AVIATION AND DRONE TECH

2024 Supply & Demand Analysis Overview

Published January 2025

MINNESOTA STATE
Transportation Center of Excellence

Developed for the Minnesota State Transportation Center of Excellence by RealTime Talent

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Introduction and Sector Overview....2
Industry/Occupation Mix....4
Talent Demand Detail....5
Employment and Wage Overview....5
Employment Types....6
Wage Analysis....7
Job Posting Trends....8
Talent Supply Detail....12
Talent Unemployment, Underemployment, and Educational Attainment....12
Workforce Demographics....13
Aligned Postsecondary Programs....14
Graduate Demographics....17
Conclusion....21
FAQ....22

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, as well as designing, servicing, or piloting drones.[1] In all, about 10,297 people work in Aviation and Drone Technology roles in Minnesota as of the second quarter of 2024—a 9.9% increase (927 workers) from a year prior.

Overall employment in Minnesota grew by nearly 25,855 workers (0.8%) between the second quarter of 2023 and the second quarter of 2024, a cooling of the growth seen in the prior year. Over the past five years (since the second quarter of 2019), employment grew by about 8,807 workers, or an 0.1% average annual growth in total statewide employment. Over the next five years, overall employment is forecast to remain flat (0.0% average annual growth), while all Transportation Occupations together forecast moderate growth of 0.1% average annual growth. During this time frame, Aviation and Drone Technology employment is also anticipated to be relatively flat in Minnesota (-0.1% annually), with employment declining by about 57 total jobs. Total baseline demand for Aviation and Drone Technology talent is anticipated to be around 4,429 professionals needed to fill positions due to job exits and transfers, such as retirements and job changes.

Transportation Pathways in Minnesota – Baseline Forecast, 2024Q2

	Current					5-Year History		5-Year Baseline Forecast				
Occupation	Empl	Avg Ann Wages[2]	LQ	Unempl	Unempl Rate	Empl Change	Ann % Change	Total Demand	Exits	Transfers	Empl Change	Ann % Change
Automotive Technology Pathway	20,796	$70,800	0.97	323	1.5%	-806	-0.8%	7,773	2,869	4,826	78	0.1%
Aviation and Drone Technology Pathway	10,297	$132,400	0.96	105	1.0%	308	0.6%	4,427	1,450	3,034	-57	-0.1%
Collision Repair Pathway	7,342	$58,400	1.09	179	2.4%	244	0.7%	3,035	1,186	1,950	-101	-0.3%
Diesel Equipment and Truck Pathway	12,514	$68,400	1.02	92	0.7%	282	0.5%	5,328	2,000	3,244	84	0.1%
Marine and Power Sports Pathway	4,149	$52,000	0.83	125	2.9%	-10	0.0%	2,413	1,027	1,413	-27	-0.1%
Truck Driving Pathway*	96,100	$55,400	0.95	3,351	3.4%	857	0.2%	53,460	24,107	28,491	862	0.2%
Transportation Occupations	**141,847**	**$64,100**	**0.95**	**3,852**	**2.6%**	**616**	**0.1%**	**71,066**	**29,736**	**40,624**	**706**	**0.1%**
Total - All Occupations	**3,101,622**	**$69,500**	**1.00**	**90,732**	**2.8%**	**8,807**	**0.1%**	**1,656,897**	**685,274**	**973,094**	**-1,471**	**0.0%**

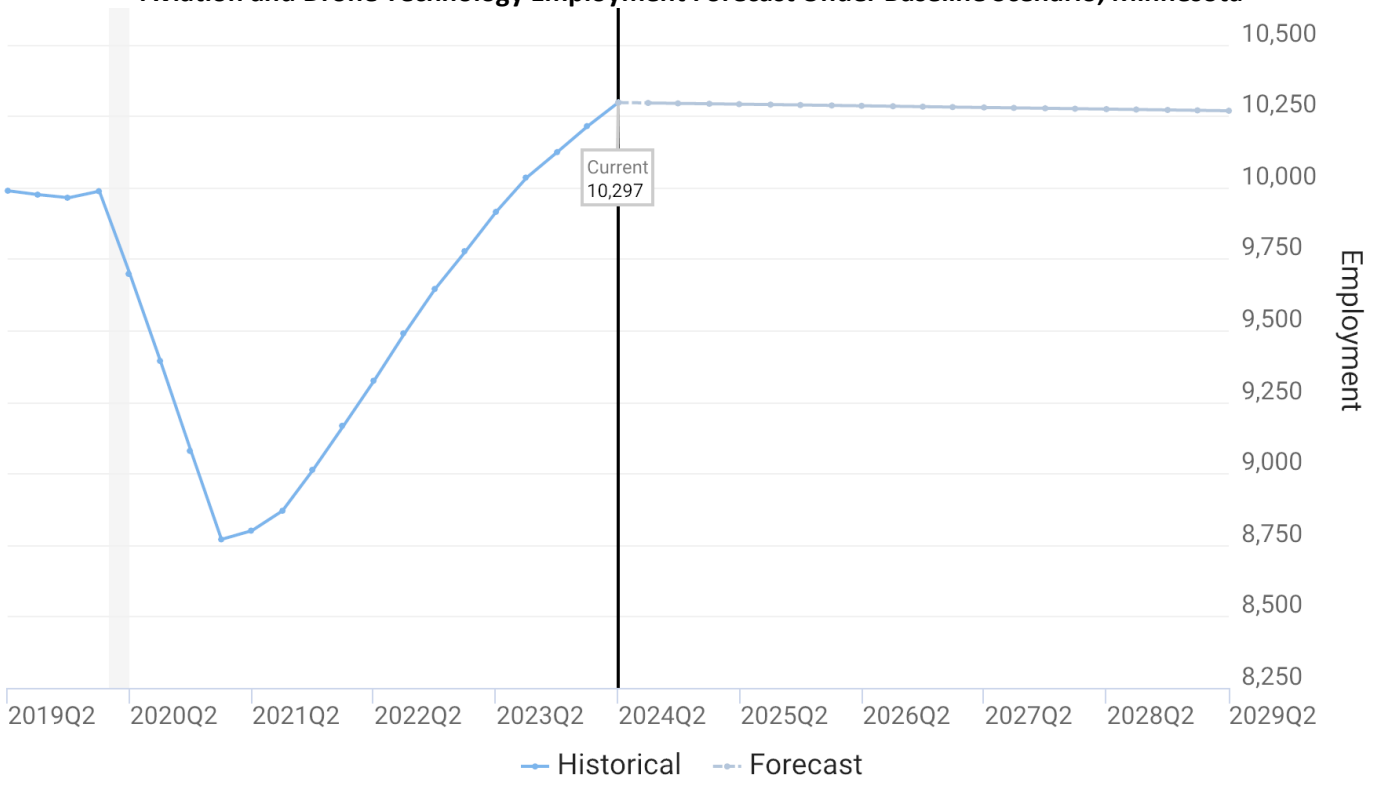
*This pathway includes School Bus Driver careers as of 2022, which were not included in the 2020 or 2021 estimates of career pathway employment or demand.

Source: JobsEQ®
Data as of 2024Q2 unless noted otherwise
Note: Figures may not sum due to rounding.
1. Data based on a four-quarter moving average unless noted otherwise.
2. 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 TalentNeuron, accessed 1/8/2025 at talentneuron.com Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2024Q4 dataset accessed at analyst.lightcast.io

Minnesota's job market continued to cool in 2024 from the strong recoveries of 2021-2023. Unemployment rates have stabilized around 2.8% as of 2024. 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 has seen continued employment growth in the past four quarters, surpassing pre-pandemic employment, though the forecast for the next five years is flat (-0.1% change annually).

Aviation and Drone Technology Employment Forecast Under Baseline Scenario, Minnesota



Source: JobsEQ® Data as of 2024Q2 The shaded areas of the graph represent national recessions.

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Industry/Occupation Mix

Aviation and Drone Technology talent is primarily concentrated in the Scheduled Air Transportation Industry (39.5%) but are critical to a wide range of air transportation and aerospace industries in Minnesota, now surpassing the pre-pandemic volumes of Aviation and Drone Technology talent employment.

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

		CURRENT			10-YEAR DEMAND			
NAICS Code	Industry Title	% of Occ Empl	Empl	Avg Ann Wages	Exits	Transfers	Empl Growth	Total Demand
4811	Scheduled Air Transportation	39.5%	4,069	$160,100	1,277	2,805	-121	3,961
4881	Support Activities for Air Transportation	9.9%	1,023	$91,700	282	571	1	853
5511	Management of Companies and Enterprises	4.0%	411	$137,100	111	231	3	345
5413	Architectural, Engineering, and Related Services	3.9%	398	$111,700	91	161	-4	248
4812	Nonscheduled Air Transportation	3.8%	392	$138,200	133	292	19	444
3345	Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	3.6%	371	$115,200	87	148	-9	226
9261	Administration of Economic Programs	3.2%	331	$159,500	69	207	-14	263
3364	Aerospace Product and Parts Manufacturing	2.4%	244	$87,200	71	128	-25	174
4921	Couriers and Express Delivery Services	1.9%	195	$141,100	60	124	16	199
6219	Other Ambulatory Health Care Services	1.8%	182	$102,100	60	129	-2	188
5613	Employment Services	1.8%	181	$92,700	49	90	-6	134
9211	Executive, Legislative, and Other General Government Support	1.7%	170	$122,600	38	100	-3	136
6115	Technical and Trade Schools	1.4%	140	$137,300	44	99	-4	139
3344	Semiconductor and Other Electronic Component Manufacturing	1.4%	139	$120,100	34	57	9	100
9231	Administration of Human Resource Programs	1.2%	120	$129,700	28	61	1	90
3391	Medical Equipment and Supplies Manufacturing	1.1%	118	$101,400	26	44	-2	68
5417	Scientific Research and Development Services	1.0%	99	$131,700	24	41	7	71
9221	Justice, Public Order, and Safety Activities	0.9%	95	$127,900	21	49	-4	66
5416	Management, Scientific, and Technical Consulting Services	0.9%	94	$117,900	23	42	8	73
5415	Computer Systems Design and Related Services	0.9%	89	$127,600	22	39	13	74
–	All Others	14.0%	1,437	–	349	649	4	1,002

Source: JobsEQ®
Data as of 2024Q2. 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.

Source: RealTime Talent analysis of Chmura Economics JobsEQ®, http://www.chmuraecon.com/jobseq/. Job Posting Trends section uses data from TalentNeuron, accessed 1/8/2025 at talentneuron.com Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2024Q4 dataset accessed at analyst.lightcast.io

Talent Demand Detail

Employment and Wage Overview

Of all occupations found in the Aviation and Drone Technology pathway, the specific occupations of Air Traffic Controllers, Airline Pilots, Commercial Pilots, Airfield Operations Specialists, and Electro-Mechanical and Mechatronics Technologists and Technicians are uniquely concentrated in Minnesota to a higher degree than seen in the nation overall. On average, Aviation careers pay about $132,400 per year—about $62,900 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 $194,000 compared to Electro-Mechanical and Mechatronics Technologists and Technicians at $65,900 annually.

		Current					5-Year Baseline Forecast				
SOC	Occupation	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	2,516	$194,000	1.42	12	0.5%	1,369	434	967	-33	-0.3%
17-2199	Engineers, All Other	2,302	$120,800	0.78	32	1.4%	664	243	405	16	0.1%
49-3011	Aircraft Mechanics and Service Technicians	2,097	$91,800	0.76	11	0.5%	775	282	501	-7	-0.1%
53-2012	Commercial Pilots	1,410	$144,400	1.29	6	0.5%	798	246	549	2	0.0%
53-2021	Air Traffic Controllers	652	$167,500	1.55	3	0.5%	279	68	219	-7	-0.2%
53-2022	Airfield Operations Specialists	406	$71,100	1.28	2	0.5%	175	42	137	-4	-0.2%
17-3024	Electro-Mechanical and Mechatronics Technologists and Technicians	345	$65,900	1.18	8	2.2%	131	52	89	-10	-0.6%
49-2091	Avionics Technicians	232	$70,700	0.52	18	7.2%	87	29	58	0	0.0%
53-1041	Aircraft Cargo Handling Supervisors	171	$71,400	0.99	3	1.6%	84	26	58	0	0.0%
51-2011	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	165	$70,600	0.31	10	5.5%	64	29	51	-16	-2.0%
	Aviation and Drone Technology Pathway	**10,297**	**$132,400**	**0.96**	**105**	**1.0%**	**4,427**	**1,450**	**3,034**	**-57**	**-0.1%**
	Total - All Occupations	**3,101,622**	**$69,500**	**1.00**	**90,732**	**2.8%**	**1,656,897**	**685,274**	**973,094**	**-1,471**	**0.0%**

Source: JobsEQ®
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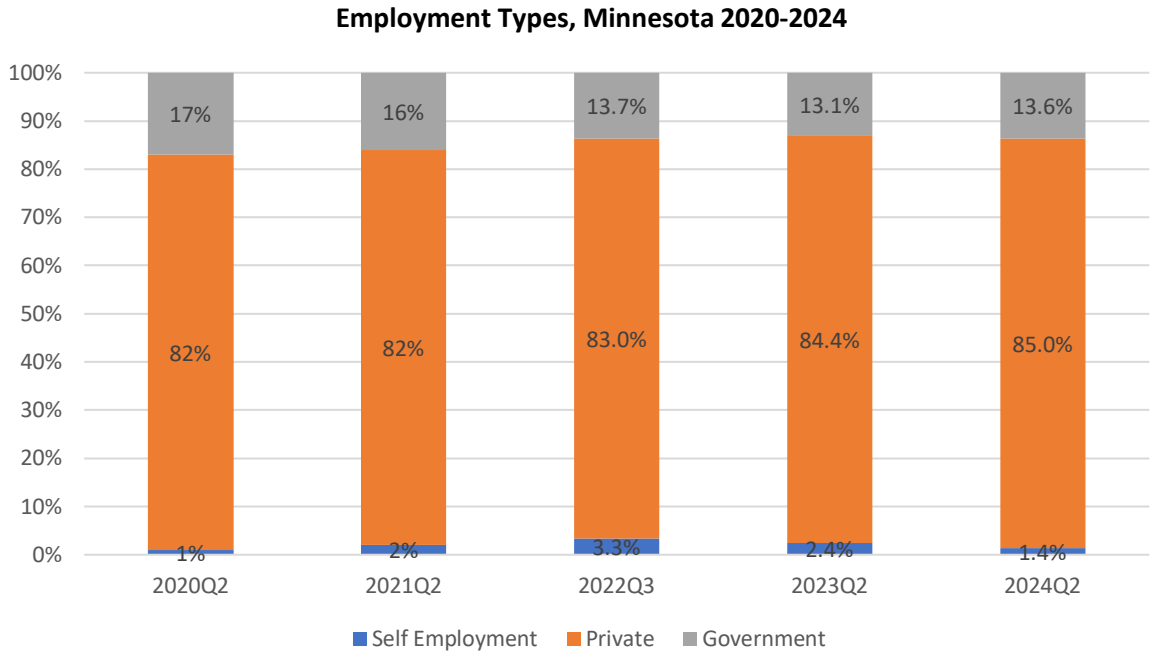
Employment Types

About 85% of people employed in Aviation and Drone Technology careers in Minnesota work for private employers, while only about 1.4% are self-employed (a slight decrease from last year). The remaining 13.6% work for state, federal, or local government entities (mostly federal). The share employed by government agencies has declined slightly over the past few years.



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Wage Analysis

The Aviation and Drone Technology pathway saw wage averages increase from the prior year's estimates across all occupations. Entry-level wages in the pathways far exceed the average entry-level wages observed across all occupations statewide, paying an average of $87,100 annually for entry-level talent.

Occupation Wages, Average Annual in Minnesota, 2024Q2

					Percentiles					Education and Training		
SOC	Occupation	Mean	Entry Level	Experienced	10%	25%	50% (Median)	75%	90%	Typical Entry-Level Education	Previous Work Experience	Typical On-the-Job Training
17-2199	Engineers, All Other	$120,800	$84,300	$139,100	$79,100	$95,900	$117,200	$139,300	$165,300	BA	None	None
17-3024	Electro-Mechanical and Mechatronics Technologists and Technicians	$65,900	$47,100	$75,200	$45,500	$51,900	$63,800	$80,100	$90,200	AS	None	None
49-2091	Avionics Technicians	$70,700	$45,000	$83,500	$41,000	$53,300	$71,700	$78,300	$97,000	Certificate	None	None
49-3011	Aircraft Mechanics and Service Technicians	$91,800	$56,100	$109,600	$53,700	$63,600	$84,100	$127,200	$137,700	Certificate	None	None
51-2011	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	$70,600	$47,900	$81,900	$44,500	$55,300	$69,200	$86,400	$102,200	HS/GED	None	Mod-term OJT
53-1041	Aircraft Cargo Handling Supervisors	$71,400	$53,400	$80,400	$52,900	$55,000	$59,900	$93,800	$103,900	HS/GED	< 5 years	None
53-2011	Airline Pilots, Copilots, and Flight Engineers	$194,000	$121,500	$230,200	$113,300	$141,700	$183,500	$233,800	$306,700	BA	< 5 years	Mod-term OJT
53-2012	Commercial Pilots	$144,400	$101,700	$165,700	$98,000	$111,300	$132,900	$190,600	$222,400	Certificate	None	Mod-term OJT
53-2021	Air Traffic Controllers	$167,500	$116,100	$193,300	$97,300	$148,500	$176,100	$198,700	$220,500	AS	None	Long-term OJT
53-2022	Airfield Operations Specialists	$71,100	$41,900	$85,800	$39,900	$47,200	$61,000	$85,300	$118,400	HS/GED	None	Long-term OJT
	Aviation and Drone Technology Pathway	**$132,400**	**$87,100**	**$155,000**	**$81,500**	**$100,300**	**$125,800**	**$163,600**	**$197,600**			
	Total - All Occupations	**$69,500**	**$34,600**	**$87,000**	**$32,000**	**$39,600**	**$54,500**	**$81,600**	**$119,000**			

Source: JobsEQ®
Wage data represent the average for all Covered Employment

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. While entry-level wages in Rural Greater Minnesota and Urban Greater Minnesota are close, Urban Greater Minnesota generally has higher wages on average and at the median and higher percentiles.

Aviation and Drone Technology Pathway Wages, 2024Q2

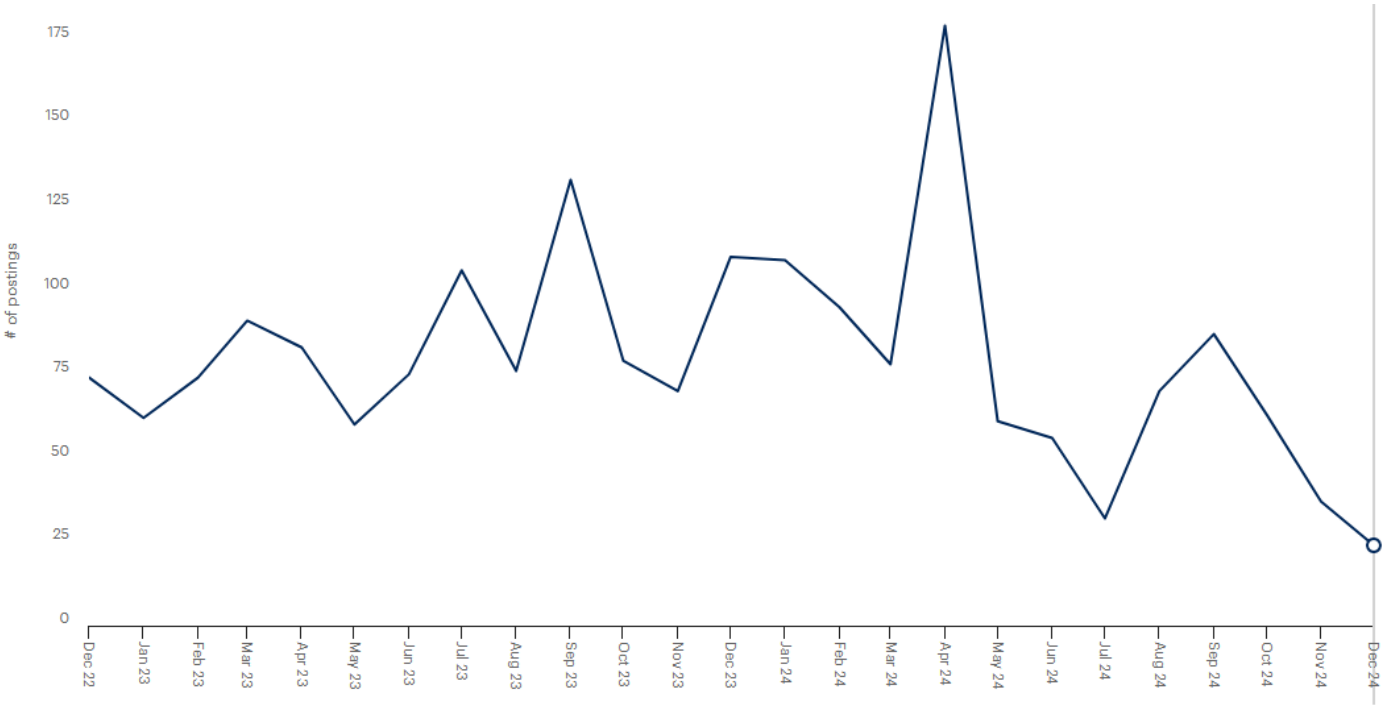
					Percentiles				
Region	Empl Count	Mean	Entry Level	Experienced	10%	25%	50% (Median)	75%	90%
Rural Greater Minnesota	902	$104,300	$71,400	$120,800	$66,100	$81,700	$99,000	$127,600	$152,700
Urban Greater Minnesota	851	$116,300	$74,800	$137,100	$70,100	$85,800	$109,500	$139,200	$169,000
7-County Metro	8,219	$137,500	$91,200	$160,600	$85,800	$104,200	$130,900	$170,300	$203,800
Minnesota	**10,297**	**$132,400**	**$87,100**	**$155,000**	**$81,500**	**$100,300**	**$125,800**	**$163,600**	**$197,600**

Source: RealTime Talent analysis of Chmura Economics JobsEQ®, http://www.chmuraecon.com/jobseq/. Job Posting Trends section uses data from TalentNeuron, accessed 1/8/2025 at talentneuron.com Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2024Q4 dataset accessed at analyst.lightcast.io

Job Posting Trends

Data in this section focuses on newly advertised jobs between January 1 and December 31, 2024 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 TalentNeuron; industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2024Q4 dataset. There were 767 new jobs advertised in Aviation careers across Minnesota during this timeframe, a decrease of -16% from the prior twelve months. The share of positions advertised by staffing and temp agencies in the Aviation and Drone Technology pathway grew to 14%, and Employment Placement Agencies were the top employer type in job postings. Posted wages increased to an average of $24.43 per hour (compared to $22.46 per hour in 2023), and there were about 3 hires per every 1 unique job postings advertised based on Lightcast estimates.

Volume of Career Pathway Online Job Postings in 2023 and 2024

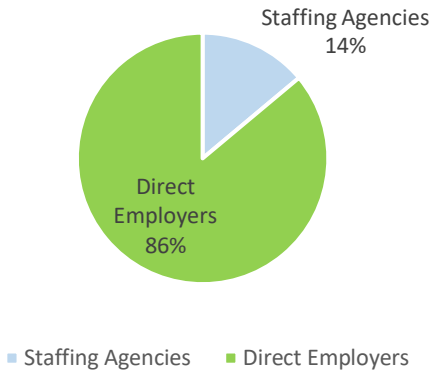


Top Employers by Volume of New Job Postings, With Change from Prior Year

	Employer	Percent Change between 2023 and 2024
1.	Army	-34%
2.	Navy	50%
3.	U.S. Air Force	1633%
4.	Department of the Air Force	80%
5.	SAIC	63%
6.	North Memorial Health Care	257%
7.	Delta Air Lines	-41%
8.	Honeywell	400%
9.	SUN COUNTRY AIRLINES	25%
10.	Cirrus Aircraft Corporation	-24%

Source: RealTime Talent analysis of Chmura Economics JobsEQ®, http://www.chmuraecon.com/jobseq/. Job Posting Trends section uses data from TalentNeuron, accessed 1/8/2025 at talentneuron.com Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2024Q4 dataset accessed at analyst.lightcast.io

New Job Postings Advertised in Minnesota by Employer Type



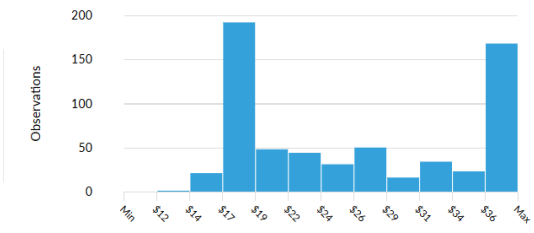
New Job Postings by Industry or Employer Type

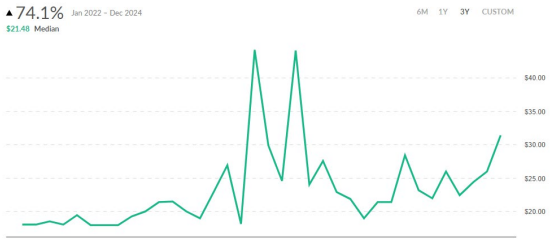
Industry	Total/Unique (Jan 2024 - Dec 2024)	Posting Intensity	Median Posting Duration
Employment Placement Agencies	448 / 212	2 : 1	21 days
Engineering Services	204 / 69	3 : 1	32 days
Other Airport Operations	117 / 61	2 : 1	23 days
Supermarkets and Other Grocery Retailers (except Convenience Retailers)	171 / 40	4 : 1	23 days
Scheduled Passenger Air Transportation	151 / 38	4 : 1	16 days
Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	94 / 35	3 : 1	14 days
Other Support Activities for Air Transportation	75 / 35	2 : 1	24 days
Aircraft Engine and Engine Parts Manufacturing	70 / 33	2 : 1	20 days
General Medical and Surgical Hospitals	74 / 28	3 : 1	37 days
Regulation and Administration of Transportation Programs	38 / 27	1 : 1	18 days

Pathway Advertised Salary Range

$24.43/hr

Median Advertised Salary





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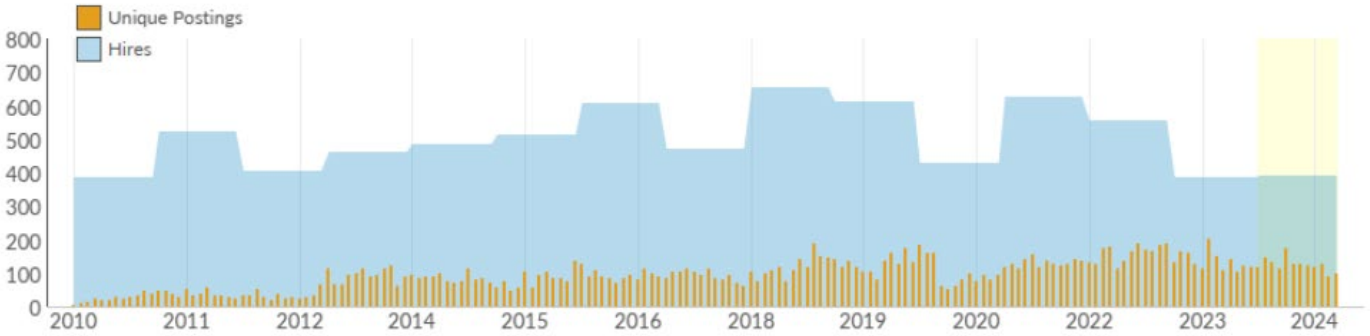
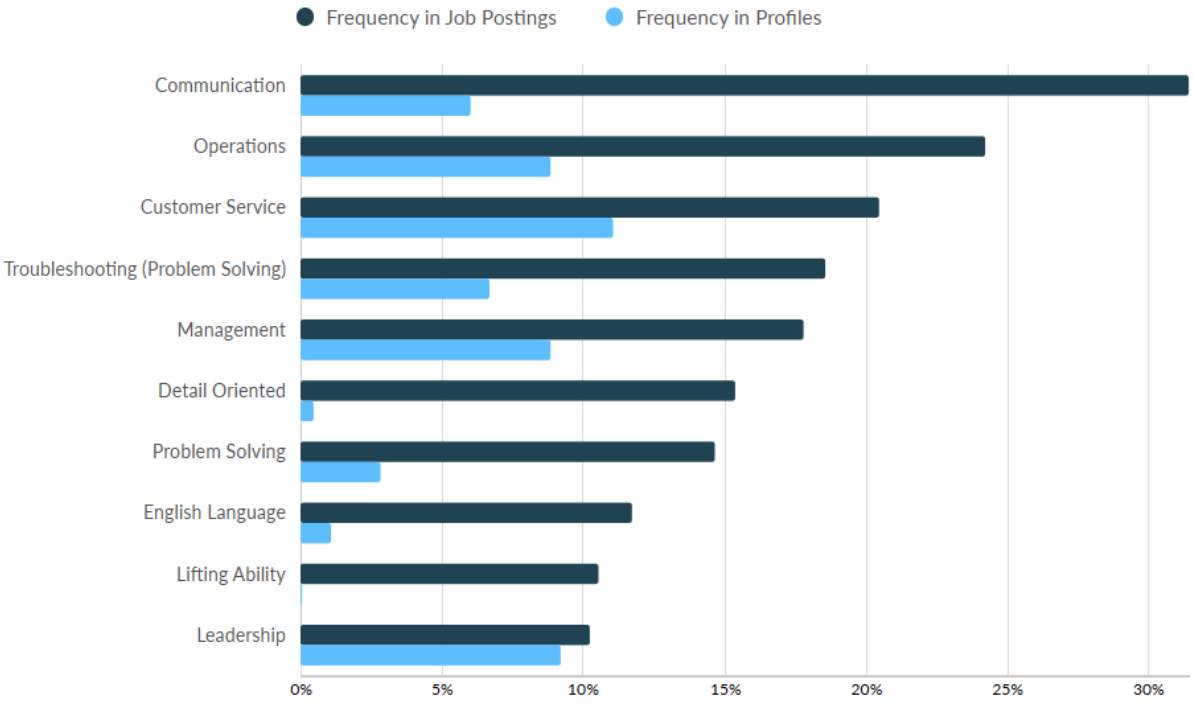
Monthly Ratio of Unique Job Postings to Estimated Hires



Top Common Skills



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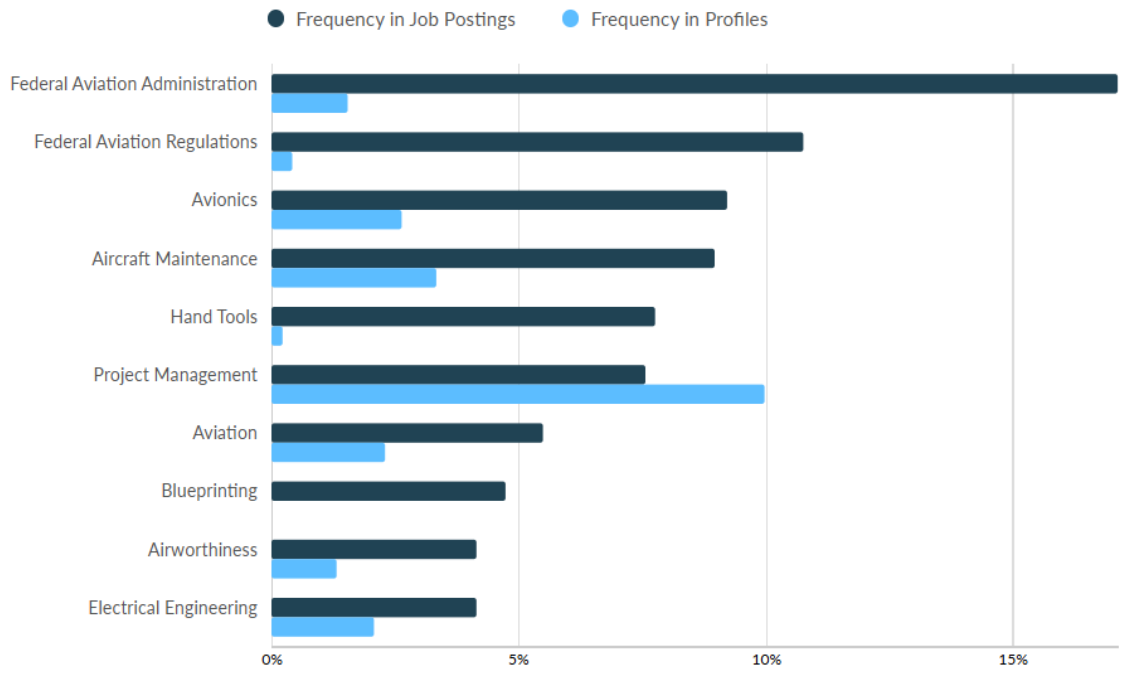
Top Specialized Skills



Top Certifications and Qualifications

Qualification	Postings with Qualification
Valid Driver's License	345
Airframe & Powerplant (A&P) Certificate	143
Drone Pilot Certificate	35
Airline Transport Pilot Licence	35
Professional Engineer (PE) License	33
Security Identification Display Area (SIDA) Badge	26
FAA First Class Medical Certificate	25
Commercial Driver's License (CDL)	23
FAA Multi-Engine Rating	22
FAA Instrument Rating	21

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Talent Supply Detail

Talent Unemployment, Underemployment, and Educational Attainment

At an overall pathway unemployment rate of 1.0% (a slight drop from the prior year), there are about 105 unemployed Aviation and Drone Technology professionals statewide. An additional 1,209 (an increase from the previous year's 1,136) 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

		Empl (Place of Residence)								Overall Occupation[1]		
SOC	Occupation	< 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%	1.6%	3.2%	5.3%	54.1%	27.1%	8.6%	2,307	N/A	32	1.4%
17-3024	Electro-Mechanical and Mechatronics Technologists and Technicians	1.7%	16.2%	19.3%	27.8%	28.2%	5.4%	1.3%	345	105	8	2.2%
49-2091	Avionics Technicians	1.1%	14.3%	22.6%	46.1%	14.5%	1.4%	0.0%	232	37	18	7.2%
49-3011	Aircraft Mechanics and Service Technicians	1.7%	20.3%	24.3%	34.1%	16.4%	3.0%	0.2%	2,079	411	11	0.5%
51-2011	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	10.5%	43.6%	19.5%	13.2%	11.4%	1.4%	0.5%	172	20	10	5.5%
53-1041	Aircraft Cargo Handling Supervisors	4.8%	27.3%	20.9%	14.5%	27.5%	4.3%	0.8%	167	57	3	1.6%
53-2011	Airline Pilots, Copilots, and Flight Engineers	0.2%	1.9%	4.5%	5.8%	68.9%	16.1%	2.6%	2,485	N/A	12	0.5%
53-2012	Commercial Pilots	0.2%	2.2%	5.0%	6.8%	68.0%	15.3%	2.5%	1,378	N/A	6	0.5%
53-2021	Air Traffic Controllers	0.4%	4.5%	14.2%	21.5%	50.4%	6.8%	2.2%	628	351	3	0.5%
53-2022	Airfield Operations Specialists	0.4%	4.3%	13.8%	20.5%	51.7%	7.1%	2.3%	411	229	2	0.5%
	Aviation and Drone Technology Pathway	**0.8%**	**7.7%**	**10.7%**	**15.1%**	**48.7%**	**13.7%**	**3.2%**	**10,204**	**1,209**	**105**	**1.0%**
	Total - All Occupations	**5.2%**	**20.6%**	**14.8%**	**13.9%**	**31.0%**	**10.7%**	**3.9%**	**3,094,991**	**533,165**	**90,732**	**2.8%**

Source: JobsEQ®
Data as of 2024Q2 unless noted otherwise
Note: Figures may not sum due to rounding.
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.

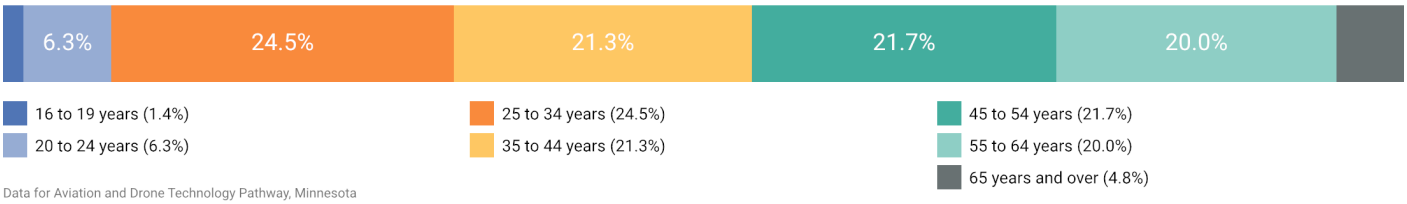
[2] Chmura adopts the New York Fed methodology of counting as underemployed only those who have acquired at least a Bachelor's degree and yet are working in an occupation that does not typically require a Bachelor's degree. In Occupation Diversity, the only occupations shown in the Underemployment table 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."

Source: RealTime Talent analysis of Chmura Economics JobsEQ®, http://www.chmuraecon.com/jobseq/. Job Posting Trends section uses data from TalentNeuron, accessed 1/8/2025 at talentneuron.com Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2024Q4 dataset accessed at analyst.lightcast.io

Workforce Demographics

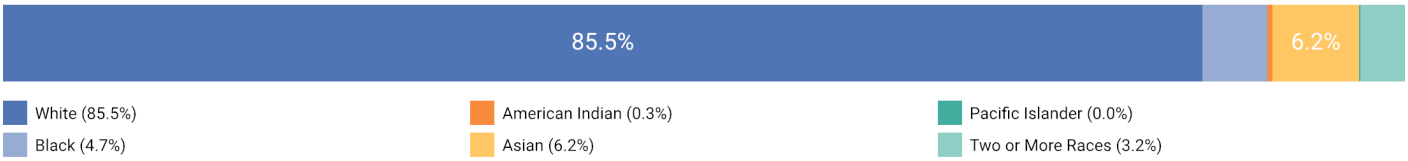
The share of the workforce under the age of 25 has remained steady from the prior year (7.7%) and the share over the age of 64 has increased to 4.8% based on 2024Q2 estimates. The largest demographic group by race are White, representing 85.5% (decreased by 3.0 percentage points from the previous year) of the total pathway's workforce, with the next largest cohort being Asian talent representing 6.2% of the workforce. About 4.3% of the pathway's workforce are Hispanic or Latinx, and 10.1% is female (a slight drop from the prior year).

Aviation and Drone Technology Workforce Age Demographics, 2024Q2



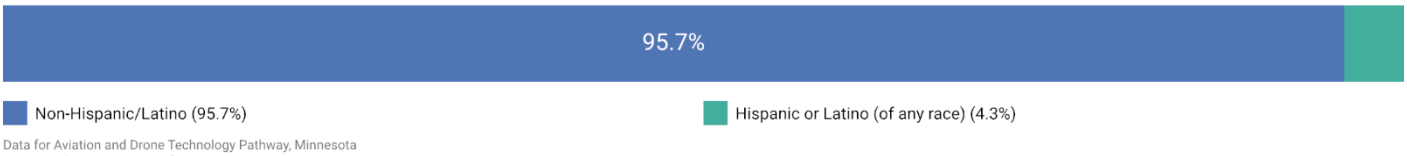
Data for Aviation and Drone Technology Pathway, Minnesota
Source: JobsEQ®. Data as of 2024Q2.

Aviation and Drone Technology Workforce Race Demographics, 2024Q2



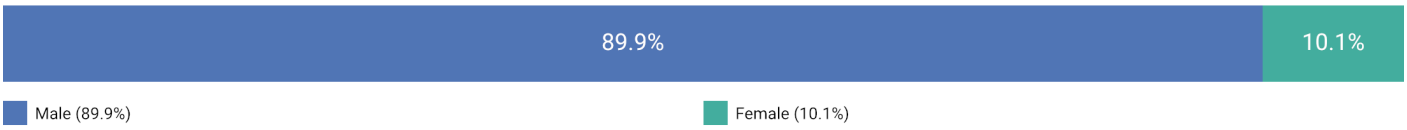
Data for Aviation and Drone Technology Pathway, Minnesota
Source: JobsEQ®. Data as of 2024Q2.

Aviation and Drone Technology Workforce Ethnicity Demographics, 2024Q2



Data for Aviation and Drone Technology Pathway, Minnesota
Source: JobsEQ®. Data as of 2024Q2.

Aviation and Drone Technology Workforce Gender Demographics, 2024Q2



Data for Aviation and Drone Technology Pathway, Minnesota
Source: JobsEQ®. Data as of 2024Q2.

Source: RealTime Talent analysis of Chmura Economics JobsEQ®, http://www.chmuraecon.com/jobseq/. Job Posting Trends section uses data from TalentNeuron, accessed 1/8/2025 at talentneuron.com Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2024Q4 dataset accessed at analyst.lightcast.io

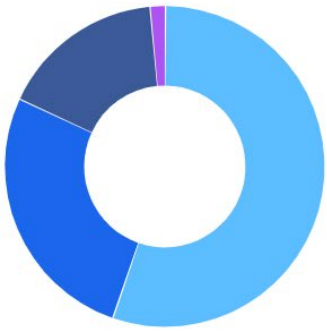
Aligned Postsecondary Programs

There were about 717 awards conferred at 31 different Minnesota postsecondary institutions in programs aligned to Aviation and Drone Technology careers in SY2023. Among these 266 were at the Associate level, and 133 were certificates that could be earned in less than two years. The average school had about 23 completions, but range from one to 91 completions. Five institutions offered programs remotely (16% of institutions), with 74 awards obtained remotely in 2023 (10% of all pathway completions). This is an increase in remote programs and awards compared to the prior year. 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.

Postsecondary Program Awards Aligned to Aviation and Drone Technology Careers by Level, SY2023

CIP Code	Title	Certificate < 1 Yr	Certificate 1+ but < 2 Yr	Associate's	Certificate 2+ but < 4 Yr	Bachelor's	Post-Bacc	Masters	Doctorate	Total Awards
15.0406	Automation Engineer Technology/Technician	21	43	99	10	0	0	0	0	173
15.0303	Electrical, Electronic, and Communications Engineering Technology/Technician	14	20	59	5	7	0	0	0	105
14.0101	Engineering, General	0	0	0	0	78	0	0	0	78
15.0405	Robotics Technology/Technician	10	0	34	0	0	0	20	0	64
47.0607	Airframe Mechanics and Aircraft Maintenance Technology/Technician	3	0	25	26	0	0	0	0	54
14.3601	Manufacturing Engineering	0	0	0	0	16	13	10	0	39
52.0203	Logistics, Materials, and Supply Chain Management	3	0	4	0	25	0	0	0	32
15.0404	Instrumentation Technology/Technician	0	0	25	4	0	0	0	0	29
15.0000	Engineering Technologies/Technicians, General	0	0	0	0	27	0	0	0	27
14.9999	Engineering, Other	0	0	0	0	0	0	21	0	21
49.0102	Airline/Commercial/Professional Pilot and Flight Crew	0	0	7	0	6	0	0	0	13
14.1201	Engineering Physics/Applied Physics	0	0	0	0	13	0	0	0	13
01.0205	Agricultural Mechanics and Equipment/Machine Technology/Technician	0	0	4	5	0	0	0	0	9
15.0499	Electromechanical Technologies/Technicians, Other	8	0	0	0	0	0	0	0	8
14.3901	Geological/Geophysical Engineering	0	0	0	0	7	0	1	0	8
14.4201	Mechatronics, Robotics, and Automation Engineering	0	0	0	0	8	0	0	0	8
15.0407	Mechatronics, Robotics, and Automation Engineering Technology/Technician	0	4	3	0	0	0	0	0	7
14.1301	Engineering Science	0	0	0	0	6	0	0	0	6
15.0805	Mechanical/Mechanical Engineering Technology/Technician	0	0	6	0	0	0	0	0	6
47.0609	Avionics Maintenance Technology/Technician	4	0	0	0	0	0	0	0	4
15.1502	Engineering Design	0	0	0	0	0	3	1	0	4
47.0608	Aircraft Powerplant Technology/Technician	3	0	0	0	0	0	0	0	3
15.9999	Engineering/Engineering-Related Technologies/Technicians, Other	0	0	0	0	0	0	3	0	3
14.2701	Systems Engineering	0	0	0	0	0	0	3	0	3
49.0104	Aviation/Airway Management and Operations	0	0	0	0	0	0	0	0	0
15.0403	Electromechanical/Electromechanical Engineering Technology/Technician	0	0	0	0	0	0	0	0	0
15.1601	Nanotechnology	0	0	0	0	0	0	0	0	0
	Total	**66 (9.2%)**	**67 (9.3%)**	**266 (37.1%)**	**50 (7.0%)**	**193 (26.9%)**	**16 (2.2%)**	**59 (8.2%)**	**0 (0.0%)**	**717**

Source: RealTime Talent analysis of Chmura Economics JobsEQ®, http://www.chmuraecon.com/jobseq/. Job Posting Trends section uses data from TalentNeuron, accessed 1/8/2025 at talentneuron.com Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2024Q4 dataset accessed at analyst.lightcast.io



Institution Type	Completions (2023)	Market Share
Public, 2-year	392	55.2%
Public, 4-year or above	189	26.6%
Private not-for-profit, 4-year or above	118	16.6%
Private for-profit, 4-year or above	11	1.5%

Just over half (55.2%) of awards were conferred by public two-year institutions, with Hennepin Technical College and Dunwoody College of Technology comprising 22.1% of SY2023 awards conferred. Minnesota State University – Mankato was the institution with the second greatest number of completions.

Source: RealTime Talent analysis of Chmura Economics JobsEQ®, http://www.chmuraecon.com/jobseq/. Job Posting Trends section uses data from TalentNeuron, accessed 1/8/2025 at talentneuron.com Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2024Q4 dataset accessed at analyst.lightcast.io

Aviation and Drone Technology Postsecondary Program Awards by Institution, SY2023

Institution	Completions (2023)	Growth % YOY (2023)	Market Share (2023)	IPEDS Tuition & Fees (2023)	Completions Trend (2019-2023)
Hennepin Technical College	91	8.3%	12.8%	$5,881	
Minnesota State University-Mankato	70	75.0%	9.9%	$9,490	
Dunwoody College of Technology	66	11.9%	9.3%	$25,659	
Lake Superior College	50	-5.7%	7.0%	$5,785	
University of Minnesota-Twin Cities	49	36.1%	6.9%	$16,488	
South Central College	45	73.1%	6.3%	$6,146	
Anoka Technical College	35	150.0%	4.9%	$6,267	
Ridgewater College	34	-5.6%	4.8%	$6,109	
University of St Thomas	29	-46.3%	4.1%	$52,284	
Bemidji State University	27	22.7%	3.8%	$10,114	
Metropolitan State University	22	-21.4%	3.1%	$9,780	
Minnesota State College Southeast	22	4.8%	3.1%	$7,820	
St Cloud Technical and Community College	21	5.0%	3.0%	$4,957	
Minneapolis Community and Technical College	20	-51.2%	2.8%	$6,128	
Alexandria Technical & Community College	19	-9.5%	2.7%	$6,213	
Northland Community and Technical College	19	18.8%	2.7%	$6,262	
Saint Paul College	15	-40.0%	2.1%	$6,318	
University of Northwestern-St Paul	12	-53.8%	1.7%	$36,830	
Academy College	11	-47.6%	1.5%	$18,252	
Central Lakes College-Brainerd	11	-62.1%	1.5%	$6,209	
Saint Cloud State University	7	-61.1%	1.0%	$10,117	
Bethany Lutheran College	6	-14.3%	0.8%	$30,010	
Minnesota State University Moorhead	6	50.0%	0.8%	$10,336	
University of Minnesota-Duluth	5	150.0%	0.7%	$14,318	
Minnesota West Community and Technical College	4	-66.7%	0.6%	$6,484	
Hamline University	3	Insf. Data	0.4%	$48,311	
Winona State University	3	50.0%	0.4%	$10,498	
Century College	3	-57.1%	0.4%	$6,182	
Pine Technical & Community College	2	100.0%	0.3%	$4,681	
Saint Mary's University of Minnesota	2	100.0%	0.3%	$43,160	
Rochester Community and Technical College	1	Insf. Data	0.1%	$6,359	

Source: RealTime Talent analysis of Chmura Economics JobsEQ®, http://www.chmuraecon.com/jobseq/. Job Posting Trends section uses data from TalentNeuron, accessed 1/8/2025 at talentneuron.com Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2024Q4 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 Hispanic/Latine students who conferred awards in SY2023, while Logistics, Materials, and Supply Chain Management programs graduated the largest number of Black students. Robotics Technology/Technician programs have the largest number of international students, and nearly all programs have an overrepresentation of male students.[3] Overall, the total number of international students increased by three from the previous school year. The total number of female graduates in programs aligned to the Automotive Technology pathway decreased from 117 to 93.

[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

Source: RealTime Talent analysis of Chmura Economics JobsEQ®, http://www.chmuraecon.com/jobseq/. Job Posting Trends section uses data from TalentNeuron, accessed 1/8/2025 at talentneuron.com Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2024Q4 dataset accessed at analyst.lightcast.io

Race and Gender of Graduates Receiving Postsecondary Awards in SY2023, Minnesota

CIP Code	Description	All 2023 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	9	0	0	0	0	0	9	0	9	0
14.0101	Engineering, General	78	3	3	0	4	4	58	6	58	20
14.1201	Engineering Physics/Applied Physics	13	1	1	0	1	1	9	0	8	5
14.1301	Engineering Science	6	1	0	0	0	0	4	1	4	2
14.2701	Systems Engineering	3	0	1	0	1	0	1	0	3	0
14.3601	Manufacturing Engineering	39	6	2	0	2	1	25	3	31	8
14.3901	Geological/Geophysical Engineering	8	0	0	0	0	0	8	0	3	5
14.4201	Mechatronics, Robotics, and Automation Engineering	8	0	0	0	1	0	7	0	8	0
14.9999	Engineering, Other	21	3	8	0	2	1	6	1	16	5
15.0000	Engineering Technologies/Technicians, General	27	0	0	0	1	2	21	3	25	2
15.0303	Electrical, Electronic, and Communications Engineering Technology/Technician	105	0	5	0	15	2	69	14	100	5
15.0403	Electromechanical/Electromechanical Engineering Technology/Technician	0	0	0	0	0	0	0	0	0	0
15.0404	Instrumentation Technology/Technician	29	0	0	0	0	2	25	2	26	3
15.0405	Robotics Technology/Technician	64	10	3	0	6	4	40	1	58	6
15.0406	Automation Engineer Technology/Technician	173	0	10	1	10	20	125	7	158	15
15.0499	Electromechanical Technologies/Technicians, Other	8	0	2	0	4	1	1	0	8	0
15.0805	Mechanical/Mechanical Engineering Technology/Technician	6	0	0	0	2	0	4	0	6	0
15.1502	Engineering Design	4	0	3	0	0	0	0	1	2	2
15.1601	Nanotechnology	0	0	0	0	0	0	0	0	0	0
15.9999	Engineering/Engineering-Related Technologies/Technicians, Other	3	2	0	0	0	0	1	0	2	1
47.0607	Airframe Mechanics and Aircraft Maintenance Technology/Technician	54	2	0	0	5	1	45	1	50	4
47.0608	Aircraft Powerplant Technology/Technician	3	0	0	0	2	1	0	0	3	0
47.0609	Avionics Maintenance Technology/Technician	4	0	0	0	0	0	2	2	4	0
49.0102	Airline/Commercial/Professional Pilot and Flight Crew	13	0	0	0	1	0	11	1	12	1
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	32	2	11	1	2	1	14	1	23	9
	All Aviation and Drone Technology Postsecondary Programs	**710**	**30**	**49**	**2**	**59**	**41**	**485**	**44**	**617**	**93**

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 TalentNeuron, accessed 1/8/2025 at talentneuron.com Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2024Q4 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 26 aligned programs for the Aviation and Drone Technology pathway nearly all have a low share of BIPOC graduates, and a low share of female graduates. The share of BIPOC graduates increased by 6.5 percentage points from the 2022 school year and the share of female graduates decreased by 3.0 percentage points from the 2022 school year.

Source: RealTime Talent analysis of Chmura Economics JobsEQ®, http://www.chmuraecon.com/jobseq/. Job Posting Trends section uses data from TalentNeuron, accessed 1/8/2025 at talentneuron.com Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2024Q4 dataset accessed at analyst.lightcast.io

Postsecondary Strategy Summary Table, Minnesota 2024

Occupation	Related Programs*	2024Q2 Empl	Workforce BIPOC by Race	Workforce Hispanic/Latinx	Workforce Female	Workforce Under 45	SY2023 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	• Airline/Commercial/Professional Pilot and Flight Crew	2,516	7.2%	3.5%	7.1%	44.1%	7	Y	15.4%	7.7%
Aircraft Mechanics and Service Technicians	• Agricultural Mechanics and Equipment/Machine Technology/Technician • Airframe Mechanics and Aircraft Maintenance Technology/Technician	2,097	14.9%	6.3%	4.1%	60.6%	63	Y	11.1%	6.4%
Engineers, All Other	• Engineering, General • Engineering Physics/Applied Physics • Engineering Science • Systems Engineering • Manufacturing Engineering • Geological/Geophysical Engineering • Mechatronics, Robotics, and Automation Engineering • Engineering, Other	2,302	22.2%	2.5%	13.2%	56.6%	0	Y	25.0%	25.6%
Commercial Pilots*	• Airline/Commercial/Professional Pilot and Flight Crew	1,410	5.7%	3.0%	7.0%	42.2%	7	Y	15.4%	7.7%
Air Traffic Controllers	• Aviation/Airway Management and Operations	652	20.2%	7.2%	19.1%	69.2%	0	Y	N/A no awards	N/A no awards
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	• Aircraft Powerplant Technology/Technician	165	19.7%	7.1%	31.9%	56.6%	3	Y	100.0%	0.0%
Electro-Mechanical and Mechatronics Technologists and Technicians	• 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	345	18.0%	2.9%	17.2%	50.2%	358	N	28.8%	8.1%
Airfield Operations Specialists*	• Aviation/Airway Management and Operations	406	22.3%	7.9%	19.1%	70.0%	0	Y	N/A no awards	N/A no awards
Aircraft Cargo Handling Supervisors	• Logistics, Materials, and Supply Chain Management	171	30.9%	6.6%	26.4%	57.0%	7	Y	27.5%	13.1%
Avionics Technicians	• Avionics Maintenance Technology/Technician	232	14.0	5.4%	4.1%	55.2%	4	Y	0.0%	50.0%
Aviation and Drone Technology Pathway	**All 26 aligned programs**	**10,297**	**14.5%**	**4.3%**	**10.1%**	**53.5%**	**449**	**Y**	**27.5%**	**13.1%**
All Occupations		**3,101,622**	**17.1%**	**5.6%**	**47.8%**	**57.2%**	**28,275**		**36.7%**	**66.3%**

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 TalentNeuron, accessed 1/8/2025 at talentneuron.com Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2024Q4 dataset accessed at analyst.lightcast.io

Conclusion

Over the next five years, Aviation and Drone Technology employment is anticipated to be relatively flat in Minnesota (-0.1% change annually), with employment forecast to decline by about 57 total jobs. Total baseline demand for Aviation and Drone Technology talent is anticipated to be around 4,429 professionals needed to fill positions due to job exits and transfers, such as retirements and job changes.

Of all occupations found in the Aviation and Drone Technology pathway, the specific occupations of Air Traffic Controllers, Airline Pilots, Commercial Pilots, Airfield Operations Specialists, and Electro-Mechanical and Mechatronics Technologists and Technicians are uniquely concentrated in Minnesota to a higher degree than seen in the nation overall. On average, Aviation careers pay about $132,400 per year—about $62,900 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 $194,000 compared to Electro-Mechanical and Mechatronics Technologists and Technicians at $65,900 annually.

At an overall pathway unemployment rate of 1.0% (a slight drop from the prior year), there are about 105 unemployed Aviation and Drone Technology professionals statewide. The 26 aligned programs for the Aviation and Drone Technology pathway nearly all 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.

Source: RealTime Talent analysis of Chmura Economics JobsEQ®, http://www.chmuraecon.com/jobseq/. Job Posting Trends section uses data from TalentNeuron, accessed 1/8/2025 at talentneuron.com Industry detail, skill and certification analysis, wage trends, and posting to hire analysis are from the Lightcast 2024Q4 dataset accessed at analyst.lightcast.io

FAQ

How is employment forecast determined?

Forecast employment growth uses national projections from the Bureau of Labor Statistics, forecasts for 2024-2034, 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 Catherine Jett, Research Strategist for RealTime Talent at catherine@realtimetalentmn.org or visit the RealTime Talent website at www.realtimetalent.org

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