



WAMPO Economic Development Report – Aerospace

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In Partnership With:



JEO CONSULTING GROUP



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Introduction and Summary

This report provides an overview of the aerospace manufacturing sector in the Wichita area, including an analysis of the industry landscape, labor market, transportation infrastructure, balance of trade, and general trends in the United States. The study aims to identify weaknesses, opportunities, and competitiveness within the aerospace industry.

The industry landscape analysis reveals the relative growth and size of the aerospace manufacturing market in comparison to other communities. While Wichita had negative employment growth, robust wage growth indicates increased competitiveness in attracting labor. Other cities like Houma, Des Moines, and Tucson showed robust employment and wage growth in the aerospace sector.

All cities analyzed saw increases in wages from 2020-2021. Labor analysis indicates reductions in employment and establishments in Wichita, while Kansas City saw increases in both. However, Wichita has the largest value of employment in the aerospace sector among the analyzed cities. The concentration of Aerospace Engineers in the WAMPO region is vital to the aerospace industry.

Productivity analysis suggests that semiconductors and other electronic components substantially grew, while aerospace products and parts experienced a net decline. Temporary negative forces affecting productivity include changes in occupational structure, loss of skilled, aging workforce, shrinking skilled labor pool, and the time required to train unskilled/moderate skilled labor.

The skills, knowledge, and abilities required for the aerospace sector primarily focus on oral comprehension, oral expression, mathematics, mechanical knowledge, critical thinking, reading comprehension, and active listening.

General trends in the U.S. aerospace sector suggest rising establishments and revenues, while wages are expected to remain stagnant. The industry faces high barriers to entry due to high capital requirements, government regulations, and proprietary technology. The threat of substitutes is low, and there is moderate bargaining power for both buyers and suppliers. Rivalry among existing firms is high.

In summary, the aerospace manufacturing sector in Wichita is competitive, with a high level of rivalry among existing firms. The industry plays a vital role in the local economy, offering employment opportunities and contributing to innovation and technology. Understanding the industry landscape, labor market, transportation infrastructure, balance of trade, and general trends is crucial for identifying weaknesses and leveraging growth opportunities within the aerospace sector.

Industry Landscape

The following NAICS codes, provided by the Greater Wichita Partnership, constitute the category of aerospace. These codes were used to extract specific industry data related to these subsections.

Aerospace		
NAICS	Description	Subsector
334220	Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing	
334417	Electronic Connector Manufacturing	
334419	Other Electronic Component Manufacturing	
334511	Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	
334515	Instrument Manufacturing for Measuring and Testing Electricity and Electrical Signals	
334519	Other Measuring and Controlling Device Manufacturing	
336413	Other Aircraft Parts and Auxiliary Equipment Manufacturing	
541330	Engineering Services	
541380	Testing Laboratories	
336411	Aircraft Manufacturing	MRO
336412	Aircraft Engine and Engine Parts Manufacturing	MRO
488190	Other Support Activities for Air Transportation	MRO
811310	Commercial and Industrial Machinery and Equipment (except Automotive and Electronic) Repair and Maintenance	MRO

In order to give perspective to the climate of this key sector, a list of other communities with strong aerospace manufacturing sectors has been identified using their location quotients. Additionally, other Midwestern cities have been included for consistent comparison to convey where Wichita has growth opportunities.

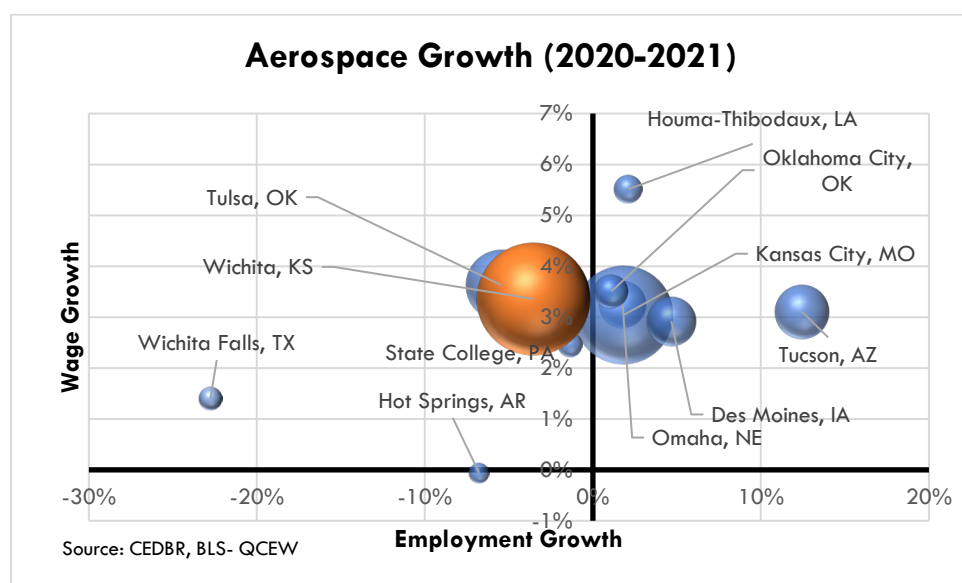
Key Aerospace Communities
Des Moines- West Des Moines, IA MSA
Hot Springs, AR MSA
Houma-Thibodaux, LA MSA
Kansas City, KS-MO MSA
Oklahoma City, OK MSA
Omaha- Council Bluff, NE-IA MSA
State College, PA MSA
Tucson , AZ MSA
Tulsa, OK MSA
Wichita Falls, TX MSA
Wichita, KS MSA

The comparison cities were selected based on the following criteria: employment concentration, size of the town, and preference for Midwest. Furthermore, all of the communities were vetted with the Greater Wichita Partnership as communities that the Wichita area competes within the respective sector.

In order to capture the broad industry landscape and recent competitiveness of the aerospace manufacturing sector within the Wichita area, this study developed a growth matrix. The matrix captures the relative growth and size of the market compared to the selected comparable communities. Any city within the top right quadrant should be considered in a growth mode. Those in

the bottom left quadrant are in declining sectors. The other two quadrants, bottom right and top left, identify economic weaknesses that must be addressed.

Of the cities being compared in the aerospace manufacturing sector, Houma, Des Moines, and Tucson had the most robust employment along with a high wage growth and employment growth relative to the other locations. Unfortunately, Wichita had negative employment growth. The good news, however, is that the robust wage growth signals that the industry is ramping up to be more competitive in attracting labor. Most of the other markets were also increasing wages at or near the same rate as Wichita, making the overall labor market tight.



Labor

Wichita saw reductions in both wages and establishments from 2020 to 2021. Due to the proximity to the WAMPO region, both the Kansas City and Tulsa areas are considered frequent competitors in the aerospace labor market. Both locations saw increases in wages and establishments in 2021. However, Wichita did have the largest value of employment in the aerospace sector of the cities analyzed.

Aerospace Employment

	2015	2016	2017	2018	2019	2020	2021	Annualized growth	
								2015-21	2020-21
Des Moines, IA	2,643	2,759	2,881	3,069	3,637	3,838	3,906	7%	2%
Hot Springs, AR	713	645	637	685	746	738	688	-1%	-7%
Houma-Thibodaux, LA	1,704	1,639	1,649	1,654	1,737	1,705	1,741	0%	2%
Kansas City, KS-MO	19,948	20,243	19,913	20,319	20,452	20,259	20,627	0%	2%
Oklahoma City, OK	5,838	6,318	6,060	6,664	7,223	7,094	7,172	3%	1%
Omaha, NE	3,575	3,608	3,699	4,069	4,239	4,337	4,539	4%	5%
State College, PA	1,141	1,125	1,134	1,210	1,271	1,323	1,305	2%	-1%
Tucson, AZ	4,595	4,369	4,585	4,720	5,144	4,980	5,600	3%	12%
Tulsa, OK	14,480	14,344	14,531	15,875	15,407	14,397	13,613	-1%	-5%
Wichita Falls, TX	1,619	1,561	1,533	1,710	1,714	1,319	1,018	-5%	-23%
Wichita, KS	29,299	29,054	29,265	31,446	33,480	26,555	25,616	-2%	-4%

Source: CEDBR, BLS- QCEW

Aerospace Employment

	2015	2016	2017	2018	2019	2020	2021	growth	
								2015-21	2020-21
Radio and television broadcasting and wireless									
Electronic connector manufacturing									
Other electronic component manufacturing	99	100	101	102	103	104	95	-1%	-9%
Search, detection, navigation, guidance, aerospace									
Instrument manufacturing for measuring									
Other measuring and controlling device	84	80	80	79	85	81	80	-1%	-1%
Aircraft manufacturing	20,000	20,500	21,000	23,042	24,537	19,059	18,565	-1%	-3%
Aircraft engine and engine parts									
Other aircraft parts and auxiliary	6,198	5,672	5,293	5,355	5,696	4,380	3,823	-5%	-13%
Other support activities for air	716	745	774	803	832	771	850	3%	10%
Engineering services	1,326	1,211	1,266	1,271	1,275	1,256	1,261	-1%	0%
Testing laboratories and services	283	321	315	336	352	297	313	2%	5%
Commercial and industrial machinery	593	425	436	458	600	607	630	1%	4%

Source: CEDBR, BLS- QCEW



WAMPO Economic Development Report

Aerospace Establishments

Communities	Annual 2020	Annual 2021	YR/YR %
Des Moines- West Des Moines, IA MSA	325	336	3%
Hot Springs, AR MSA	29	31	7%
Houma-Thibodaux, LA MSA	128	133	4%
Kansas City, KS-MO MSA	848	894	5%
Oklahoma City, OK MSA	664	660	-1%
Omaha- Council Bluff, NE-IA MSA	322	347	8%
State College, PA MSA	93	85	-9%
Tucson , AZ MSA	370	392	6%
Tulsa, OK MSA	598	607	2%
Wichita Falls, TX MSA	50	51	2%
Wichita, KS MSA	266	262	-2%

Source: CEDBR, BLS- QCEW

Aerospace Wages

Community	2015	2016	2017	2018	2019	2020	2021
Des Moines, IA	\$65,631	\$67,600	\$69,139	\$70,704	\$72,824	\$75,270	\$77,720
Hot Springs, AR	\$52,525	\$50,147	\$54,193	\$52,399	\$54,410	\$54,389	\$54,357
Houma-Thibodaux, LA	\$72,608	\$71,474	\$72,743	\$75,645	\$76,073	\$76,363	\$80,573
Kansas City, KS-MO	\$71,777	\$72,092	\$73,294	\$75,302	\$76,779	\$79,242	\$81,652
Oklahoma City, OK	\$68,653	\$67,250	\$69,655	\$72,113	\$74,622	\$77,454	\$80,167
Omaha, NE	\$74,921	\$71,953	\$66,184	\$67,730	\$69,663	\$73,195	\$75,334
State College, PA	\$58,930	\$60,293	\$61,750	\$63,361	\$65,154	\$68,537	\$70,222
Tucson , AZ	\$63,833	\$62,479	\$72,588	\$71,412	\$72,674	\$74,041	\$76,340
Tulsa, OK	\$62,599	\$63,715	\$65,040	\$66,033	\$67,921	\$70,312	\$72,863
Wichita Falls, TX	\$58,624	\$60,978	\$63,335	\$63,553	\$64,033	\$65,812	\$66,729
Wichita, KS	\$56,861	\$59,086	\$59,350	\$61,910	\$63,134	\$64,307	\$66,466

Source: CEDBR, BLS - QCEW

Wages and location quotients were gathered for each occupation for the Wichita MSA. While each occupation had an above-average location quotient compared to the rest of the United States, the WAMPO region's high concentration of Aerospace Engineers is one of the main components of its aerospace industry.

Key Occupations

Occupation	Wichita MSA Employment	US Employment
Welders, Cutters, Solderers, and Brazers	1,480	20,870
Aerospace Engineers	1,690	40,600
Mechanical Engineers	730	26,940
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	5,340	372,400
Machinists	1,560	67,460

Source: CEDBR: BLS, OES

A location quotient is a statistical measure used to compare the concentration or specialization of a particular industry or occupation in a specific geographic area relative to its concentration in a larger reference area, typically a region or a nation. It is calculated by dividing the proportion of employment in a specific industry or occupation in the target area by the proportion of employment in the same industry or occupation in the reference area, and then comparing the result to a value of one. A location quotient greater than 1 indicates a higher concentration of the industry or occupation in the target area compared to the reference area, suggesting specialization or a comparative advantage in that particular sector. Conversely, a location quotient of less than 1 indicates a lower concentration, less specialization in the industry or occupation in the target area.

2021 Labor Costs - Aerospace

Occupation (SOC code)	Mean Wage	10th Percentile Wage	90th Percentile Wage	Location Quotient
Aerospace Engineers(172011)				13.73
Mechanical Engineers(172141)	\$85,420	\$56,830	\$128,230	1.31
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers(512011)				82.96
Machinists(514041)	\$47,700	\$31,190	\$66,850	2.46
Welders, Cutters, Solderers, and Brazers(514121)	\$50,530	\$37,020	\$66,020	1.81

Source: CEDBR, BLS-OES

Productivity is an important component of the labor discussion. Using national figures, the following list of occupations has been detailed for the aerospace manufacturing sector, where productivity is compared against the base year 2012. Those sectors with increasing productivity, as represented by rates above 100, are growing and have the opportunity for increased wages and profitability.

Of the four subsectors within aerospace, the only one with substantial growth was semiconductors and other electronic components, which has grown by more than 31 percent since 2012. Unfortunately, aerospace products and parts had a net decline despite the growth from 2013 through 2017. The decreasing productivity rates are likely due to structural and exogenous factors. The following are some of those temporary negative forces:

- Changes in the structure of occupations
- Loss of skilled aging workforce
- Shrinking skilled -labor pool
- Length of time to train unskilled/moderate skilled labor

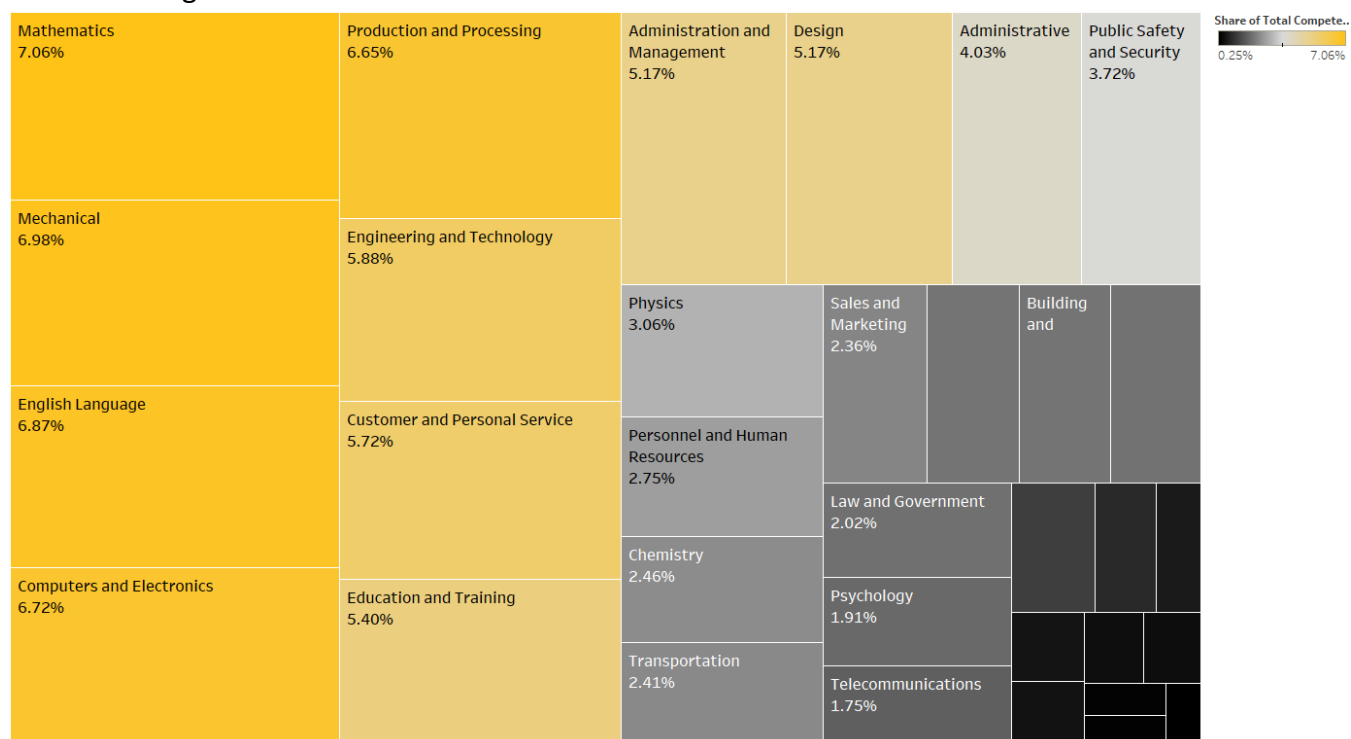
Aerospace Productivity

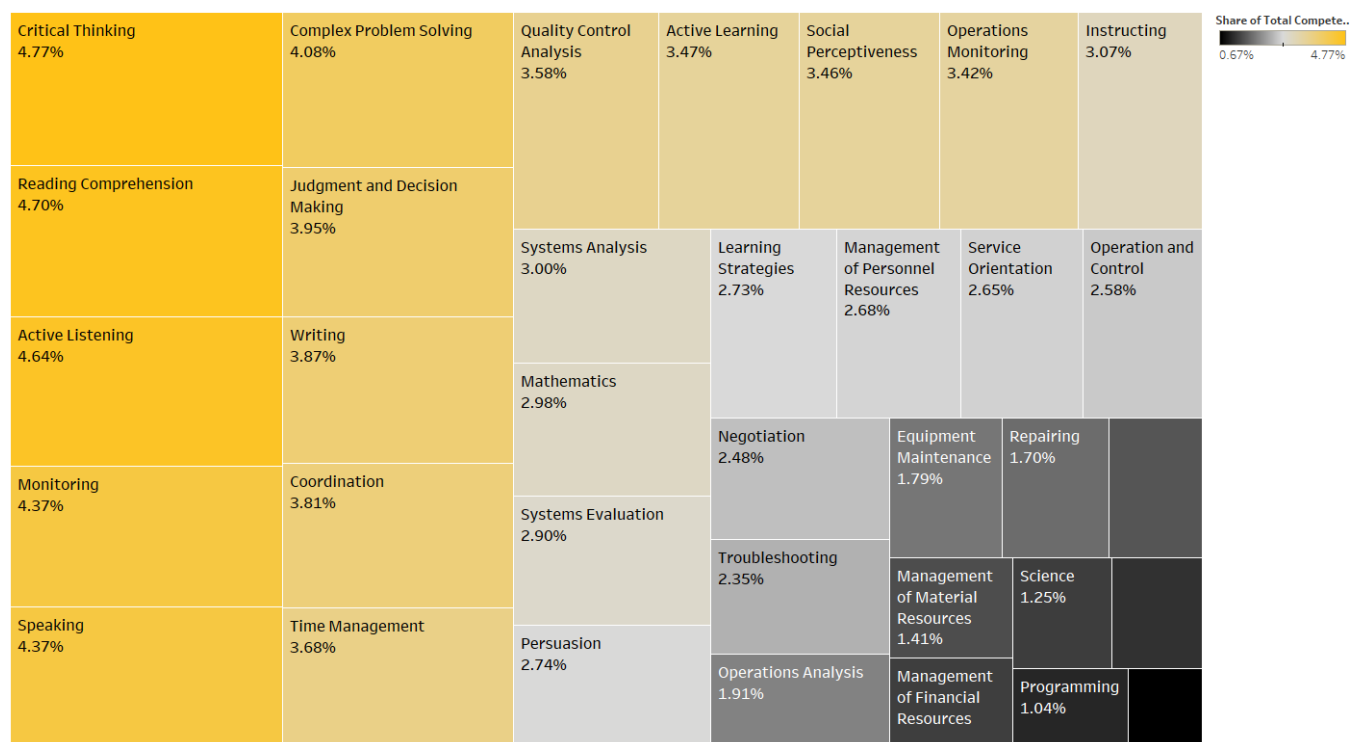
Industry	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Semiconductors and other electronic components	118.3	133.8	100.0	96.6	101.0	103.7	99.2	111.5	115.6	113.9	115.7	131.1
Electronic instruments	89.5	92.7	100.0	98.2	96.7	92.1	92.4	95.8	96.8	92.5	93.6	93.4
Aerospace products and parts	95.5	93.3	100.0	105.0	111.9	113.2	103.6	111.0	106.3	91.7	82.0	81.3
Engineering services	101.1	104.4	100.0	96.4	98.8	98.8	98.6	98.3	98.5	99.1	99.1	99.7

Note: ** Data for some sectors only available at 4-digit level

Source: CEDBR, BLS

Another component of the labor discussion is the skills, knowledge, and abilities required for the sector of the workforce. In the aerospace sector, the most important skills were oral comprehension and oral expression. The most important knowledge component was mathematics and mechanical, which strongly overlaps with the advanced manufacturing industry. Finally, the most essential abilities were critical thinking, reading comprehension, and active listening, which all also overlap with the advanced manufacturing sector.





To summarize the labor conversation through the framework of this particular sector, it is essential to consider where the employers are located. Therefore, a list of all organizations within this sector with 100 employees or more has been collected. With knowledge of these particular businesses' locations and workforce density, WAMPO can leverage this list to analyze what thoroughfares can be strengthened to propagate the industry.

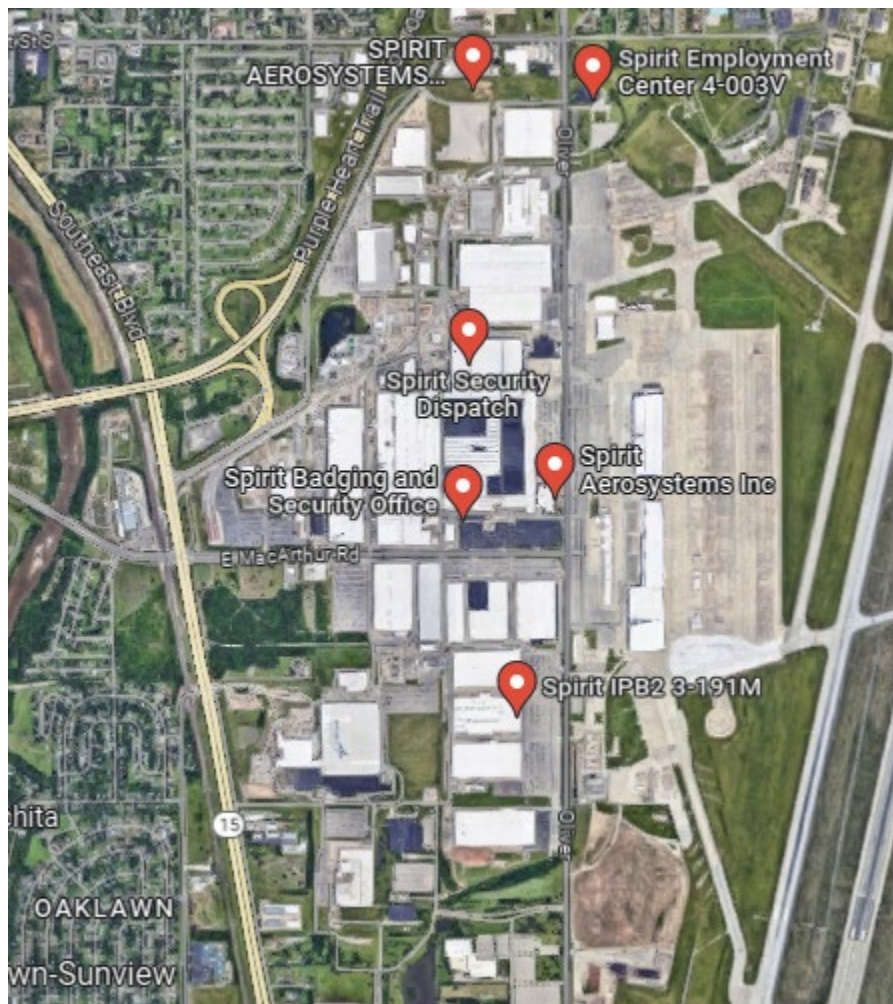
Key WAMPO players*

Company Name	Location	Employee Size
Spirit Aerosystems		15,000
Spirit Aerosystems Holdings		11,500
Cessna Aircraft Co		9,000
Bombardier Learjet		2,000
Cessna Aircraft Co		600
Aeroflex Test Solutions		350
Center Industries Corp		275
Spirit Aerosystems Inc		257
Professional Engineering		215
GKN Aerospace Precision Mchng		200
Honeywell Aerospace		200
Triumph Group		200
Airbus North Amer Engrng Inc		196
HM Dunn Aerosystems		190
Lee Aerospace		190
Collins Aerospace		185
Mid Kan Engr Consultants		180
HM Dunn Aerosystems Inc		176
Globe Engineering Co		159
Triumph Structures-Wichita		157
D-J Engineering Inc		130
Electromech Technologies LLC		130
LMI Aerospace		126
Cox Machine Inc		120
Triumph Accessory Svc-Wllngtn		118
Kelly Aerospace Turbine RTBLS		103
Aero-Mach Labs Inc		100
Aerospace Turbine Rotables Inc		100
Figeac Arrow North America		100
Millennium Concepts		100
Mkec Engineering Inc		100
Product Manufacturing Corp		100
Source: CEDBR, Data Axle*		

*This table uses Data Axle listings, under certain circumstances known establishments may have misrepresented employment counts. For more details see the 'Data Axle Limitations' document.

Main WAMPO Thoroughfares

Using the list of major firms in the WAMPO region, the demand on the transportation system can be evaluated through three parameters; inbound goods, outbound goods, and labor movement. When evaluating the largest firm, Spirit Aerosystems, their transportation demand mostly relies on heavy highway traffic along with rail for both inbound and outbound goods. The main labor access points are either via the Kansas Turnpike, Oliver, or K-15.

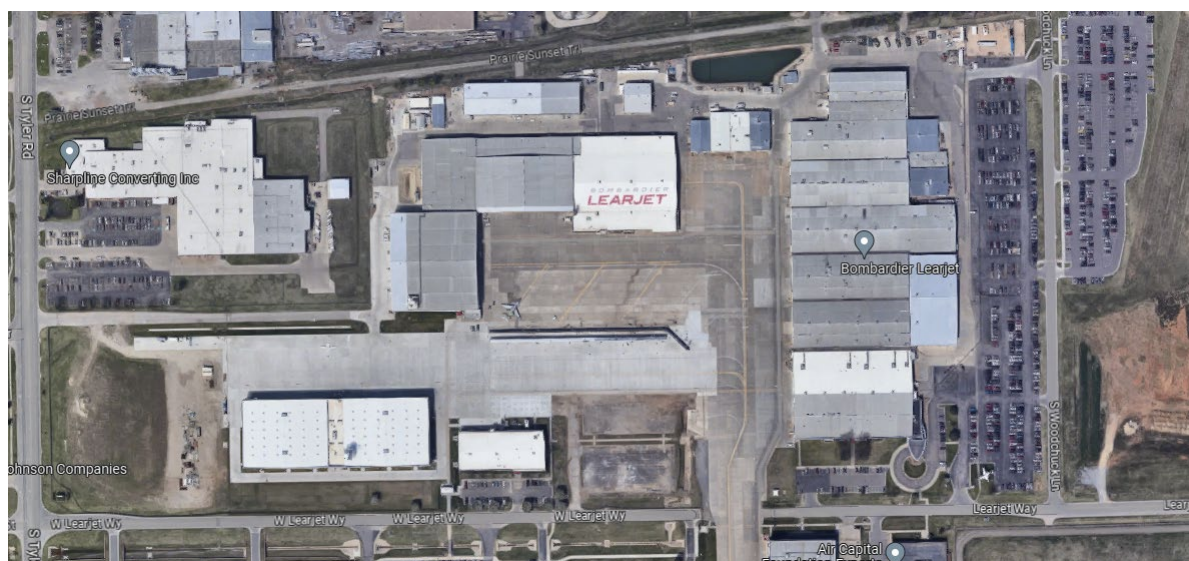


Cessna Aircraft has one location in East Wichita along with another in West Wichita. Both of these locations will utilize heavy highway and air for inbound and outbound goods. The labor access for the West location is from Hoover via Southwest Blvd. Meanwhile, the labor access for the East location is along Woodlawn Blvd or Pawnee St via the Kansas Turnpike.





Bombardier Learjet relies on heavy highway and air for both inbound and outbound goods, and has the unique transportation feature of a runway bridge over a road. This is an important component to consider when discussing the transportation system, as Wichita is one of the few regions in the country where these bridges are such an integral part of the infrastructure. The main access for the labor is either along Eisenhower AP Pkwy or Tyler Rd.



Balance of Trade

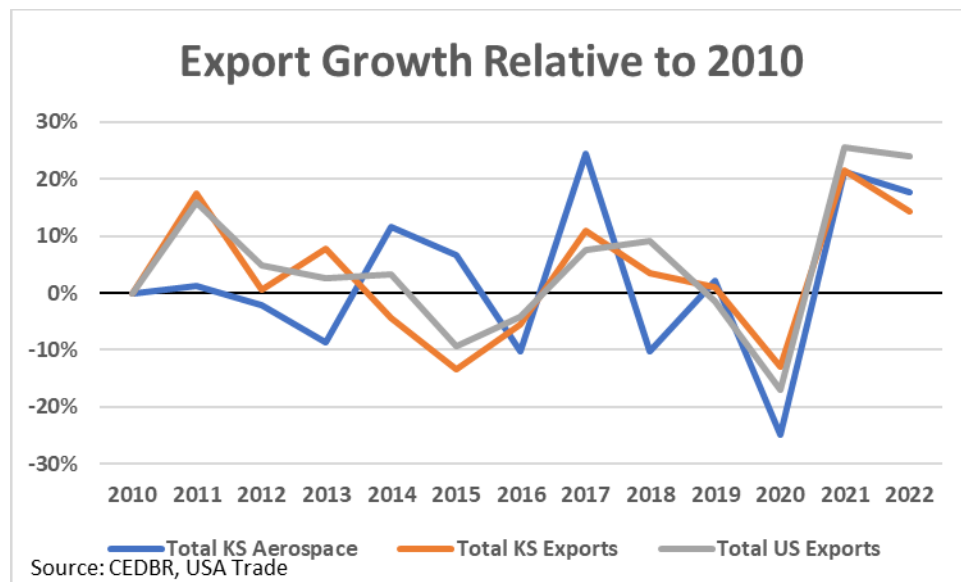
Reviewing the data for aerospace from 2010 to 2022, it can be seen that there was a decline of 41% in 2020, followed by an increase of 2% in 2021 and a further increase of 12% in 2022.

Aerospace has performed more strongly than total Kansas exports over the period of 2010 to 2022, with an overall increase of 12%. In contrast, total US exports had a decline of 16% in 2020, although it did experience a rise of 16% in 2021 and a further increase of 12% in 2022. Despite these increases, total exports have only seen a slight overall increase of 1% from 2010 to 2022, while aerospace has seen a much more significant increase of 55%.

Overall, it can be seen that while Kansas Aerospace exports have generally performed better than overall Kansas Exports, its performance has been more similar to Total US Exports. Nevertheless, the recent recovery in Kansas aerospace exports suggests a positive outlook for the industry, which may bode well for the economy of the Wichita area.

Imports - Aerospace					
Subsector	2018	2019	2020	2021	2022
3342 Communications Equipment	\$383,154,016	\$470,783,656	\$426,897,612	\$378,361,253	\$460,548,482
3344 Semiconductors & Other Electronic Components	\$159,932,898	\$160,188,632	\$135,477,936	\$134,126,302	\$205,687,599
3345 Navigational/measuring/medical/control Instrument	\$768,020,771	\$887,675,205	\$667,313,815	\$718,422,512	\$720,623,406
3364 Aerospace Products & Parts	\$1,842,513,492	\$1,943,330,805	\$1,142,497,711	\$1,183,921,280	\$1,339,054,827
Total KS Aerospace	\$3,153,621,177	\$3,461,978,298	\$2,372,187,074	\$2,414,831,347	\$2,725,914,314
Total Kansas Imports	12,291,983,874	12,129,842,417	10,393,505,709	12,135,488,835	13,438,371,455
Total US Exports	\$2,536,145,273,678	\$2,491,699,567,726	\$2,330,836,392,063	\$2,831,110,526,625	\$3,246,431,588,450
*Data not available for all subsectors					
Source: CEDBR - USA Trade					

Exports - Aerospace					
Subsector	2018	2019	2020	2021	2022
3342 Communications Equipment	\$162,162,406	\$176,804,688	\$165,758,528	\$230,779,506	\$313,746,833
3344 Semiconductors & Other Electronic Components	\$99,381,838	\$88,400,853	\$124,463,543	\$159,434,711	\$150,886,195
3345 Navigational/measuring/medical/control Instrument	\$401,744,508	\$519,724,538	\$417,484,831	\$474,464,586	\$564,268,763
3364 Aerospace Products & Parts	\$2,384,384,709	\$2,318,689,394	\$1,725,292,993	\$2,142,058,712	\$2,454,765,180
Total KS Aerospace	\$3,047,673,461	\$3,103,619,473	\$2,432,999,895	\$3,006,737,515	\$3,483,666,971
Total KS Exports	\$11,581,768,320	\$11,681,205,948	\$10,405,315,895	\$12,540,570,549	\$13,965,084,671
Total US Exports	\$1,665,786,886,956	\$1,645,940,338,649	\$1,428,518,279,410	\$1,754,300,367,662	\$2,062,937,260,943
*Data not available for all subsectors					
Source: CEDBR - USA Trade					

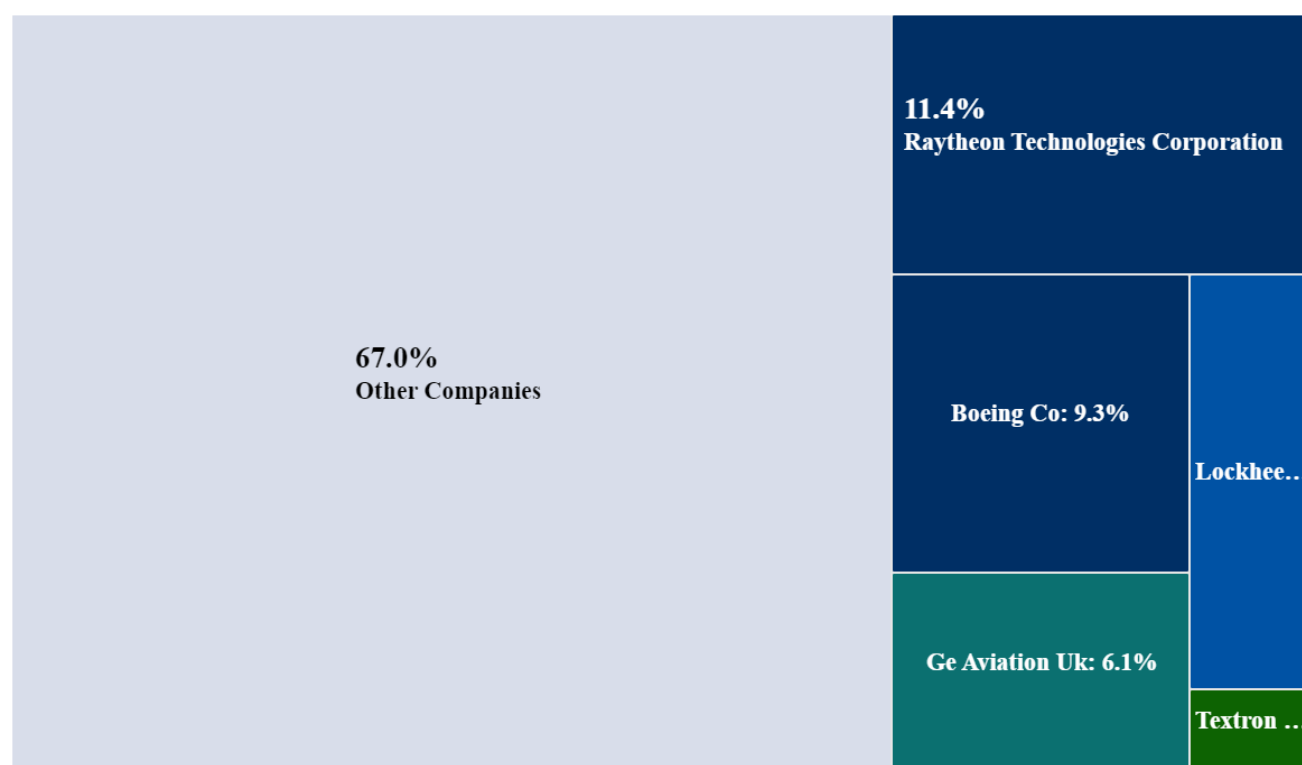


General US Trends

To assess the potential growth of the aerospace manufacturing sector, this study examined five economic forces at the national level. Those broad economic conditions were then applied to the regional market, firms, and trends to provide the context of its economic competitiveness.

The competitive landscape in the US aerospace sector remains high, as no single firm controls a majority of the industry. Conversely, the company with the most significant proportion of the sector is Raytheon Technologies Corporation, at 11.4%. Only two other organizations control about a 5% proportion of the industry.

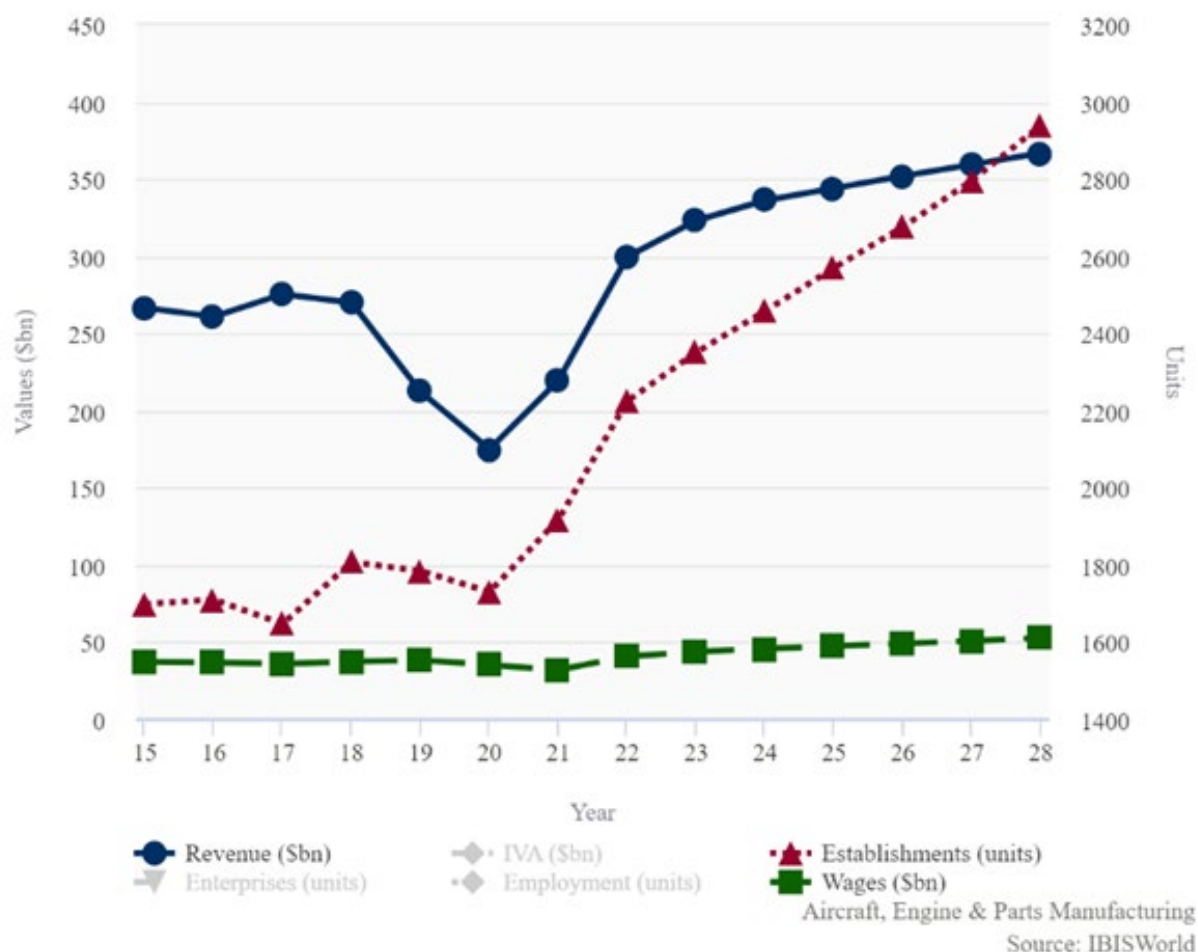
Breakdown of Industry Market Share (2023)



Source: IBISWorld, Aircraft, Engine & Parts Manufacturing

When reviewing trends for the sector as a whole, both establishments and revenues are projected to rise. Wages, on the other hand, are expected to remain stagnant.

Industry Performance 2015–2028



Threat of new entrants

- **High capital requirements:** The aerospace industry is capital-intensive, requiring large investments in research and development, manufacturing, and marketing. For example, the cost of developing a new commercial aircraft can range from \$10 billion to \$20 billion.
- **Government regulations:** The aerospace industry is heavily regulated, making it difficult for new companies to comply with all the requirements. For example, the Federal Aviation Administration (FAA) regulates aircraft design, manufacture, and operation.
- **Proprietary technology:** The aerospace industry is characterized by proprietary technology, which gives existing companies a competitive advantage. For example, Boeing has proprietary technology in designing and manufacturing aircraft wings.

Threat of substitutes

- Low threat of substitutes: The aerospace industry is characterized by a low threat of substitutes, as there are no close substitutes for aircraft. For example, no other mode of transportation can provide the same level of speed, efficiency, and safety as an aircraft.

Bargaining power of buyers

- Moderate bargaining power of buyers: The bargaining power of buyers in the aerospace industry is moderate, as there are a limited number of major buyers, such as airlines and defense contractors. For example, Boeing is a major supplier of aircraft to airlines, and airlines have some bargaining power in negotiating prices with Boeing.

Bargaining power of suppliers

- Moderate bargaining power of suppliers: The bargaining power of suppliers in the aerospace industry is moderate, as there are a limited number of major suppliers, such as aerospace manufacturers and component suppliers. For example, Spirit AeroSystems is a major supplier of aircraft parts to Boeing, and Spirit AeroSystems has some bargaining power in negotiating prices with Boeing.

Rivalry among existing firms

- High rivalry among existing firms: The rivalry among existing firms in the aerospace industry is high, as a limited number of major companies compete for a share of the market. For example, Boeing and Airbus are the two major manufacturers of commercial aircraft, and they are constantly competing for market share.
- The aerospace industry in Wichita, Kansas, is competitive, with a high level of rivalry among existing firms. The industry is also characterized by high barriers to entry, which make it difficult for new companies to enter the market. The threat of substitutes is low, as there are no close substitutes for aircraft. As a result, the bargaining power of buyers and suppliers is moderate.

The aerospace industry is a vital part of the Wichita economy and a significant employer in the area. The industry is also a source of innovation and technology and plays an essential role in the national and global economy.