate	102
Airline Transport Pilot Licence	36
FAA Instrument Rating	31
Professional Engineer (PE) License	31
Advanced Cardiovascular Life Support (ACLS) Certification	25
Basic Cardiac Life Support	25
American Medical Technologists (AMT) Certification	25
Engineer in Training	24
Cardiopulmonary Resuscitation (CPR) Certification	21

Talent Supply Detail

Talent Unemployment, Underemployment, and Educational Attainment

At an overall pathway unemployment rate of 1.5% (the same percent as the previous year), there are about 135 unemployed Aviation and Drone Technology professionals statewide. An additional 1,136 (an increase from the previous year's 986) Aviation professionals are underemployed—meaning they are working in roles for which they are overqualified by education or experience.²

Aviation and Drone Technology Pathway in Minnesota

SOC	Occupation	Empl (Place of Residence)								Overall Occupation ¹		
		< High School	High School	Some College	Two-Year	Four-Year	Master's	PhD	Total Empl	Underemployed	Unemployed	Unempl Rate
17-2199	Engineers, All Other	0.2%	1.3%	3.1%	6.3%	54.5%	26.2%	8.5%	1,737	0	11	0.6%
17-3024	Electro-Mechanical and Mechatronics Technologists and Technicians	1.8%	17.3%	20.5%	29.3%	26.0%	4.0%	1.2%	423	119	7	1.6%
49-2091	Avionics Technicians	0.8%	16.3%	29.1%	33.7%	17.5%	2.7%	0.0%	91	19	8	7.8%
49-3011	Aircraft Mechanics and Service Technicians	1.6%	18.1%	26.0%	32.5%	18.1%	2.7%	1.0%	2,072	448	26	1.3%
51-2011	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	9.4%	42.8%	20.9%	14.1%	11.1%	1.4%	0.4%	294	35	21	5.9%
53-1041	Aircraft Cargo Handling Supervisors	3.5%	26.6%	21.6%	16.5%	25.5%	5.2%	1.0%	164	55	1	1.2%
53-2011	Airline Pilots, Copilots, and Flight Engineers	0.2%	1.6%	5.0%	5.4%	67.3%	16.8%	3.6%	2,388	0	23	0.9%
53-2012	Commercial Pilots	0.2%	2.0%	5.8%	6.6%	66.3%	15.8%	3.3%	1,025	0	10	1.0%
53-2021	Air Traffic Controllers	0.1%	6.7%	16.9%	15.8%	50.5%	9.0%	0.9%	543	305	20	3.5%
53-2022	Airfield Operations Specialists	0.1%	6.7%	16.9%	16.1%	50.4%	8.9%	0.9%	288	156	5	3.6%
Aviation and Drone Technology Pathway		0.9%	8.5%	12.4%	14.8%	46.9%	13.1%	3.4%	9,026	1,136	135	1.5%
Total - All Occupations		4.8%	20.9%	15.2%	14.1%	30.7%	10.4%	3.9%	2,976,622	526,677	87,730	2.9%

Source: JobsEQ®

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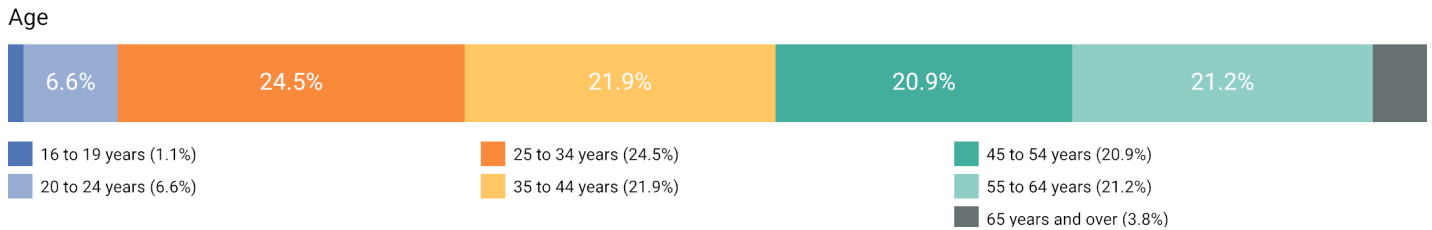
1. "Overall occupation" characteristics refer to attributes across all individuals in those occupations, not just those limited to the demographic categories shown in this table.

² Chmura adopts the New York Fed methodology of counting as underemployed only those who have acquired at least a Bachelor's degree and yet are working in an occupation that does not typically require a Bachelor's degree. In Occupation Diversity, the only occupations shown in the Underemployment table are "non-college jobs", as designated by the New York Fed. Per the New York Fed, "a job is classified as a college job if 50 percent or more of the people working in that job indicate that at least a bachelor's degree is necessary; otherwise, the job is classified as a non-college job."

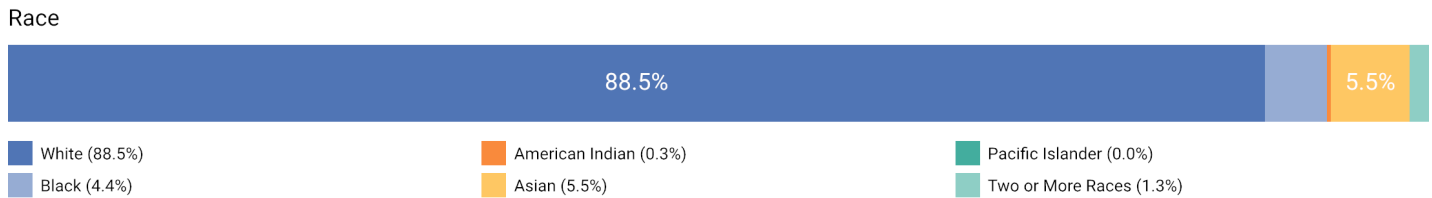
Workforce Demographics

Last year, as of 2022Q2, the Aviation and Drone Technology pathway had the smallest share of its workforce under the age of 25 out of all the Transportation pathways (4.6%), and 5% of the workforce was over 64 years old as of 2022 estimates. However, the share of the workforce under the age of 25 has increased from the prior year (7.7%) and the share over the age of 64 has decreased to 3.8% based on 2023Q2 estimates. The largest demographic group by race are White, representing 88.5% (increased by 0.3 percentage points from the previous year) of the total pathway’s workforce, with the next largest cohort being Asian talent representing 5.5% of the workforce. About 4.1% (an increase from the prior year’s 3.3%) of the pathway’s workforce are Hispanic or Latinx, and the share of female increased by 1.4 percentage points from the previous year (now 10.6%).

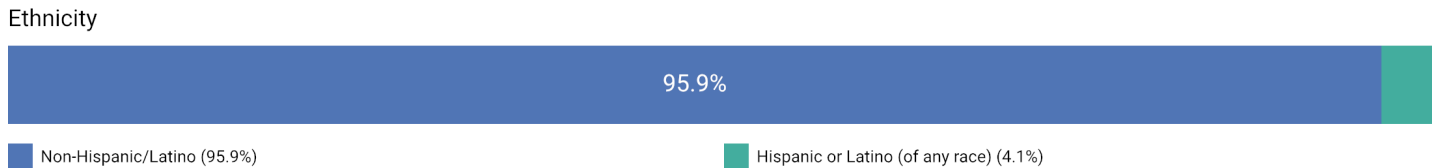
Aviation and Drone Technology Workforce Age Demographics, 2023Q2



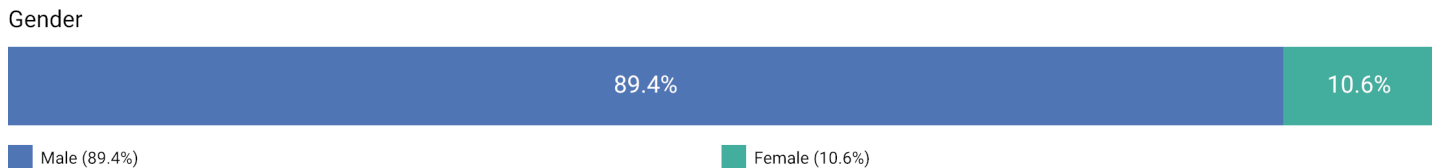
Aviation and Drone Technology Workforce Race Demographics, 2023Q2



Aviation and Drone Technology Workforce Ethnicity Demographics, 2023Q2



Aviation and Drone Technology Workforce Gender Demographics, 2023Q2



Source: RealTime Talent analysis of Chmura Economics JobsEQ®, <http://www.chmuraecon.com/jobseq/>. Job Posting Trends section uses data from Gartner TalentNeuron Plan, accessed 1/10/2024 at talentneuronplan.gartner.com Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2023Q4 dataset accessed at analyst.lightcast.io

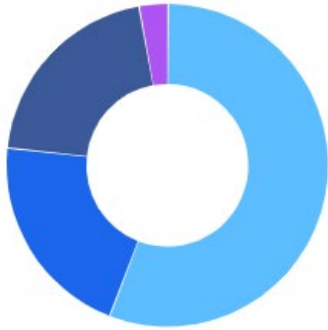
Aligned Postsecondary Programs

There were about 728 awards conferred at 30 different Minnesota postsecondary institutions in programs aligned to Aviation and Drone Technology careers in SY2022. Among these 262 were at the Associate level, and 108 were certificates that could be earned in less than two years. The average school had about 24 completions, but range from one to 84 completions. Three institutions offered programs remotely (10% of institutions), with 28 awards obtained remotely in 2022 (4% of all pathway completions). Programs mapping to this career pathway are diverse and several align to other occupations outside of this career pathway, namely in STEM and Manufacturing clusters.

Aviation and Drone Technology Postsecondary Program Awards by Level, SY2022

CIP Code	Title	Certificate < 1 Yr	Certificate 1+ but < 2 Yr	Associate's	Certificate 2+ but < 4 Yr	Bachelor's	Masters	Doctorate	Total Awards
15.0406	Automation Engineer Technology/Technician	21	32	100	11	0	0	0	164
47.0607	Airframe Mechanics and Aircraft Maintenance Technology/Technician	0	0	37	47	0	0	0	84
15.0303	Electrical, Electronic, and Communications Engineering Technology/Technician	12	6	42	4	3	0	0	67
14.0101	Engineering, General	0	0	0	0	65	1	0	66
14.3601	Manufacturing Engineering	0	0	0	0	23	30	0	53
15.0405	Robotics Technology/Technician	3	0	24	0	0	11	0	38
52.0203	Logistics, Materials, and Supply Chain Management	0	0	5	0	31	0	0	36
14.9999	Engineering, Other	0	0	0	0	0	30	0	30
49.0102	Airline/Commercial/Professional Pilot and Flight Crew	0	0	11	0	18	0	0	29
15.0000	Engineering Technologies/Technicians, General	0	0	7	0	22	0	0	29
15.0404	Instrumentation Technology/Technician	0	2	21	4	0	0	0	27
15.0499	Electromechanical Technologies/Technicians, Other	20	0	0	0	0	0	0	20
14.4201	Mechatronics, Robotics, and Automation Engineering	4	5	1	0	10	0	0	20
01.0205	Agricultural Mechanics and Equipment/Machine Technology/Technician	0	0	5	7	0	0	0	12
15.1502	Engineering Design	0	0	0	0	0	10	0	10
14.1301	Engineering Science	0	0	0	0	9	0	0	9
14.2701	Systems Engineering	0	0	0	0	0	9	0	9
15.0805	Mechanical/Mechanical Engineering Technology/Technician	0	0	8	0	0	0	0	8
15.9999	Engineering/Engineering-Related Technologies/Technicians, Other	0	0	0	0	0	7	0	7
47.0609	Avionics Maintenance Technology/Technician	3	0	0	0	0	0	0	3
14.1201	Engineering Physics/Applied Physics	0	0	0	0	3	0	0	3
14.3901	Geological/Geophysical Engineering	0	0	0	0	2	1	0	3
47.0608	Aircraft Powerplant Technology/Technician	0	0	1	0	0	0	0	1
49.0104	Aviation/Airway Management and Operations	0	0	0	0	0	0	0	0
15.0403	Electromechanical/Electromechanical Engineering Technology/Technician	0	0	0	0	0	0	0	0
15.0407	Mechatronics, Robotics, and Automation Engineering Technology/Technician	0	0	0	0	0	0	0	0
15.1601	Nanotechnology	0	0	0	0	0	0	0	0
00.0000	Total	63 (8.6%)	45 (6.2%)	262 (36.0%)	73 (10.0%)	186 (25.5%)	99 (13.6%)	0	728

Source: RealTime Talent analysis of Chmura Economics JobsEQ®, <http://www.chmuraecon.com/jobseq/>. Job Posting Trends section uses data from Gartner TalentNeuron Plan, accessed 1/10/2024 at talentneuronplan.gartner.com Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2023Q4 dataset accessed at analyst.lightcast.io



Institution Type	Completions (2022)	Market Share
Public, 2-year	406	55.8%
Public, 4-year or above	152	20.9%
Private not-for-profit, 4-year or above	149	20.5%
Private for-profit, 4-year or above	21	2.9%

Over half (55.8%) of awards were conferred by public two-year institutions, with Hennepin Technical College and Dunwoody College of Technology comprising 19.6% of SY2022 awards conferred. In SY2021, Minneapolis Community and Technical College was the institution with the second greatest number of completions. Completions are up overall by 31.6% from 2012.

Aviation and Drone Technology Postsecondary Program Awards by Institution, SY2022

Institution	Completions (2022)	Growth % YOY (2022)	Market Share (2022)	IPEDS Tuition & Fees (2022)	Completions Trend (2018-2022)
Hennepin Technical College	84	-6.7%	11.5%	\$5,881	
Dunwoody College of Technology	59	-4.8%	8.1%	\$24,611	
University of St Thomas	54	3.8%	7.4%	\$50,366	
Lake Superior College	53	47.2%	7.3%	\$6,404	
Minneapolis Community and Technical College	41	-52.9%	5.6%	\$6,098	
Minnesota State University-Mankato	40	-13.0%	5.5%	\$9,444	
University of Minnesota-Twin Cities	36	24.1%	4.9%	\$15,859	
Ridgewater College	36	-10.0%	4.9%	\$6,114	
Central Lakes College-Brainerd	29	11.5%	4.0%	\$6,140	
Metropolitan State University	28	-12.5%	3.8%	\$9,684	
South Central College	26	-31.6%	3.6%	\$6,146	
University of Northwestern-St Paul	26	85.7%	3.6%	\$35,340	
Saint Paul College	25	47.1%	3.4%	\$6,318	
Bemidji State University	22	-12.0%	3.0%	\$10,130	
Academy College	21	75.0%	2.9%	\$17,997	
Alexandria Technical & Community College	21	-12.5%	2.9%	\$6,107	
Minnesota State College Southeast	21	50.0%	2.9%	\$7,490	
St Cloud Technical and Community College	20	-4.8%	2.7%	\$6,075	
Saint Cloud State University	18	-40.0%	2.5%	\$10,117	
Northland Community and Technical College	16	-27.3%	2.2%	\$6,244	
Anoka Technical College	14	7.7%	1.9%	\$6,075	
Minnesota West Community and Technical College	12	9.1%	1.6%	\$6,484	
Bethany Lutheran College	7	16.7%	1.0%	\$29,010	
Century College	7	40.0%	1.0%	\$6,105	
Minnesota State University Moorhead	4	-42.9%	0.5%	\$10,236	
Bethel University	2	100.0%	0.3%	\$41,270	
University of Minnesota-Duluth	2	0.0%	0.3%	\$14,126	
Winona State University	2	Insf. Data	0.3%	\$10,492	
Pine Technical & Community College	1	Insf. Data	0.1%	\$4,643	
Saint Mary's University of Minnesota	1	-50.0%	0.1%	\$41,150	

Source: RealTime Talent analysis of Chmura Economics JobsEQ®, <http://www.chmuraecon.com/jobseq/>. Job Posting Trends section uses data from Gartner TalentNeuron Plan, accessed 1/10/2024 at talentneuronplan.gartner.com Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2023Q4 dataset accessed at analyst.lightcast.io

Graduate Demographics

Postsecondary program diversity varies by program across the Aviation and Drone Technology pathway. Automation Engineering Technology postsecondary programs continue to have the largest number of African American and Hispanic students who conferred awards in SY2022. Manufacturing Engineering programs have the largest number of international students, and all programs have an overrepresentation of male students.³ Overall, the total number of international students increased by seven from the previous school year. The total number of female graduates in programs aligned to the Automotive Technology pathway.

³ [NCES IPEDS](#) refers to international students that do not have resident status in the United States as “nonresident aliens.” This title aligns to Federal tax definitions and according to NCES IPEDS refers to “a person who is not a citizen or national of the United States and who is in this country on a visa or temporary basis and does not have the right to remain indefinitely. Note: Nonresident aliens are reported separately, rather than in any of the racial/ethnic categories.” They are not included in calculations of BIPOC talent in this report as race and ethnicity information is not provided for these international students. The terminology of “international student” has been used in this report as it is more familiar to a common audience. <https://nces.ed.gov/ipeds/report-your-data/race-ethnicity-definitions>. For more information, view this article from Berkeley on tax filing status of international students. <https://internationaloffice.berkeley.edu/taxes/tax-filing-status>

Race and Gender of Graduates Receiving Postsecondary Awards in SY2022, Minnesota

CIP Code	Description	All 2021 Graduates	International Student*	Black or African American, non-Hispanic	American Indian or Alaska Native	Asian, Native Hawaiian or Other Pacific Islander	Hispanic or Latino	White, non-Hispanic	Multiple or unknown race/ethnicity	Gender - Males	Gender - Females
01.0205	Agricultural Mechanics and Equipment/Machine Technology/Technician	12	0	0	0	0	0	12	0	11	1
14.0101	Engineering, General	66	1	1	0	1	4	56	3	51	15
14.1201	Engineering Physics/Applied Physics	3	1	0	1	0	0	1	0	2	1
14.1301	Engineering Science	9	1	0	0	0	0	8	0	8	1
14.2701	Systems Engineering	9	2	1	0	1	0	4	1	8	1
14.3601	Manufacturing Engineering	53	10	2	0	8	1	31	1	38	15
14.3901	Geological/Geophysical Engineering	3	0	0	0	0	0	3	0	2	1
14.4201	Mechatronics, Robotics, and Automation Engineering	20	0	0	0	0	2	18	0	16	4
14.9999	Engineering, Other	30	1	2	0	1	1	24	1	17	13
15.0000	Engineering Technologies/Technicians, General	29	0	4	0	1	2	21	1	26	3
15.0303	Electrical, Electronic, and Communications Engineering Technology/Technician	67	1	6	1	17	3	35	4	53	14
15.0403	Electromechanical/Electromechanical Engineering Technology/Technician	0	0	0	0	0	0	0	0	0	0
15.0404	Instrumentation Technology/Technician	27	0	2	1	0	1	23	0	25	2
15.0405	Robotics Technology/Technician	38	2	0	0	4	2	26	4	32	6
15.0406	Automation Engineer Technology/Technician	164	2	14	0	13	16	116	3	151	13
15.0499	Electromechanical Technologies/Technicians, Other	20	0	4	0	4	1	11	0	20	0
15.0805	Mechanical/Mechanical Engineering Technology/Technician	8	0	0	0	0	0	8	0	8	0
15.1502	Engineering Design	10	2	2	0	1	0	2	3	6	4
15.1601	Nanotechnology	0	0	0	0	0	0	0	0	0	0
15.9999	Engineering/Engineering-Related Technologies/Technicians, Other	7	1	0	0	1	1	3	1	1	6
47.0607	Airframe Mechanics and Aircraft Maintenance Technology/Technician	84	2	11	0	2	5	55	9	79	5
47.0608	Aircraft Powerplant Technology/Technician	1	0	0	0	0	0	1	0	1	0
47.0609	Avionics Maintenance Technology/Technician	3	0	0	0	0	0	1	2	3	0
49.0102	Airline/Commercial/Professional Pilot and Flight Crew	29	0	0	0	1	2	24	2	26	3
49.0104	Aviation/Airway Management and Operations	0	0	0	0	0	0	0	0	0	0
52.0203	Logistics, Materials, and Supply Chain Management	36	1	6	1	3	3	21	1	27	9
All Aviation and Drone Technology Postsecondary Programs		728	27	55	4	58	44	504	36	611	117

[NCES IPEDS](#) refers to international students that do not have resident status in the United States as “nonresident aliens.” This title aligns to Federal tax definitions and according to NCES IPEDS refers to “a person who is not a citizen or national of the United States and who is in this country on a visa or temporary basis and does not have the right to remain indefinitely. Note: Nonresident aliens are reported separately, rather than in any of the racial/ethnic categories.” They are not included in calculations of BIPOC talent in this report as race and ethnicity information is not provided for these international students. The terminology of “international student” has been used in this report as it is more familiar to a common audience. <https://nces.ed.gov/ipeds/report-your-data/race-ethnicity-definitions>. For more information, view this article from Berkeley on tax filing status of international students. <https://internationaloffice.berkeley.edu/taxes/tax-filing-status>

Source: RealTime Talent analysis of Chmura Economics JobsEQ®, <http://www.chmuraecon.com/jobseq/>. Job Posting Trends section uses data from Gartner TalentNeuron Plan, accessed 1/10/2024 at talentneuronplan.gartner.com. Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2023Q4 dataset accessed at analyst.lightcast.io

Postsecondary programs aligned to all Aviation and Drone Technology pathway occupations except for Electro-Mechanical and Mechatronics Technologists and Technicians and Avionics Technicians are underproducing graduates in comparison to national benchmarks. Each occupation in the Aviation and Drone Technology pathway except Aircraft Structure, Surfaces, Rigging, and Systems Assemblers are experiencing talent shortages. The 27 aligned programs for the Aviation and Drone Technology pathway all have a low share of BIPOC graduates, and a low share of female graduates. The share of BIPOC graduates decreased by 8.2 percentage points from the 2021 school year and the share of female graduates decreased by 0.2 percentage points from the 2021 school year.

Postsecondary Strategy Summary Table, Minnesota 2023

Occupation	Related Programs*	2023Q2 Empl	Workforce BIPOC by Race	Workforce Hispanic/Latinx	Workforce Female	Workforce Under 45	SY2022 Graduates (Certificate and AA/AS only)	Award Gap (All Award Levels)**	Graduates BIPOC by Race or Ethnicity (All Award Levels)	Graduates Female (All Award Levels)
Airline Pilots, Copilots, and Flight Engineers	<ul style="list-style-type: none"> Airline/Commercial/Professional Pilot and Flight Crew 	2,437	3.9%	3.2%	8.0%	53.9%	11	Y	0.41%	0.41%
Aircraft Mechanics and Service Technicians	<ul style="list-style-type: none"> Agricultural Mechanics and Equipment/Machine Technology/Technician Airframe Mechanics and Aircraft Maintenance Technology/Technician 	2,146	13.3%	5.8%	4.5%	53.3%	42	Y	3.0%	0.82%
Engineers, All Other	<ul style="list-style-type: none"> Engineering, General Engineering Physics/Applied Physics Engineering Science Systems Engineering Manufacturing Engineering Geological/Geophysical Engineering Mechatronics, Robotics, and Automation Engineering Engineering, Other 	1,868	16.6%	2.2%	13.0%	56.1%	0	Y	3.3%	7.0%
Commercial Pilots*	<ul style="list-style-type: none"> Airline/Commercial/Professional Pilot and Flight Crew 	1,079	2.6%	2.6%	7.9%	51.5%	11	Y	0.41%	0.41%
Air Traffic Controllers	<ul style="list-style-type: none"> Aviation/Airway Management and Operations 	553	20.8%	7.4%	19.6%	56.9%	0	Y	N/A no awards	N/A no awards
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	<ul style="list-style-type: none"> Aircraft Powerplant Technology/Technician 	437	21.4%	6.6%	31.8%	56.2%	1	Y	0.0%	0.0%
Electro-Mechanical and Mechatronics Technologists and Technicians	<ul style="list-style-type: none"> Engineering Technologies/Technicians, General Electrical, Electronic, and Communications Engineering Technology/Technician Electromechanical/Electromechanical Engineering Technology/Technician Instrumentation Technology/Technician Robotics Technology/Technician Automation Engineer Technology/Technician Mechanical/Mechanical Engineering Technology/Technician Engineering Design Nanotechnology Engineering/Engineering-Related Technicians, Other 	304	16.2%	3.0%	15.3%	51.0%	298	N	11.7%	6.6%
Airfield Operations Specialists*	<ul style="list-style-type: none"> Aviation/Airway Management and Operations 	282	20.5%	7.4%	19.6%	57.2%	0	Y	0.0%	0.0%
Aircraft Cargo Handling Supervisors	<ul style="list-style-type: none"> Logistics, Materials, and Supply Chain Management 	170	25.8%	6.0%	25.4%	52.5%	5	Y	1.51%	1.2%
Avionics Technicians	<ul style="list-style-type: none"> Avionics Maintenance Technology/Technician 	94	14.3%	5.6%	4.3%	54.5%	3	N	0.3%	0.0%
Aviation and Drone Technology Pathway	All 26 aligned programs	9,370	11.5%	4.1%	10.6%	54.1%	370	Y	21.0%	16.1%
All Occupations		3,075,767	16.0%	5.4%	48.1%	56.7%	29,072		27.7%	66.0%

NOTE: Red highlighting indicates lower than overall share of workforce or graduate pool, or existence of occupation or award gap. *Related programs may overlap among occupations within the pathway or across other Transportation career pathways. Only those programs most tightly aligned to the occupation in question are listed in this column. **Award gaps are estimated based on a wider alignment of programs than what is illustrated in this table.

Source: RealTime Talent analysis of Chmura Economics JobsEQ®, <http://www.chmuraecon.com/jobseq/>. Job Posting Trends section uses data from Gartner TalentNeuron Plan, accessed 1/10/2024 at talentneuronplan.gartner.com. Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2023Q4 dataset accessed at analyst.lightcast.io

Conclusion

The Aviation and Drone Technology pathway employment forecast declined slightly in 2023, now forecasting a flat (0.0%) annual employment growth over the next five years, compared to the forecasted growth of 0.2% from 2022Q3 estimates. Of the ten occupations included in the Aviation and Drone Technology pathway, Aircraft Structure and Systems Assemblers, Air Traffic Controllers, Airline Pilots, and Aircraft Cargo Handling Supervisors are uniquely concentrated in Minnesota to a higher degree than seen in the nation overall, with location quotients of 1.52, 1.41, 1.37, and 1.16 respectively. On average, Aviation careers pay about \$125,500 per year—about \$59,400 higher than the average wage statewide across all positions. While average wages in the Aviation and Drone Technology pathway increased substantially from the prior year’s estimates (by \$10,300), average wages for several occupations within the pathway saw declines. Avionics Technicians, Aircraft Mechanics and Service Technicians, and Air Traffic Controllers saw average wages drop from the prior year’s estimates. Entry-level wages in the pathways far exceed the average entry-level wages observed across all occupations statewide, paying an average of \$80,800 annually for entry-level talent.

About 12.6% of workers employed in the Aviation and Drone Technology pathway in Minnesota are underemployed (about 1,136 underemployed people). Each of the 27 programs aligned with the Aviation and Drone Technology pathway have a low share of BIPOC graduates and a low share of female graduates. There is an opportunity to diversify student enrollment into these programs.

FAQ

How is employment forecast determined?

Forecast employment growth uses national projections from the Bureau of Labor Statistics, forecasts for 2022-2032, adapted for regional growth patterns by Chmura. Employment data are based on [occupation forecasts](#) and event-based forecasts if applicable. Forecasts are developed at the county level; therefore, for detailed (6-digit NAICS) ownership-specific industries, the forecast employment growth for a zip code or place (city, town, etc.) is taken from the forecast of the county to which it belongs.

What is a location quotient?

A location quotient (LQ) is a measurement of concentration in comparison to the nation. An LQ of 1.00 indicates a region has the same concentration of an industry (or occupation) as the nation. An LQ of 2.00 would mean the region has twice the expected employment compared to the nation and an LQ of 0.50 would mean the region has half the expected employment in comparison to the nation.

What is a cluster?

A cluster is a geographic concentration of interrelated industries or occupations. If a regional cluster has a location quotient of 1.25 or greater, the region is considered to possess a competitive advantage in that cluster.

What is separation demand?

Separation demand is the number of jobs required due to separations—labor force exits (including retirements) and turnover resulting from workers moving from one occupation into another. Note that separation demand does not include all turnover—it does not include when workers stay in the same occupation but switch employers. The total projected demand for an occupation is the sum of the separation demand and the growth demand (which is the increase or decrease of jobs in an occupation expected due to expansion or contraction of the overall number of jobs in that occupation).

What is the difference between industry wages and occupation wages?

Industry wages and occupation wages are estimated via separate data sets, often the time periods being reported do not align, and wages are defined slightly differently in the two systems (for example, certain bonuses are included in the industry wages but not the occupation wages). It is therefore common that estimates of the average industry wages and average occupation wages in a region do not match exactly.

What is NAICS?

The North American Industry Classification System (NAICS) is used to classify business establishments according to the type of economic activity. The NAICS Code comprises six levels, from the “all industry” level to the 6-digit level. The first two digits define the top level category, known as the “sector,” which is the level examined in this report.

What is SOC?

The Standard Occupational Classification system (SOC) is used to classify workers into occupational categories. All workers are classified into one of over 804 occupations according to their occupational definition. To facilitate classification, occupations are combined to form 22 major groups, 95 minor groups, and 452

occupation groups. Each occupation group includes detailed occupations requiring similar job duties, skills, education, or experience.

Who created this report?

This report was developed by RealTime Talent for the Transportation Center of Excellence. If you have questions about the data found in this report, or are interested in learning more, please contact the Senior Director of Strategic Research Erin Olson at erin@realtimentalentmn.org or visit the RealTime Talent website at www.realtimentalent.org