

**THE CENTER FOR  
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IN TENNESSEE (CERT)**



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# **AEROSPACE & DEFENSE**



## TABLE OF CONTENTS

- 3** Introduction
- 4** Industry Overview
- 6** Recent Growth
- 7** Related Industries
- 8** Exports
- 9** Future Outlook
- 10** Appendices
- 13** References

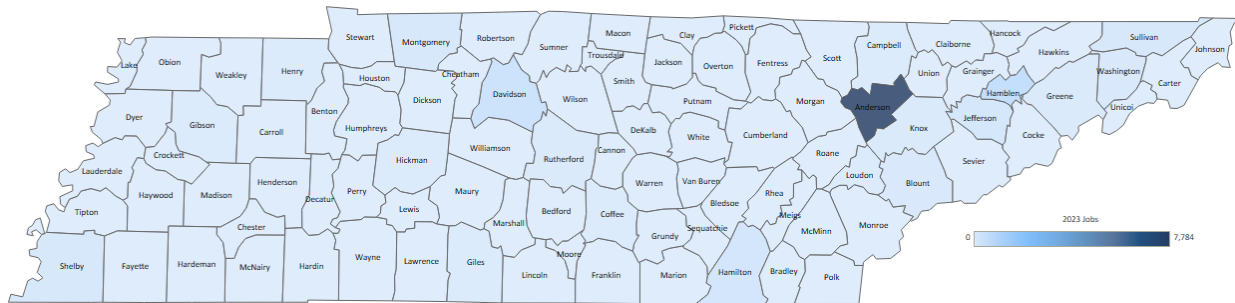


# INTRODUCTION

The Aerospace and Defense cluster is integral to ensuring national security and driving technological advancement in aviation and space exploration. The state’s network of airports and transportation infrastructure has contributed to the cluster’s strength. Some companies with the largest presence include Y-12 National Security Complex, Howmet Castings & Services Inc., Eaton Corporation, and an array of smaller companies specializing in various segments of the cluster.

This cluster’s largest concentration of employment is in Anderson County, home to the Y-12 National Security Complex. Other counties leading the cluster in employment include Hamblen, Davidson, Hamilton, Jefferson, and Shelby counties.<sup>1</sup>

## Exhibit 1: 2023 Aerospace and Defense Cluster Employment by County



Source: Lightcast (April 2024)

## SPOTLIGHT: Y-12 NATIONAL SECURITY COMPLEX

The Y-12 National Security Complex, located in Anderson County, was established in 1943 during the Manhattan Project. It was an integral part of the United States’ national security strategy, being the sole manufacturer of enriched uranium components for nuclear weapons. The complex is instrumental in producing weapon components, recycling, and refurbishing old components, assessing stockpiled weapons’ effectiveness, and dismantling weapons for nuclear materials storage. Moreover, Y-12’s scope extends to supplying the Navy with enriched uranium for reactors on its vessels and providing equipment to the National Guard for protection against radiological attacks. It also engages in cooperative efforts with federal agencies, such as the National Nuclear Security Administration (NNSA), to safeguard nuclear materials on both a national and international scale.

The Y-12 National Security Complex employs approximately 4,500 staff and 2,000 subcontractors. During Fiscal Year 2022, they were honored with Excellence Awards for outstanding accomplishments by the U.S. Department of Energy.

# INDUSTRY OVERVIEW

Tennessee provides companies operating in the Aerospace and Defense cluster with access to major research assets, advanced manufacturing strength, educational support, and a skilled workforce, which has helped attract many of the world’s top aerospace and defense companies to Tennessee. Clustering optimizes logistics and supply chain management by reducing costs, fostering innovation, and supporting economies of scale. Overall, clustering improves operational efficiency and cost-effectiveness. The cluster includes aerospace industries, which concentrate on aviation and space exploration. These industries include aircraft manufacturing and guided missile and space vehicle manufacturing. The second category of industries included in the cluster is defense industries, which focus on military equipment and technologies. These industries include small arms ammunition manufacturing and military armored vehicle, tank and tank component manufacturing.<sup>A</sup>

## INDUSTRY CLUSTER

*An industry cluster is a geographic concentration of interconnected businesses, suppliers, and service providers.*

In 2023, the Aerospace and Defense cluster employed over 11,155 individuals across 128 establishments. Employment had 42 percent growth over the past five years and is projected to grow an additional 17 percent by 2028. Most employment (70 percent) in the cluster is in ammunition manufacturing (excluding small arms), where Tennessee has the highest location quotient (LQ) in the country. Tennessee’s top Aerospace and Defense occupations include management and production roles, as well as engineering, business and financial operations, and office support. In 2023, the average earnings were \$129,336, which is higher than the state’s average earnings of \$76,493.<sup>B</sup> In 2023, the cluster contributed over \$2.7 billion to the Gross Regional Product (GRP), ranking it as the fourth largest economic contributor in the Southeast.<sup>2</sup>

## LOCATION QUOTIENT (LQ)

*An economic metric that compares the concentration of a particular industry’s employment in a region to its concentration at a national level.*

<sup>A</sup> See Appendix 1 for industry employment and earning totals.

<sup>B</sup> See Appendix 2 for 2023 top occupations in the cluster.

The Tennessee Department of Economic and Community Development (TNECD) partners with other state agencies and higher education institutions to ensure that the state can provide a skilled workforce to meet the future demands of Tennessee companies. The state's higher education institutions have awarded over 20,400 aerospace and defense-related degrees and certificates since 2018. Graduates in these programs have received degrees in various programs including Engineering, Precision Production, and Mechanic and Repair Technologies/Technicians.

The state is home to several institutions, such as the University of Tennessee Space Institute and Middle Tennessee State University (MTSU) aerospace program, which are instrumental in providing industry-aligned education and training. As of 2023, MTSU is expanding its aerospace program in Bedford County to meet the needs of the new pilot shortage and other aerospace professionals. The University of Tennessee Knoxville offers a specialized Aerospace and Defense MBA (ADMBA) with industry-focused coursework, preparing graduates for successful careers at leading organizations such as Lockheed Martin, Boeing, and NASA.



# RECENT GROWTH

The Aerospace and Defense cluster has grown considerably. Since 2019, TNECD has facilitated 17 projects, which are projected to create more than 1,900 new jobs and attract over \$307 million in capital investment.<sup>3</sup>

Exhibit 2: Recent Major Aerospace and Defense Projects

Company	New Job Commitments	Capital Investment	County	Landed Date
Smith & Wesson Brands, Inc.	750	\$124,521,000	Blount	9/30/2021
Oshkosh Manufacturing, LLC	122	\$2,020,000	Jefferson	12/31/2022
GS Performance, LLC	110	\$6,983,847	Davidson	10/29/2020
West Star Aviation, LLC	100	\$17,000,000	Hamilton	12/13/2021
Safari Enterprises, LLC	85	\$7,500,000	Macon	5/24/2021
Accurate Energetic Systems, LLC	80	\$9,700,000	Humphreys	2/24/2020
Mirion Technologies, Inc.	76	\$8,820,000	Anderson	7/31/2021
Troy Industries, Inc.	75	\$7,186,200	Montgomery	5/13/2021
Military Systems Group, Inc.	69	\$9,090,000	Davidson	1/8/2019
Banyon Global Technologies	60	\$3,800,000	Knox	2/28/2022
AerSale Inc.	54	\$5,450,000	Shelby	7/31/2023
Whisper Aero Inc.	47	\$7,500,000	Cumberland	8/3/2021
Southern Precision Machining, LLC	45	\$4,470,000	Bedford	4/30/2019
SGB Enterprises Inc.	41	\$1,700,819	Maury	10/4/2023
VK Integrated Systems	34	\$840,000	Montgomery	7/8/2022
Airtech Advanced Materials Group	29	\$13,025,000	Robertson	9/20/2019

Source: Tennessee Department of Economic and Community Development (April 2024)



# RELATED INDUSTRIES

The Aerospace and Defense cluster has a notable impact on job creation in secondary industries. Several companies in Tennessee are closely tied to this cluster but do not explicitly fall within one of the cluster’s industries.

## Exhibit 3: Major Companies in Related Industries

Company	NAICS	Industry	Employment	County
BAE Systems Ordnance Systems Inc. (OSI)	325920	Explosives Manufacturing	957	Sullivan
Embraer Aircraft Maintenance Services LLC.	488190	Other Support Activities for Air Transportation	353	Davidson
Kilgore Flares Company	325998	All Other Miscellaneous Chemical Product and Preparation Manufacturing	342	Hardeman
West Star Aviation, LLC	488190	Other Support Activities for Air Transportation	375	Hamilton
Alemite, LLC	333999	All Other Miscellaneous General Purpose Machinery Manufacturing	250	Washington
Modern Forge Of Tennessee, Inc	332112	Nonferrous Forging	155	Sullivan
Cirrus	488190	Other Support Activities for Air Transportation	164	Blount
Accurate Energetic Systems, LLC	325920	Explosives Manufacturing	119	Humphreys

Source: Tennessee Department of Economic and Community Development (April 2024)

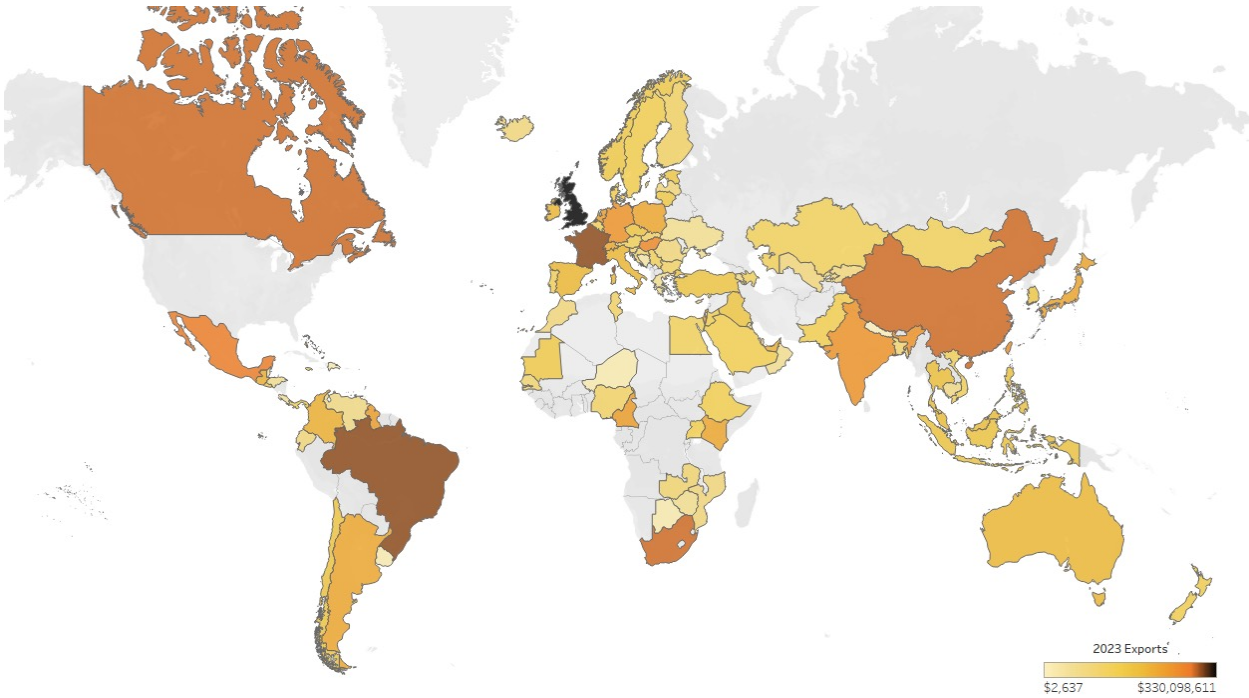
BAE Systems Ordnance Systems Inc. serves as the operating contractor for the Holston Army Ammunition Plant in Kingsport, providing explosive and propellant products to the U.S. Department of Defense, the Department of Energy, and commercial customers. Since its establishment in the 1940s, the facility has consistently supplied products for American defense efforts across multiple conflicts.

The Arnold Engineering Development Complex (AEDC), located at the Arnold Air Force Base, also contributes to the cluster. AEDC hosts the world’s largest flight simulation facilities, providing critical testing services for the majority of high-performance aircraft and missile systems utilized by the U.S. Department of Defense. AEDC plays an important role in aerospace development and defense readiness with 14 unique simulation capabilities. The complex is equipped with 55 wind tunnels, various test cells for rocket and turbine engines, and numerous specialized testing units.

# EXPORTS

In 2023, Tennessee’s exports of Aerospace Products and Parts reached \$960.4 million. The primary export destinations for these products include United Kingdom (\$330 million), Brazil (\$88.9 million), France (\$85 million), South Africa (\$77.8 million), and Canada (\$57.1 million).<sup>4</sup>

Exhibit 4: 2023 Total Exports of Aerospace Products and Parts



Source: US Census Bureau, "USA Trade Online," (April 2024)  
Note: A logarithmic transformation was applied to the employment data to enhance the visualization. The mathematical adjustment ensures a more uniform distribution of data, making variations across other countries more discernible.

In addition to Aerospace Products and Parts, other industries also contribute to the state’s exports in the Aerospace and Defense cluster. Exports for the Navigational, Measuring, Medical, and Control Instruments totaled over \$2.7 billion in 2023. This industry specializes in products such as detection, navigation, guidance, aeronautical, and nautical systems. Additionally, exports to world markets of Arms and Ammunition totaled nearly \$12 million in 2023. Historically, exports in the cluster have exceeded imports, which contributes to a trade surplus in this cluster.



# FUTURE OUTLOOK

In recent years, the Aerospace and Defense cluster has faced numerous challenges. The COVID-19 pandemic required companies to curtail production and capacity, which was further impacted by supply chain constraints. Geopolitical tensions, such as the Russia-Ukraine war, have had a substantial impact on the availability of critical metals like titanium.

In contrast, defense contractors have had consistent government funding, reducing some of the impact from these economic factors on the industry. Despite concerns of escalating costs, defense spending is increasing, particularly in the United States and Europe. This is in part due to the Russia-Ukraine war and the evolving conflict between Israel and Hamas.

In recent years, Tennessee has focused on expanding the state's Aerospace and Defense cluster. The state has provided resources to encourage company recruitment and expansions while ensuring that an available workforce is prepared to meet growing industry demands. Over the past five years, 17 projects have landed in Tennessee. These companies have committed to over 1,900 new jobs and over \$307 million in capital investment. These company commitments will provide high quality jobs to Tennessee workers to improve the quality of life across the state while improving the state's competitiveness for the Aerospace and Defense cluster.



# APPENDICES

## Appendix 1: 2023 Aerospace and Defense Industry Totals

Industry Category	NAICS	2023 Jobs	2023 Business Locations	Employment Growth Rate (2018-2023)	2023 GRP Earnings	Southeast Ranking	National Ranking
<b>AEROSPACE INDUSTRIES</b>							
Search, Detection, Navigation, Guidance, Aeronautical, and Nautical System and Instrument Manufacturing	334511	156	20	Insf. Data	\$66,330,365	8	34
Aircraft Manufacturing	336411	54	22	-85%	\$35,178,446	10	35
Aircraft Engine and Engine Parts Manufacturing	336412	998	9	18%	\$186,135,087	4	19
Other Aircraft Parts and Auxiliary Equipment Manufacturing	336413	994	33	-14%	\$225,581,245	6	20
Guided Missile and Space Vehicle Manufacturing	336414	74	4	Insf. Data	\$10,437,443	3	14
<b>DEFENSE INDUSTRIES</b>							
Small Arms Ammunition Manufacturing	332992	<10	6	Insf. Data	\$1,570,731	Insf. Data	Insf. Data
Ammunition (except Small Arms) Manufacturing	332993	7,854	3	55%	\$2,034,109,539	1	1
Small Arms, Ordnance, and Ordnance Accessories Manufacturing	332994	788	30	92%	\$154,918,925	5	13
Military Armored Vehicle, Tank, and Tank Component Manufacturing	336992	265	2	Insf. Data	\$70,014,735	5	10

Source: Lightcast (April 2024)

## Appendix 2: 2023 Aerospace and Defense Industry Top Occupations

SOC	Occupation	2023 Employment	Median Hourly Wage	Typical Entry Level Required
<b>MANAGEMENT OCCUPATIONS</b>				
11-1021	General and Operations Managers	60,606	\$50.48	Bachelor's degree
11-3051	Industrial Production Managers	5,151	\$48.08	Bachelor's degree
<b>ARCHITECTURE AND ENGINEERING OCCUPATIONS</b>				
17-2112	Industrial Engineers	7,017	\$40.70	Bachelor's degree
17-2141	Mechanical Engineers	3,029	\$45.02	Bachelor's degree
<b>SALES AND RELATED OCCUPATIONS</b>				
41-4012	Sales Representatives, Wholesale and Manufacturing, Except Technical and Scientific Products	15,803	\$27.45	High school diploma or equivalent
<b>OFFICE AND ADMINISTRATIVE SUPPORT OCCUPATIONS</b>				
43-4051	Customer Service Representatives	72,344	\$17.61	High school diploma or equivalent
43-5061	Production, Planning, and Expediting Clerks	12,144	\$22.36	High school diploma or equivalent
43-5071	Shipping, Receiving, and Inventory Clerks	20,256	\$17.92	High school diploma or equivalent
43-9061	Office Clerks, General	53,640	\$15.69	High school diploma or equivalent
<b>INSTALLATION, MAINTENANCE, AND REPAIR OCCUPATIONS</b>				
49-3011	Aircraft Mechanics and Service Technicians	5,111	\$37.84	High school diploma or equivalent
49-9041	Industrial Machinery Mechanics	9,327	\$28.75	High school diploma or equivalent
49-9071	Maintenance and Repair Workers, General	35,656	\$19.16	High school diploma or equivalent
<b>PRODUCTION OCCUPATIONS</b>				
51-1011	First-Line Supervisors of Production and Operating Workers	18,074	\$29.66	High school diploma or equivalent
51-2011	Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	221	\$21.64	High school diploma or equivalent
51-2098	Miscellaneous Assemblers and Fabricators	55,323	\$18.26	High school diploma or equivalent
51-4022	Forging Machine Setters, Operators, and Tenders, Metal and Plastic	731	\$18.84	High school diploma or equivalent
51-4031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic	6,260	\$18.13	High school diploma or equivalent

Source: Lightcast (April 2024)

## Appendix 2: 2023 Aerospace and Defense Industry Top Occupations (Continued)

SOC	Occupation	Employment	Median Hourly Wage	Typical Entry Level Required
<b>PRODUCTION OCCUPATIONS</b>				
51-4033	Grinding, Lapping, Polishing, and Buffing Machine Tool Setters, Operators, and Tenders, Metal and Plastic	1,524	\$17.95	High school diploma or equivalent
51-4041	Machinists	8,977	\$22.66	High school diploma or equivalent
51-4081	Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic	3,728	\$18.76	High school diploma or equivalent
51-4111	Tool and Die Makers	4,347	\$22.97	High school diploma or equivalent
51-4121	Welders, Cutters, Solderers, and Brazers	12,146	\$21.51	High school diploma or equivalent
51-9061	Inspectors, Testers, Sorters, Samplers, and Weighers	19,584	\$18.22	High school diploma or equivalent
51-9161	Computer Numerically Controlled Tool Operators	2,184	\$21.85	High school diploma or equivalent
51-9198	Helpers—Production Workers	4,392	\$15.50	High school diploma or equivalent
<b>TRANSPORT AND MATERIAL MOVING OCCUPATIONS</b>				
53-7062	Laborers and Freight, Stock, and Material Movers, Hand	91,498	\$17.29	No formal educational credential

Source: Lightcast (April 2024)

## REFERENCES

- <sup>1</sup> Lightcast (April 2024)
- <sup>2</sup> Ibid.
- <sup>3</sup> Tennessee Department of Economic and Community Development (April 2024)
- <sup>4</sup> US Census Bureau, "USA Trade Online," (April 2024)