

# AEROready Certification

Southwest Johnson County, Kansas



October 2019

<https://www.aeroready.us/>

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## Executive Summary

This assessment reveals a clear opportunity to expand the economic base and add aerospace businesses in Southwest Johnson County. Furthermore, the greater region contains adequate resources in both labor and industry to support aerospace industry expansions to the Southwest Johnson County Region.

There is a clear opportunity for increased capacity due to current demands. In 2018, over \$176 million in purchases were made by aerospace companies within a 1-hour drivetime of Southwest Johnson County outside the county creating a \$176 in excess demand for aerospace companies locating in the County.

Southwest Johnson County has a workforce that is capable of supporting both aerospace parts manufacturing and assembly and related business services. The 10 most important skilled aerospace occupations are more cost effective than in Wichita and 43% less than the USA average. Additionally, Southwest Johnson County has more skilled manufacturing workers than any other county in the Kansas City Metro Area

Considering the following factors, Southwest Johnson County should be an excellent target for aerospace MROs and manufacturing

- Johnson County currently oversees a 7,339 ft. long runway
- Up to 1,000+ available acres, 300+ acres with taxiway access
- Part of the Kansas City Metro Area
- Garmin and Honeywell recently announced large investments in the region
- Name brand recognized companies are already in the County: Amazon, DuPont, Unilever, CenturyLink
- New Century AirCenter is less than 5 miles from Logistics Park Kansas City, the BNSF's Intermodal Logistics Terminals, one of the best intermodal parks in America
- FAA Part 147 certified training institute with Airframe & Powerplant Certification in the region

## Components to AEROREady™ Certification

In order to award an AEROREady™ certification, our consulting team analyses hundreds of site selection criteria with emphasis on the following 10 items:

1. Assessment of airport property, facilities, navigation equipment, runway, taxiway and available property
2. Availability of local training of technical skills often needed by aerospace companies
3. An FAA certified A&P (Airframe and Power Plant) training facility located within reasonable proximity
4. Available industrial building(s) or hangar(s) suitable for aviation development
5. An available skilled workforce suitable for aviation employment, over 70 skills analyzes
6. Adequate infrastructure to support the aviation industry
7. Aviation support service business and industry in the region
8. A community's pro-business environment and ability to financially support a marketing effort
9. Proximity to University-based aerospace programs and research
10. Quality of Life assets in the region, which are essential to attracting executive talent.

Our certification gives particular focus to skilled labor and the ability to train labor within a region, airport infrastructure and infrastructure in the surrounding region, and whether or not an aerospace cluster exists within a region. Additionally, we seek to understand political capital which could affect defense-related aerospace contracts within a region.

AEROREady™ certified communities, regions, or sites reduce risks for potential aerospace companies to locate in the certified areas. Our certification validates the community/region is ready for an aerospace industry, that there is an ample supply of labor and quality sites, opportunities to customize the training of labor, and utility and transportation infrastructure is in place. If all the resources are present or readily available to successfully attract aerospace industries, we will award an AEROREady™ Certificate—or identify the resources lacking, yet, necessary to attract and sustain aerospace industries.

For the sake of clarity, Aviation refers to aircraft that operate within the atmosphere. On the other hand, Aerospace is the all-encompassing term that refers to both aviation activities and space flight. We will primarily use the term Aerospace in this assessment and marketing plan, unless referring to specific aviation skills or industries.

Lastly, we will offer recommendations and marketing insight and offer a strategy to guide the recruitment process to effectively attract aerospace business into the area.

## Introduction and Brief History

The New Century AirCenter, 30 minutes from downtown Kansas City, is located adjacent to I-35, in Southwest Johnson County. The New Century AirCenter contains approximately 2,500 acres of land and is a true multi-modal center, linking air, rail, and Interstate access, including multiple runways and taxiways, three full FBO service centers and a short line railroad.

Johnson County is one of 15-counties in the Kansas City MSA. Johnson County has a population of 591,000 and makes up over 25% of the population of the Kansas City MSA. The Kansas City MSA offers access to world-class education, housing, medical care, professional sports, cultural attractions, commercial air service and an unrivaled quality of life.

The New Century AirCenter, formerly known as the Olathe Naval Air Station, Flatley Field, and Johnson County Industrial Airport is adjacent to the City of Gardner. The Naval Airbase served as headquarters for the Naval Air transport Service during World War II and as a flight training center for Cadets. For many years thereafter it increased in size and importance, hosting both fighter and reconnaissance groups.

In 1973 the base was given to the Johnson County government and turned into a commercial airport, industrial park and business center. Today, called the New Century AirCenter, the property hosts over 35 companies, located in almost 3 million square feet of space with total employees on site of over 4,000.



## Our Team

Next Move Group was honored by Goldman Sachs in 2017 as one of the top small businesses in America. Next Move Group has three primary service offerings: Site Selection, Economic Development Products, and Executive Searches. One of Next Move Group's partners is a member of the prestigious Site Selectors Guild. Next Move Group has offices in St Louis, MO; New Orleans, LA; Greenville, SC; and Toronto. Visit our website to learn more <https://www.thenextmovegroup.com/>.

Our subcontractors Tucson Roberts and Robert Ingram have economic development experience in multiple areas including piloting aircraft, airport management, FAA Part-147 aviation school management, workforce training, marketing, and recruitment activities. This experience plays a defining role in the following Assessment and Marketing Strategy.

## Who We Are

Our principals have assisted in the recruitment or expansion of numerous aerospace companies including the following:

- Airbus
- Eclipse Aviation
- Boeing
- Goodrich Aerostructures (UTC Corp.)
- Crestview Aerospace
- Aero Mark (CAS)
- Fokker Technologies
- Segers Aero Corp
- Jamco-America
- Sierra Nevada
- Bell Helicopter (Textron)
- Vector Aerospace/Eurocopter
- DRS Technologies
- MFG Galileo Composites
- Commercial Jet, Inc.



## SECTION 1) Assessment of Airport Property, Facilities, Navigation Equipment, Runway, Taxiway and Available Property

The Johnson County Airport Commission currently administers two airports. The Airport Commission also provides water and sewer service to tenants of the airport. Natural gas is distributed by Atmos Energy and electric power is provided by Kansas City Power and Light (Evergy). Currently, major redevelopment efforts are underway and include road resurfacing and taxiway improvements at New Century AirCenter totaling \$7M and a runway 18 X 36 upgrade at Executive Airport totaling \$5.5M. The Airport Commission administers 3,100 acres of land and 6-miles of railroad track and a switching locomotive with access to the Burlington Northern Santa Fe Railroad.

### New Century AirCenter, IXD

Located in Gardner KS, four miles SW of Olathe, New Century AirCenter was designated as the 3<sup>rd</sup> busiest airport in Kansas in 2018, supporting 57,661 annual operations. Currently, 210 aircraft are based at the airport with a Federal Control Tower operating from 6 am to 10 pm seven days a week.

#### Runways

18 X 36 150 FT X 7,339 FT, asphalt, VASI, MALSR, Weight Bearing: Single Wheel 75, Double Wheel 175, Double Tandem 350, Edge lights: high intensity

04 X 22 100 FT X 5,130 FT, asphalt, 4-light PAPI, Weight bearing: Single Wheel 47, Double 55

#### Aircraft operations average 150 per day and include:

- 210 based aircraft
- 46% local general aviation
- 45% transient general aviation
- 5% Military
- 4% air taxi
- Instrument approach: ILS
- MALSR approach lights & 4-light PAPI
- Operating FAA tower



#### Infrastructure

- Shortline railroad connects to BNSF
- Adjacent to Interstate 35
- Natural gas is distributed by Atmos Energy
- Electric power is provided by Kansas City Power and Light (Evergy)
- Water and sewer provided by Airport Authority



Services include:

- Three FBO operations
- Fuel sales, Jet-A and 100LL
- Hangars and tie downs
- Major Airframe & Powerplant maintenance
- Bottled oxygen: Low & High
- Charter and flight training
- De-icing
- Towing
- Corporate and T-hangars

Economic Development Potential

The Johnson County Airport Commission owns approximately 1,000-acres available for development with 800-acres of industrial land at the north and northeast portion of the airport. Three hundred acres have potential access to an existing taxiway or taxiway extension. This land provides a desirable site for a maintenance, repair and overhaul operation (MRO) or a business that requires runway access and airport services. An additional 500-acres is available for industries that do not require taxiway access but could be used for aircraft parts manufacturing, design, or business support. The availability of industrial land offered by the New Century AirCenter is clearly an attractive incentive for potential aerospace business. Furthermore, the land also has access to BNSF rail and switching service provided by the airport railway.



Area in red is available acreage with taxiway access

**Recommendation to strengthen recruitment efforts**

Develop and set aside taxiway access property inside New Century AirCenter

- This property should be utilized exclusively for aerospace purposes including MRO, manufacturing and service support facilities. There is potential for up to 300-500 acres with taxiway access, but additional taxiway and utilities must be planned and constructed to link this property to the operating airport.

Develop plans for running infrastructure to the site so its deal ready



### Johnson County Executive Airport, OJC

The airport is located four miles SE of Olathe Kansas and primarily used by general aviation aircraft and in 2018 had 39,667 annual operations making it the fourth busiest airport in Kansas. The airport consists of 500 acres and supports seven aviation businesses including three helicopter support businesses.

#### Runway:

18 X 36, 4,098 FT X 75 FT, concrete, 4-box VASI on right, 2-box VASI on left, MSLR, Weight bearing: Single wheel 12.5. Runway Lights: medium intensity.

#### Aircraft operations averaged 101 per day and include:

- 240 based aircraft
- 60% transient general aviation
- 38% local general aviation
- 2% air taxi
- Less than 1% military
- Instrument approach: LOC/DME

#### Services include:

- Two FBO Operations
- Corporate and T-hangars
- Flight instruction
- Fuel: Jet A and 100LL
- Major Airframe & Powerplant service
- Bottle oxygen: Low
- De-icing
- Towing



#### Economic Development Potential:

On March 7, 2017 severe weather destroyed three T-hangar buildings and 60 aircraft. The Airport Commission has been replacing the destroyed facilities and opened 68 new hangar bays. Plans are to utilize the airport primarily as a general aviation airport and develop the airport to support its general aviation mission.

## SECTION 2) Availability of Local Training of Technical Skills Often Needed by Aerospace Companies

### **Johnson County Community College (JCCC)**

JCCC is the largest community college in Kansas and one of the ten largest in the U.S. and has impressive resources. With almost 20,000 students enrolled in technical and continuing education courses, this community college plays a major role in educating and training the future workforce of the region. Although they currently offer no specialty aerospace courses, they do provide education and training in many of the 72-essential skills typically needed by manufacturers. JCCC is also very responsive to industry request and capable of adding an aerospace curriculum or partnering with others swiftly if the need arises.



### **Gardner-Edgerton Public Schools**

These schools are very high quality, have a growing technical education program and are interested in partnering in aerospace education and training.

## Recommendations

### **Support Gardner-Edgerton High School's effort to add an aerospace curriculum**

This might include a 2-plus-2 partnership to offer FFA Part 147 basic courses. Several states including AL, WV and SC offer aerospace curriculums in high school which can offer proven models to follow.



### **Engage Johnson County Community College to establish an aerospace curriculum as requested by a local or prospective industry.**

Each segment of the aerospace industry requires selected skills. The college should be included in the recruiting process to assure familiarity with potential new industry requirements.

## SECTION 3) FAA Certified A&P (Airframe and Power Plant) Training Facility

There is a certified FAA Part-147 maintenance school (the Aviation Institute of Maintenance) located within commuting distance of Southwest Johnson County, only 36-miles away in Kansas City.

### Aviation Institute of Maintenance

The Aviation Institute of Maintenance is located approximately 35-minutes from the New Century AirCenter and is FAA Part 147 certified training institution. It is the single certified maintenance school within commuting distance of New Century AirCenter. This institute currently enrolls over 200-students and is a critical component in recruiting MRO businesses to the region. It is privately owned and desires to grow and to partner with local secondary schools and community colleges to expand its outreach.

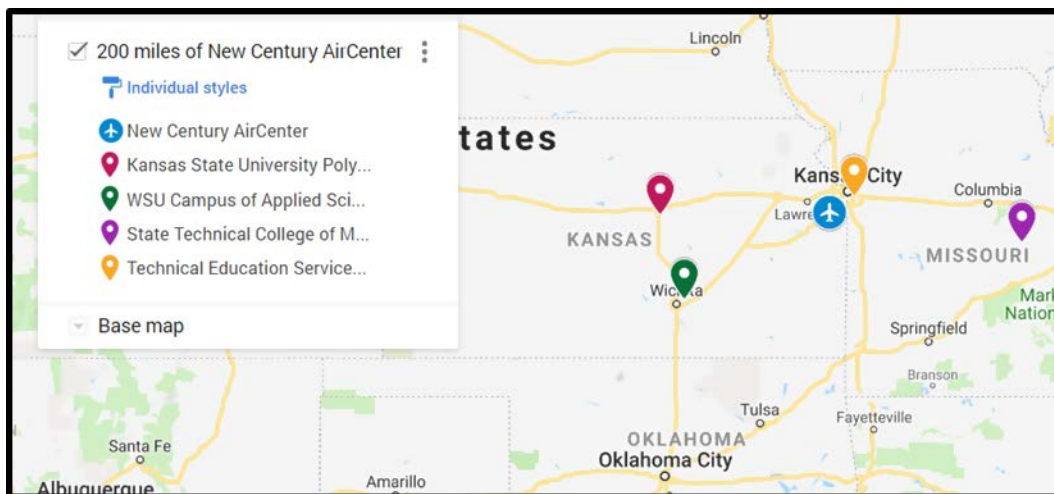


The Aviation Institute of Maintenance, located in Kansas City, offers Aircraft Mechanic programs which prepares students for the Airframe and Powerplant Technician certificate.

- [Click here](#) to learn more

Three additional FAA Maintenance Schools are located within a 200-mile radius of the Southwest Johnson County.

*FAA Certified Maintenance Schools within 200-miles:*



## Recommendations

**Work with the Aviation Institute of Management (AIM) to increase access to Airframe and Powerplant certified training in Southwest Johnson County.**

- This could be accomplished by partnering with Gardner-Edgerton High School or Johnson County Community College. Establish a close, mutually beneficial working relationship with AIM. They have excellent contacts and experience throughout the Aviation Industry.

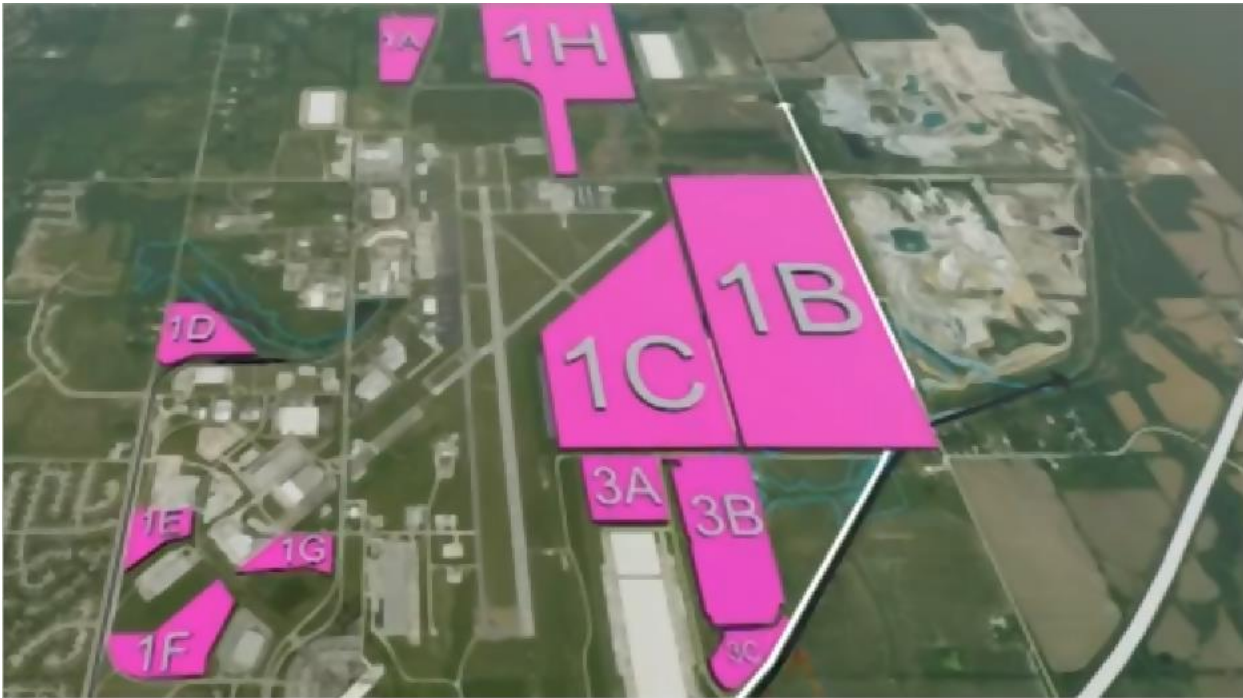
## SECTION 4) Available Industrial Building(S) or Hangar(S) Suitable for Aviation Development



### Property and Area Description

311,100 +/- SF building. 4 +/- acres of fenced, paved and lighted outside storage. Potential for additional outside storage. 95 trailer parking spaces. Adjacent 9 +/- acres available for lease for additional trailer parking. 22' - 26' clear height. 36 dock high doors. 6 oversized drive-in doors. ESFR sprinkler system. The facility has great bones and unique characteristics such as outside storage and trailer parking that are difficult to find in today's market. Improvements planned to modernize the building include: roof and parking lot repairs, warehouse lighting and dock equipment upgrades. Building can be demised to 80,000 +/- SF. Great highway access. Immediate access to New Century AirCenter. Close proximity to BNSF Intermodal, T-5 Lighting.





1B – 300 acres available

1C – 200 acres available

1A – 30 acres available

1H – 120 acres available

1D – 22 acres available

1E – 8.5 acres available

1F – 19.5 acres available

1G – 15 acres available

3A – 3.5 acres available

3B – 20 acres available

3C – 15 acres available

## Feasibility Analysis: Creation of Jobs

### Number of Jobs Which Can be Created at New Century AirCenter

Based on research conducted analyzing multiple airport industrial parks across the country, we have determined it is reasonable to create 19.85 jobs per acre if developed with the following users.

These potential users include air cargo operations, small aircraft/helicopter, corporate jet/regional commercial aircraft, and large single and twin isle commercial service operations.

### Corporate/Regional MRO Aircraft Hangars

- *Average number of jobs per hangar based on our research: **50 jobs/hangar (1 hangar can typically be sited on 3-4 acres)***

For corporate and regional aircraft, an average of 50 jobs/hangar is common. Excellent comparisons are Gulfstream in Appleton, Wisconsin, C and L Aviation in Bangor, Maine, and Airbus in Mobile, Alabama, listed below.

**Gulfstream, Appleton, Wisconsin, 190,000 Sq-ft MRO hangar  
100 jobs announced with the expansion (AIN Online, 26 August 2019):**

- Expansion
- 190,000 Sq-ft hangar
- 100 jobs



Gulfstream, Appleton, WI

**C and L Aviation Group, Bangor ME, 15 acres Corporate and Regional jet  
MRO 200+ jobs (BDN Maine, Business):**

- 15-acre site in Bangor, Maine
- Maintenance and repair on corporate and regional jets
- Currently have 4 hangars and 200 employees
- Additional expansion potential can go to 6 hangars and 300 employees on the 15-acres



C & L Aviation Group, Bangor, Maine



**Airbus Defense and Space MRO Mobile, Alabama, 5 acres, CASA C212, C235, and C295, 50 jobs, (Mobile Area Chamber of Commerce):**

- 5-acre site in Mobile, Alabama
- Maintenance and repair of small cargo aircraft
- Currently have 1 hangar and 1 service building and 50 employees



Airbus Defense & Space MRO, Mobile, AL

### Large Commercial Jet MRO Hangars

- Average number of jobs per hangar based on our research: **335 jobs/hangar**

For large commercial jet hangars, an average of 335 jobs/hangar is common. Comparables are listed below:

**Southwest, Denver, Colorado, 130,000 Sq-ft MRO hangar 75 jobs announced with the new hangar (MRO Network, 16 May 2019):**

- Under Construction
- 130,000 Sq-ft hangar
- 75 jobs



Southwest, Denver, CO

**VT Mobile Aerospace Engineering, Mobile, Alabama, 70 acres, commercial jet MRO operations 1000+ jobs (Amazing Alabama, Profile, 20 July 2016):**

- 70-acre site
- MRO for large jets
- 1,000-1,300 employees
- Mix of new and historic World War II era hangars



VT Mobile Aerospace Engineering, Mobile, AL

**VT Mobile Aerospace Engineering, Pensacola, Florida, 18 acres commercial jet MRO 400 jobs announced with the project (Pensacola News Journal, 17 September 2017):**

- Under construction
- 18-acre site
- 400 jobs



VT Mobile Aerospace Engineering, Pensacola, FL

**HAECO Americas, Inc, Greensboro, North Carolina, 80 acres, 1800 jobs (Triad Business Journal, 10 March 2017):**

- 80-acre site
- 1,800 jobs
- Large Commercial/Military Aircraft MRO



HAECO Americas, Greensboro, NC

**North State Aviation, Winston Salem, North Carolina, 20 acres, 364 employees (Triad Business Journal, 10 March 2017):**

- 20-acre site
- 364 jobs
- Large Jet MRO



North State Aviation, Winston Salem, NC

**Honda Aircraft Company, Greensboro, NC, 50 acres, Corporate Jet manufacturing, 1,700 jobs (Triad Business Journal, 10 March 2017):**

- Manufacturing site for Honda Jet
- 50 acres
- 1,700 jobs



Honda Aircraft Co., Greensboro, NC

### Small Aircraft/Helicopter MRO Hangars

- *Average number of jobs per hangar based on our research: 100/jobs hangar*

This category opens many potential operations from MRO, to small manufacturing, to program management for corporate or military programs. The number of jobs per hangar can vary widely however the job density per acre is usually very high.

**Yulista Aviation, Meridianville, AL 11 acres AH64 maintenance, 180 Jobs (Company website):**

- Helicopter MRO facility
- Military, support of AH64 program
- 180 jobs



Yulista Aviation, Meridianville, AL

**Sierra Nevada, 200 jobs, recently announced:**

- Rotorcraft and new tilt-rotor technology for the military
- 30,000 sq. ft. hangar

**Airbus Helicopter, Inc., Columbus, Mississippi, 38 acres, new helicopter manufacturing facility, 400 jobs at full production (per company staff November 2017):**

- Helicopter manufacturing
- 38 acres, 400 jobs
- 2 different manufacturing spaces (one for commercial and one for military) plus 1 hangar



### How Much do Hangars for MROs Cost?

*Cincinnati/Northern Kentucky International Airport in Hebron, Kentucky constructed a 103,000-squarefoot, \$19 million hangar to expand maintenance, repair and overhaul services for larger aircraft.*

**Nikki Kingery**, Projects Editor

Sep 25, 2018, 5:00am EDT

An aircraft maintenance and repair company broke ground Monday on a 103,000-square-foot, \$19 million hangar at the Cincinnati/Northern Kentucky International Airport.

[Click here to read the full story](#)



*Gulfstream Aerospace in Appleton, Kentucky is constructing a 180,000-square-foot, \$40 million hangar to expand its maintenance capabilities and overall capacity.*

Gulfstream Aerospace is undertaking a \$40 million, 180,000-sq-ft expansion of its Appleton (Wisconsin) International Airport (KATW) maintenance and completion center that is expected to add 50 percent more capacity, create 200 new jobs, and push total employment at the location to more than 1,000, the company announced on Friday. Construction is expected to start in May, with operations beginning in the second quarter of 2019.

[Click here to read the full story](#)

*Piedmont Triad in Greensboro, North Carolina constructed a \$60 million, 250,000-square-foot hangar to service greater sized aircraft and a larger quantity of aircraft.*

## HAECO Opens New Hangar for Large Jets at PTI Maintenance Facility

*\$60 Million Aerospace Facility at Airport will Employ up to 500 New Hires*

**Piedmont Triad** – HAECO Americas, one of the world's leading aircraft repair and maintenance organizations, has completed construction work on a new hangar at Piedmont Triad International Airport. The company has already hired 150 additional employees to work on large jets in the \$60 million facility.

The 250,000 square foot hangar, one of five hangars the company operates at the airport, was completed in December 2017. The company began moving aircraft (primarily passenger aircraft) into the facility for repair and maintenance in January.

[Click here to read the full story](#)

*ST Engineering Aerospace in Pensacola, Florida constructed a \$46 million, 173,500-square-foot MRO hangar to conduct maintenance and modification to aircraft.*

## ST Engineering Aerospace opens repair facility in Florida

Its US\$46m and 173,500-sqft hangar is one of the firm's largest facilities.

ST Engineering Aerospace opened a new airframe Maintenance, Repair & Overhaul (MRO) facility in Pensacola, Florida, USA. It can carry out heavy and line maintenance, as well as aircraft modification work.

[Click here to read the full story](#)

*As an extreme example, Southwest Airlines and the Maryland Aviation Administration are spending over \$100 million to build and equip a 130,000-square foot hangar to house a state-of-the-art MRO hangar.*

## Southwest to invest in new MRO facility at Baltimore/Washington

20 SEPTEMBER, 2018 | SOURCE: FLIGHT DASHBOARD | BY: GHIM-LAY YEO | WASHINGTON DC

Southwest Airlines will co-fund a new \$130 million regional maintenance facility at Baltimore/Washington International airport, to better meet its needs at the second busiest airport in its network.

Construction of the 12,080m<sup>2</sup> (130,000ft<sup>2</sup>) line maintenance facility will begin early next year, with completion in 2021. Southwest will invest \$80 million, with the Maryland Aviation Administration contributing the remaining \$50 million.

[Click here to read the full story](#)



### **Cost Estimate of 30,000-40,000 sq. ft. Hangar**

Following research, the cost estimate for a smaller sized facility of around 30,000-50,000 sq. ft would be \$40-70 per sq. ft for a typical hangar. These smaller hangars have reduced costs but come with less maintenance capabilities, instead acting as more specialized towards storage. Building a hangar for less than \$90/sq. ft. is possible, but they are typically only a shell in nature with less interior infrastructure.

### **Cost Estimate of 300,000 sq. ft. Hangar**

Following research into similar facilities, the cost estimate for a 300,000 sq. ft hangar facility would be \$225+ per sq. ft for a typical MRO type facility. Larger hangars have an increased cost for a variety of reasons. Because of their larger size, there is a higher probable need for thicker concrete slabs and larger hangar doors. Other increases in cost from the larger size include extensive higher cost office and MRO space and more expensive fire suppressant systems. Based on our research, a 200,000 to 300,000 sq. ft hangar could reach \$350 or more per sq. ft with a typical range being \$250 to \$400 per sq. ft

### **Cost Estimate of 150,000 sq. ft. Hangar**

Following research into similar facilities, the cost estimate for a 150,000 sq. ft hangar facility would be \$150-225 per sq. ft for a typical MRO type facility. As with smaller hangars, in the event that heavy painting of aircraft will be a requirement for this project, an additional 20% will need to be added to the cost as well as 25% less for storage only facilities.

### **Cost Estimate of 60,000 sq. ft. Hangar**

Of the planes that are serviced within the facility, 90% will need a height and door of 28' or less. A 60,000 sq. ft. hangar with a clear height of 28' can service CRJ900 planes and smaller. To service larger planes the height will need to be increased above 28'. Also needed in the facility will be a floor thickness of 6".

Following research into similar facilities, the cost estimate for this facility would be \$125-150 per sq. ft for a typical MRO type facility. In the event that heavy painting of aircraft will be a requirement for this project, an additional 20% will need to be added to the cost. For a hangar simply used to store planes rather than perform MRO operations on them this cost will be 25% less.

### **Cost Analysis to build new airport hangars of 60,000 sq. ft., 150,000 sq. ft., and 300,000 sq. ft.**

The cost of large commercial hangars can vary greatly per sq. ft based upon the uses and construction requirements. Research shows that the larger the plane and the higher the value of the plane, the higher the cost of the hangar. Concrete slab thickness, size and number of hangar doors and the type fire suppressant system needed are just a few of the variables.

As the size of the hangar grows, the need for outside concrete apron and storage space generally also grows. Fire suppressant cost itself can vary greatly, but again, the larger and more expensive the planes/jets being stored—and the greater the number—the more sophisticated and expensive the fire suppressant system. Calls to several commercial contractors revealed a wide range of estimates for hangars of 60,000 sq. feet to 300,000 sq. ft. These costs do not

include site prep on ground lease costs. New airport hangars of 60,000 sq. ft., 150,000 sq. ft., and 300,000 sq. ft. were analyzed to understand the potential construction costs.

## SECTION 5) Available Skilled Workforce Suitable for Aviation Employment

The skills listed below are the 10 primary, core skills necessary to directly support both aerospace parts manufacturing and assembly and related business services.

### 10 Core Occupations for Aerospace MRO Companies & Manufacturing Companies

These are the core job skills that potential aerospace businesses are certain to evaluate when considering a potential location. These occupations include:

- Aerospace Engineers
- Aerospace Engineering and Operations Technicians
- Avionics Technicians
- Aircraft Mechanics and Service Technicians
- Aircraft Structure, Surfaces, Rigging, and Systems Assemblers
- Structural Metal Fabricators and Fitters
- Fiberglass Laminators and Fabricators
- Computer-Controlled Machine Tool Operators, Metal and Plastic
- Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic
- Cutters, Braziers, Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders

### 10 Core Occupations: How Your Area's Skilled Aerospace Labor Stacks Up

In order for a region to support both aerospace parts manufacturing and assembly and related business services, they must show evidence of the 10 core occupations previously defined. The following factors, that are essential for aerospace companies and their labor, were reviewed for a 60-minute drivetime of the Southwest Johnson County:

1. Quantity of workers in region
2. Higher concentration of workers than the national average
3. Increases in occupation workers over the past 5 years
4. Projected labor costs of workers

**Your area shows advantages in 10 of 10 occupational codes. Considering these factors, you should be a great target location for any MRO or manufacturing related company.**

- **Aerospace Engineers**
  - 618 workers within 60-minute drivetime of Southwest Johnson County
  - You have 35% more aerospace engineers than the national average for an area of this size
  - 12% increase in aerospace engineers since 2013
    - In this same amount of time Wichita has had a 23% decline
    - In this same amount of time the USA has had a 6% decline
- **Aerospace Engineering and Operations Technicians**

- You have 49% more aerospace engineering and operations technicians than the national average for an area of this size
- Average wage for this position is \$58,004.38 vs. \$67,865.01 average wage for this position in Wichita and \$67,017.60 average wage for this position in USA
- 11% increase in aerospace engineering & operations technicians since 2013
  - In this same amount of time Wichita has had a 17% decline
- **Avionics Technicians**
  - Average wages for this position are \$48,156.13 vs. \$61,048.82 average wage for this position in Wichita and \$64,147.20 average wage for this position in USA
  - 5% increase in Avionics Technicians since 2013
    - In this same amount of time the USA has had a 1% decline
- **Aircraft Mechanics and Service Technicians**
  - 595 workers within a 60-minute drivetime of Southwest Johnson County
  - Average wage for this position is \$59,405.49 vs. \$59,503.18 average wage for this position in Wichita and \$62,869.05 average wage for this position in USA
- **Aircraft Structure, Surfaces, Rigging, and Systems Assemblers**
  - Average wage for this position is \$39,022.49 vs. \$52,605.48 average wage for this position in Wichita and \$53,331.20 average wage for this position in USA
  - 24% increase in Aircraft Structure, Surfaces, Rigging, and Systems Assemblers since 2013
- **Structural Metal Fabricators and Fitters**
  - Average wage for this position is \$38,864.99 vs. \$46,555.69 average wage for this position in Wichita and \$39,288.59 average wage for this position in USA
  - 2% increase in Structural Metal Fabricators and Fitters since 2013
    - In this same amount of time Wichita has seen a 4% decline
    - In this same amount of time the USA has seen a 2% decline
- **Fiberglass Laminators and Fabricators**
  - 6% increase in Fiberglass Laminators and Fabricators since 2013
- **Computer-Controlled Machine Tool Operators, Metal and Plastic**
  - 743 workers within a 60-minute drivetime of Southwest Johnson County
  - Average wage for this position is \$41,999.38 vs. \$44,073.62 average wage for this position in Wichita
  - 26% increase in Computer-Controlled Machine Tool Operators, Metal and Plastic since 2013
    - In this same amount of time Wichita has seen a 23% increase
    - In this same amount of time the USA has seen a 7% increase
- **Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic**
  - Average wage for this position is \$47,282.47 vs. \$81,009.84 average wage for this position in Wichita and \$53,185.60
  - 8% increase in Computer Numerically Controlled Machine Tool Programmers, Metal and Plastic since 2013

- In this same amount of time Wichita has seen a 7% increase
- In this same amount of time the USA has seen a 1% increase
- **Cutters, Braziers, Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders**
  - 2,306 workers within a 60-minute drivetime of Southwest Johnson County
  - 13% increase in Cutters, Braziers Welding, Soldering, and Brazing Machine Setters, Operators, and Tenders since 2013
    - In this same amount of time the USA has seen a 10% increase

### Current Aerospace Jobs Within a 60-Minute Drivetime

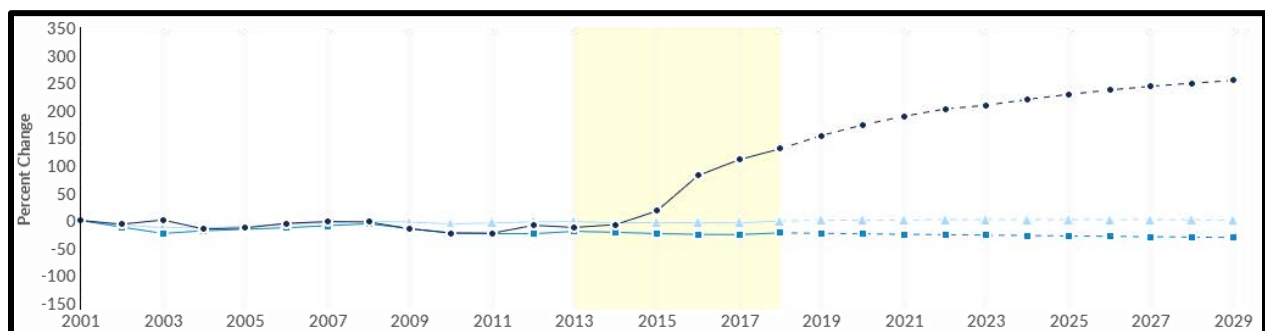
The broader aerospace industry cluster is subdivided into six primary sectors, as seen in the chart. These include the principal employers and producers of aerospace manufactured products.

These sectors have seen a 163% growth since 2013 in a 60-minute drivetime of your area. While these sectors have grown, the average earnings in a 60-minute drivetime is \$74,685 per job which is considerably less than the national average earnings of \$129,482. This labor cost advantage offers a significant recruiting advantage to potential new industry to locate in the area.

NAICS	Six primary aerospace industry sectors
336411	Aircraft Manufacturing
336412	Aircraft Engine and Engine Parts Manufacturing
336413	Other Aircraft Parts and Auxiliary Equipment Manufacturing
336414	Guided Missile and Space Vehicle Manufacturing
336415	Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Mfg.
336419	Other Guided Missile and Space Vehicle Parts and Auxiliary Equipment Manufacturing

### Projected Aerospace Jobs Growth Through 2029

The below graph indicates an increasing growth in aerospace manufacturing jobs over the next decade. This trend is projected to 2029, with the region's growth far outpacing both state and national trends. This is a very positive movement and indicates that existing aerospace manufacturing industries will consider expansion and new supplier industries and business are expected to locate in the area. The projections also suggest that the region's positive business conditions will continue to attract this sector in the area for the next decade.



*Top Line= New Century Region*

*2nd Line= USA*

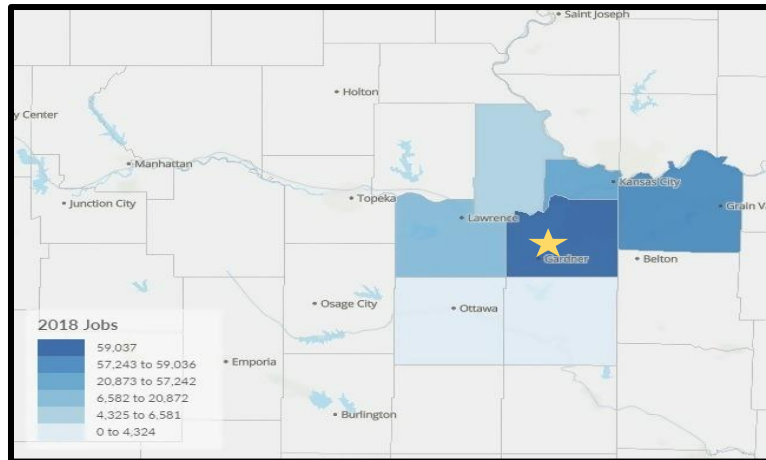
*Bottom Line= Kansas*

## Analysis of 72 Basic-Manufacturing SOC Codes

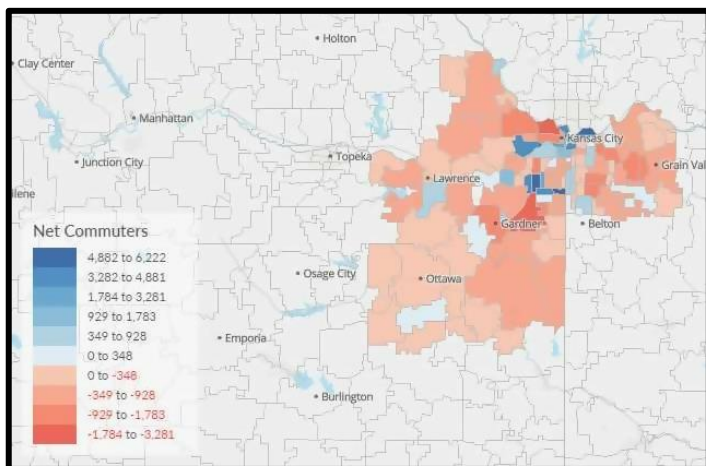
Seventy-two general skill sets are wide-ranging and recognized as essential to the comprehensive aerospace industry.

Located below is an analysis of 72 basic manufacturing occupations. These workers have skills common to many manufacturing sectors. However, these skills show a technical and research mindset that could easily be trained to accommodate the needs of aerospace manufacturing industries.

*Johnson County has the greatest concentration of manufacturing skilled workers within the Kansas City MSA.*



*Concentration of Manufacturing Jobs Per County*



*While Johnson County has the highest concentration of skilled workers in the area, the majority of these skilled workers are leaving the area to work daily, meaning a new manufacturing company in the area would have a ready-made supply of manufacturing workers.*

Description	2013 - 2018 % Change
Multiple Machine Tool Setters, Operators, and Tenders, Metal and Plastic	68%
Software Developers, Applications	55%
Logisticians	43%
Industrial Truck and Tractor Operators	35%
Industrial Engineers	34%
Computer and Information Systems Managers	34%
Laborers and Freight, Stock, and Material Movers, Hand	33%
Materials Engineers	32%
Metal Workers and Plastic Workers, All Other	31%
Inspectors, Testers, Sorters, Samplers, and Weighers	30%
Engineering Technicians, Except Drafters, All Other	30%
Computer Systems Analysts	30%
Electrical, Electronic, and Electromechanical Assemblers, Except Coil Winders, Tapers, and Finishers	28%
Computer-Controlled Machine Tool Operators, Metal and Plastic	26%
Assemblers and Fabricators, All Other, Including Team Assemblers	26%
Layout Workers, Metal and Plastic	26%
Aircraft Structure, Surfaces, Rigging, and Systems Assemblers	24%
Industrial Machinery Mechanics	22%
Electricians	22%
Mechanical Engineers	21%
Heavy and Tractor-Trailer Truck Drivers	21%
Industrial Production Managers	21%
Transportation Inspectors	20%

*These are the top growth occupations within a 60-minute drive time among the 72 Basic-Manufacturing SOC codes and represent a useful indicator to show the capacity to handle new aerospace companies.*

## SECTION 6) Adequate Infrastructure to Support the Aviation Industry

### Access to Interstate Highways

- Gardner and the New Century AirCenter are adjacent to Interstate 35 with quick access to other Kansas City region Interstates including I-29, I-70, I-49, I-435, I-635, I-470 and I-670. Sitting near the center of the U.S., the Kansas City Region, including SW Johnson County, offers enviable highway access to much of the U.S.



### Rail and Intermodal Service

- Although rail is not usually a critical part of most aerospace location searches, SW Johnson County and the entire Kansas City MSA have excellent rail assets including the BNSF, Canadian Pacific, KCS, Norfolk Southern and Union Pacific. The Logistics Park Kansas City, just a few miles from New Century AirCenter, is a BNSF multi-modal facility containing over 13-million square feet under roof including distribution, manufacturing and corporate office facilities.



## Logistics Park Kansas City

- BNSF Railway's newest state-of-the-art facility, the Logistics Park Kansas City (LPKC) Intermodal Facility is ideally located less than 5 minutes from the New Century AirCenter and has been designed to accommodate the growing demands of freight rail transportation.
  - Advanced Infrastructure
    - 443 acres
    - 750,000+ annual unit capacity\*
    - 64,000 feet of track (eight 8,000-foot strip tracks)
    - 1,810 paved parking spaces
    - 4,300 container stacking spots
    - Eight wide-span all-electric cranes
    - 1.5-million-unit capacity at full build-out
  - The Intermodal Facility offers customized distribution center (DC) location consultation and analysis
  - Private Container Yard Services
    - Lift-on & lift-off of containers
    - Container storage
    - Container repair
    - Storage for laden and empty containers
    - Parking for chassis and trucks
  - Surrounding LPKC are acres of level, well-maintained container, chassis and semi-trailer storage areas. These surface lots accommodate multiple uses, including either grounded or wheeled operations.
  - Drayage Services
    - Pulling containers in / out of the port and railroad terminals, or drayage, is a necessary part of operations at logistics parks. At LPKC, BNSF can connect you with truckers to interchange intermodal equipment at the intermodal facility. Whether you need power-only to move trailers or container drayage, or just dray rates, BNSF's partners can provide the drayage services you need.
  - The direct-rail served properties at LPKC offer direct-rail / carload access for consistent, reliable and cost-effective service. Direct-rail / carload is excellent for multi-truck quantities of commodities since three or more truckloads can easily fit in a single railcar.
  - Transload Services - Transload is the transfer of freight between modes, on behalf of non-rail-served shippers and / or receivers. The BNSF Transload network is convenient, flexible and economical and offers many advantages including:
    - Get truck-like services without paying long-haul prices
    - Ship via rail, even though your business isn't located on a rail line
    - Access a network of transload service providers stretching across the western two-thirds of the United States
  - Third Party Logistics services available

## SECTION 7) Aviation Support Service Business and Industry in the Region

Southwest Johnson County is located within a region of existing aerospace companies with a skilled workforce to match. Additionally, aerospace companies have seen increasing and consistent growth over the last 5 years. The region has a clear opportunity to expand the economic base and attract additional aerospace industry.

### Sample of Regional Aerospace Companies

- Orizon – Produces aircraft components and sections
- Honeywell Aerospace – manufactures safety and flight control systems and handles maintenance and refurbishment of aviation equipment
- Garmin – manufactures aviation-panel mount products
- Triumph Group – machining and assembly of aircraft components including landing gear assemblies, thrust reverser beams, wing attach fittings, installation brackets, hinge arm assemblies and engine inlet assemblies.
- LMI Aerospace – Supplier to Boeing, Spirit AeroSystems, Honda Aircraft, Gulfstream



### Sample of Regional Aerospace MROs

- Aviation Technical Services – Services narrow body and widebody aircraft for our commercial, cargo and military customers
- PAS Technologies – OEM and MRO whose capabilities include D-Gun / Super D-Gun, Thermal Spray (HVOF, APS), Welding (TIG, EB), Hot Form / Vacuum Heat Treat, Grinding, CNC Milling, Turning, Drilling, Inspection (CMM, NDT).

### Growth in Support Services

Our area has 42% more Other Aircraft Parts and Auxiliary Equipment Manufacturing jobs than the national average and the number of jobs in this sector has grown by 63% over the last 5 years.

### Supply Chain Purchases

In 2018, over \$176 million in purchases were made by aerospace companies within a 1-hour drivetime of Southwest Johnson County. The \$176 million in purchases imported from outside the region into the region creates a demand for potential aerospace manufacturers to fill if they located in Southwest Johnson County. The \$176 million in imported purchases breaks down as follows:

- \$98 million in purchases by Aircraft Manufacturing companies located within a 1-hour drivetime from companies outside a 1-hour drivetime of Southwest Johnson County
- \$16 million in purchases by Aircraft Engine and Aircraft Engine Parts Manufacturing companies located within a 1-hour drivetime from companies outside a 1-hour drivetime of Southwest Johnson County
- \$16 million in purchases by Aircraft Parts and Auxiliary Equipment Manufacturing within a 1-hour drivetime from companies outside a 1-hour drivetime of Southwest Johnson County
- \$34 million in purchases by Guided Missile and Space Vehicle Manufacturing companies located within a 1-hour drivetime from companies outside a 1-hour drivetime of Southwest Johnson County
- \$7 million in purchases by Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing companies located within a 1-hour drivetime from companies outside a 1-hour drivetime of Southwest Johnson County
- \$3.8 million in purchases by Other Guided Missile and Space Vehicle Parts and Auxiliary Equipment Manufacturing

### Companies in New Century AirCenter

The New Century AirCenter is home to companies known worldwide. Such as, but not limited to:



The New Century AirCenter hosts over 35 companies, located in almost 3 million square feet of space with total employees on site of over 4,000.

- Amazon Fulfillment Center
- BallStars
- Butler Avionics, Inc.
- Cav-Systems
- Cedar Creek, BlueLinx
- CFS West Holdings
- Clutch Nutrition
- Coleman Company Distribution
- Commemorative Air Force Hangar
- Danisco USA
- De Elliotte Co., Inc.
- DuPont
- Ervin Cable Construction
- Examinetics
- Ferrellgas
- Garmin International Flight Testing
- General Spring of Kansas City
- Heartland Precision Fasteners
- JetAVIVA
- Kanrus Trading Co.
- Kerry Ingredients & Flavors
- Metalwest
- Royal Tractor Co., Inc.
- Russell Hampton Company
- Signature Flight
- Steel Pipe & Supply
- Stenner Pump Company
- Stone Delivery
- Stouse LLC
- United Manufacturing
- Upfield
- V&H Trucks, Inc.
- Vestcom New Century
- Wausau Supply Co.

**Below is a sampling of aerospace related companies in a 200-mile radius of Southwest Johnson County**

<b>Company Name</b>	<b>City</b>	<b>State</b>	<b>County</b>
Boeing	CLEARWATER	KANSAS	SEDGWICK
Beechcraft International Service Company	WICHITA	KANSAS	SEDGWICK
Aerocap Products LLC	WELLINGTON	KANSAS	SUMNER
Aerospace Products Company	WICHITA	KANSAS	SEDGWICK
Advanced Welding Technologies, LLC	WICHITA	KANSAS	SEDGWICK
Aei Investment Holdings, Inc.	WICHITA	KANSAS	SEDGWICK
Aero Space Manufacturing Corporation	FREDONIA	KANSAS	WILSON
Aerobotix LLC	ABILENE	KANSAS	DICKINSON
Adronealine Racing	TOPEKA	KANSAS	SHAWNEE
AgEagle Aerial Systems, Inc.	NEODESHA	KANSAS	WILSON
Air Capital Interiors	WICHITA	KANSAS	SEDGWICK
Air Capitol Dial	WICHITA	KANSAS	SEDGWICK
American Structural Systems, Inc.	WICHITA	KANSAS	SEDGWICK
APPH Wichita, Inc.	WICHITA	KANSAS	SEDGWICK
ATK International, Inc.	LAWRENCE	KANSAS	CLOUD
Atlas Aerospace, LLC	WICHITA	KANSAS	SEDGWICK
Avalon Manufacturing Network Services, LLC	WICHITA	KANSAS	SEDGWICK
Aviation Controls, Inc.	INDEPENDENCE	KANSAS	WASHINGTON
Aviation Products, Inc.	EFFINGHAM	KANSAS	ATCHISON
AVT Corp.	OLATHE	KANSAS	JOHNSON
B/E Aerospace, Inc.	SHAWNEE MISSIO	KANSAS	JOHNSON
Bae Systems Prcsion Arstrctres	WELLINGTON	KANSAS	SUMNER
BBC Aerospace	LEAWOOD	KANSAS	JOHNSON
Beechcraft Holdings, LLC	WICHITA	KANSAS	SEDGWICK
Boeing Retired	WICHITA	KANSAS	SEDGWICK
Brittain Machine, Inc.	WICHITA	KANSAS	SEDGWICK
Brytam Manufacturing, Inc.	DERBY	KANSAS	SEDGWICK
Bush Conversions, Inc.	UDALL	KANSAS	COWLEY
Butler National Corporation	OLATHE	KANSAS	JOHNSON
Cambrey Aerospace LLC	MURDOCK	KANSAS	BUTLER
Capps Manufacturing, Inc.	WICHITA	KANSAS	SEDGWICK
Central Air Service, Inc.	RANTOUL	KANSAS	FRANKLIN
Cessna Aircraft Company	INDEPENDENCE	KANSAS	WASHINGTON
Charles Engineering, Inc.	CLEARWATER	KANSAS	SEDGWICK
Cheyenne Mfg., Inc.	WICHITA	KANSAS	SEDGWICK
Clearwater Engineering, Inc.	DERBY	KANSAS	SEDGWICK
Cmj Manufacturing, Inc.	MULVANE	KANSAS	SEDGWICK
Cox Machine Attica	HARPER	KANSAS	MCPHERSON
Creative Composites, Inc.	WICHITA	KANSAS	SEDGWICK
D & S Manufacturing, Inc.	WICHITA	KANSAS	SEDGWICK
D&D Machine, Inc.	WICHITA	KANSAS	SEDGWICK
DCS, Inc.	DERBY	KANSAS	SEDGWICK

Demata Machine & Tool, LLC	MULVANE	KANSAS	SEDGWICK
D-J Engineering, Inc.	AUGUSTA	KANSAS	BUTLER
D-J Engineering, Inc.	CONWAY SPRINGS	KANSAS	SUMNER
DSS ProDiesel Partners LLC	SHAWNEE MISSION	KANSAS	JOHNSON
Dubois, John	PRAIRIE VILLAGE	KANSAS	JOHNSON
Ducommun Aerostructures, Inc.	PARSONS	KANSAS	LABETTE
Dynamic Machine LLC	WICHITA	KANSAS	SEDGWICK
Dynamic N/C LLC	ROSE HILL	KANSAS	BUTLER
Eagle Aerial Systems, Inc.	NEODESHA	KANSAS	WILSON
Elite Air Group LLC	OLATHE	KANSAS	JOHNSON
Enjet Aero LLC	OVERLAND PARK	KANSAS	JOHNSON
Etezazi Industries	WICHITA	KANSAS	SEDGWICK
Etezazi Industries	WICHITA	KANSAS	SEDGWICK
Eurotec Vertical Flight Solutions	EUDORA	KANSAS	DOUGLAS
Evolution Aerospace, Inc.	WICHITA	KANSAS	SEDGWICK
F & M Machine Shop Inc	WICHITA	KANSAS	SEDGWICK
Fiberdyn Corporation	MANHATTAN	KANSAS	RILEY
First Global Manufacturing, Inc.	WICHITA	KANSAS	SEDGWICK
Fly Manufacturing LLC	NEWTON	KANSAS	HARVEY
Forming Specialists, Inc.	BELLE PLAINE	KANSAS	SUMNER
Four Z, Inc.	CLEARWATER	KANSAS	SEDGWICK
GE Engine Services LLC	ARKANSAS CITY	KANSAS	COWLEY
General Electric Company	WICHITA	KANSAS	SEDGWICK
Global CNC Corporation	WICHITA	KANSAS	SEDGWICK
Global Ground Support LLC	OLATHE	KANSAS	JOHNSON
Goodrich Corporation	WICHITA	KANSAS	SEDGWICK
Greco Matthews LLC	OLATHE	KANSAS	JOHNSON
H2o Performance Products	WICHITA	KANSAS	SEDGWICK
Hartwell Corp	WICHITA	KANSAS	SEDGWICK
Hiperformance LLC	NEW CENTURY	KANSAS	JOHNSON
Hisonic LLC	OLATHE	KANSAS	JOHNSON
HM Dunn Aerosystems, Inc.	WICHITA	KANSAS	SEDGWICK
Honeywell	OVERLAND PARK	KANSAS	JOHNSON
Honeywell	DERBY	KANSAS	SEDGWICK
Honeywell	NEW CENTURY	KANSAS	JOHNSON
Honeywell	OLATHE	KANSAS	JOHNSON
Honeywell	PITTSBURG	KANSAS	CRAWFORD
Honeywell	WICHITA	KANSAS	SEDGWICK
Inityaero, Inc.	WICHITA	KANSAS	SEDGWICK
Jet AirWerks LLC	ARKANSAS CITY	KANSAS	COWLEY
JMT Industries, Inc	WICHITA	KANSAS	SEDGWICK
Jones Engineering & MFG Co Inc	ROSE HILL	KANSAS	BUTLER
Keddeg Company	LENEXA	KANSAS	JOHNSON
Kelly Manufacturing Company	GRENOLA	KANSAS	ELK
Killick Aerospace	INDEPENDENCE	KANSAS	WASHINGTON
Kirk & Paula Saueressig	BURLINGTON	KANSAS	COFFEY



Kohlman Systems Research, Inc.	LAWRENCE	KANSAS	CLOUD
Landoll Corporation	MARYSVILLE	KANSAS	MARSHALL
Lathrom Manufacturing Inc	WICHITA	KANSAS	SEDGWICK
Learjet, Inc.	WICHITA	KANSAS	SEDGWICK
Litco Products Distributors, LLC	WICHITA	KANSAS	SEDGWICK
LJ Machine Co.	WICHITA	KANSAS	SEDGWICK
LMI Aerospace, Inc.	COTTONWOOD FALLS	KANSAS	CHASE
LMI Aerospace, Inc.	FREDONIA	KANSAS	WILSON
LMI Aerospace, Inc.	LENEXA	KANSAS	JOHNSON
LMI Lenexa	LENEXA	KANSAS	JOHNSON
Long's Aviation	HAYSVILLE	KANSAS	SEDGWICK
Macro-Lite, LLC	LENEXA	KANSAS	JOHNSON
McFarlane Aviation, Inc.	BALDWIN CITY	KANSAS	DOUGLAS
McGrew Real Estate - Patty McGrew	LAWRENCE	KANSAS	DOUGLAS
Metal Forming Incorporated.	BELLE PLAINE	KANSAS	SUMNER
Millennial Manufacturing Resources	WICHITA	KANSAS	SEDGWICK
Millennium Concepts, Inc.	WICHITA	KANSAS	SEDGWICK
Mini-Mac, Inc	DERBY	KANSAS	SEDGWICK
Modoc Aviation, Inc	OLATHE	KANSAS	JOHNSON
Nex-Tech Aerospace	WICHITA	KANSAS	SEDGWICK
Old Ppp, Inc.	PARSONS	KANSAS	LABETTE
Orizon Aerostructures - Chanute, Inc.	CHANUTE	KANSAS	NEOSHO
Orizon Aerostructures - Nkc, LLC	OLATHE	KANSAS	JOHNSON
Oxwell, Inc.	WELLINGTON	KANSAS	SUMNER
Park Aerospace Technologies Corp.	NEWTON	KANSAS	HARVEY
Parker Aerospace	WICHITA	KANSAS	SEDGWICK
Powell Aerospace LLC	DEXTER	KANSAS	COWLEY
Pratt & Whitney Engine Services Inc	WICHITA	KANSAS	SEDGWICK
Primus International Inc	WICHITA	KANSAS	SEDGWICK
Pulse Aerospace LLC	LAWRENCE	KANSAS	CLOUD
PWI, Inc.	WICHITA	KANSAS	SEDGWICK
R & R Holdings, Inc.	WICHITA	KANSAS	SEDGWICK
R O Terex Corporation	OLATHE	KANSAS	JOHNSON
Raytheon Company	VALLEY CENTER	KANSAS	SEDGWICK
Reliant Manufacturing LLC	GODDARD	KANSAS	SEDGWICK
Sky Aerospace LLC	WICHITA	KANSAS	SEDGWICK
Sky Drones Kc LLC	OVERLAND PARK	KANSAS	JOHNSON
Smith & Smith Aircraft International	WICHITA	KANSAS	SEDGWICK
Spirit AeroSystems	CHANUTE	KANSAS	NEOSHO
Spirit AeroSystems	BEL AIRE	KANSAS	SEDGWICK
Spirit AeroSystems	WICHITA	KANSAS	SEDGWICK
SS Aerospace, Inc.	WICHITA	KANSAS	SEDGWICK
Stol-Craft, Inc.	WELLINGTON	KANSAS	SUMNER
Td Aerospace, LLC	EL DORADO	KANSAS	BUTLER
TECT Aerospace	WICHITA	KANSAS	SEDGWICK
TECT Aerospace	WELLINGTON	KANSAS	SUMNER

TECT Aerospace	PARK CITY	KANSAS	SEDGWICK
Textron Airland LLC	WICHITA	KANSAS	SEDGWICK
Textron Aviation, Inc.	INDEPENDENCE	KANSAS	MONTGOMERY
Textron Aviation, Inc.	WICHITA	KANSAS	SEDGWICK
The Boeing Company	WICHITA	KANSAS	SEDGWICK
The Kansas City Drone Company	OVERLAND PARK	KANSAS	JOHNSON
The Triumph Group Operations Inc	WELLINGTON	KANSAS	SUMNER
Tmx Aerospace	PARK CITY	KANSAS	SEDGWICK
Tregear Aerospace, Inc.	WICHITA	KANSAS	SEDGWICK
Triumph Structures - Kansas City, Inc.	EDGERTON	KANSAS	JOHNSON
Triumph Structures - Wichita, Inc.	EDGERTON	KANSAS	JOHNSON
Triumph Structures - Kansas City, Inc.	EDGERTON	KANSAS	JOHNSON
TECT-Turning Corporation	WICHITA	KANSAS	SEDGWICK
Ultra Electronics Ice, Inc.	MANHATTAN	KANSAS	RILEY
United Instruments, Inc.	WICHITA	KANSAS	SEDGWICK
United Technology Aerospace Systems	WICHITA	KANSAS	SEDGWICK
Universal Avionics Systems Corporation	WICHITA	KANSAS	SEDGWICK
Valent Aerostructures LLC	FREDONIA	KANSAS	WILSON
Valent Aerostructures LLC	LENEXA	KANSAS	JOHNSON
Valent Aerostructures LLC	WICHITA	KANSAS	SEDGWICK
Viking Aerospace US Limit	WICHITA	KANSAS	SEDGWICK
Vinland Aerodrome, Inc.	BALDWIN CITY	KANSAS	DOUGLAS
Wasi, Inc.	WICHITA	KANSAS	SEDGWICK
Weaver Manufacturing, Inc.	WICHITA	KANSAS	SEDGWICK
Webco Air Craft	NEWTON	KANSAS	HARVEY
Yellow Leaf Aerial Drone	OLATHE	KANSAS	JOHNSON
816 Drones	BLUE SPRINGS	MISSOURI	JACKSON
Advanced Aircraft Extngshrs	BLUE SPRINGS	MISSOURI	JACKSON
Aero Factor LLC	BUTLER	MISSOURI	BATES
Aircraft Systems	ELDON	MISSOURI	MILLER
Alstom Signaling Operation LLC	WARRENSBURG	MISSOURI	JOHNSON
Atk LLC	INDEPENDENCE	MISSOURI	JACKSON
Aviation Parts Supply LLC	ARCHIE	MISSOURI	CASS
Boeing	HAZELWOOD	MISSOURI	WEBSTER
Boeing	STRAFFORD	MISSOURI	GREENE
Boeing	HAZELWOOD	MISSOURI	WEBSTER
Boeing Defense, Space & Security Group	HAZELWOOD	MISSOURI	WEBSTER
Boeing - O'Laughlin	WINFIELD	MISSOURI	LINCOLN
Champ Industries	SEYMOUR	MISSOURI	WEBSTER
Chimnely LLC	CADET	MISSOURI	WASHINGTON
Computech Manufacturing Company, Inc.	WASHINGTON	MISSOURI	JOHNSON
Dillon's Automotive	TROY	MISSOURI	LINCOLN
Drone Finder LLC	KANSAS CITY	MISSOURI	PLATTE
Drone View LLC	SPRINGFIELD	MISSOURI	HENRY
E.A.R.S. Alert LLC	HALLSVILLE	MISSOURI	BOONE
EBV Explosives Environmental Company	CARTHAGE	MISSOURI	JASPER

Eyerly Aerospace LLC	INDEPENDENCE	MISSOURI	JACKSON
General Electric Company	CARTHAGE	MISSOURI	JASPER
Gerding Enterprises	DITTMER	MISSOURI	JEFFERSON
GKN Aerospace North America, Inc.	HAZELWOOD	MISSOURI	WEBSTER
Haas TCM, Inc.	HAZELWOOD	MISSOURI	WEBSTER
Hawker Beechcraft Corporation	KANSAS CITY	MISSOURI	CLAY
Honeywell	COLUMBIA	MISSOURI	BOONE
Honeywell	GARDEN CITY	MISSOURI	CASS
Honeywell	KANSAS CITY	MISSOURI	JACKSON
Honeywell	NORTH KANSAS CITY	MISSOURI	CLAY
Impulse USA, Inc.	FESTUS	MISSOURI	JEFFERSON
Inlow Finishing Touch	DEARBORN	MISSOURI	PLATTE
Integrity Machine, LLC	WEBB CITY	MISSOURI	JASPER
Kip Drone Operations LLC	NIXA	MISSOURI	CHRISTIAN
Lake City Army Ammunition Plant	INDEPENDENCE	MISSOURI	JACKSON
Lake Ozark Helicopters, Inc.	LAKE OZARK	MISSOURI	CAMDEN
LBZ LLC	NEVADA	MISSOURI	VERNON
LMI Aerospace, Inc.	CUBA	MISSOURI	CRAWFORD
Midway Machine Company, Inc.	NEOSHO	MISSOURI	NEWTON
Midwest Aircraft Components	WELLSVILLE	MISSOURI	MONTGOMERY
Midwest Drone, Inc.	GRAIN VALLEY	MISSOURI	JACKSON
Midwest DronesCAPES LLC	SULLIVAN	MISSOURI	FRANKLIN
Midwest DroneWorks	SPRINGFIELD	MISSOURI	HENRY
Precise Machine Works LLC	HERMANN	MISSOURI	GASCONADE
Pritchett Aircraft	ROLLA	MISSOURI	PHELPS
Professional Drone Imaging	KANSAS CITY	MISSOURI	CLAY
Roberson Tool & Die LLC	BLAND	MISSOURI	GASCONADE
RTI Advanced Forming, Inc.	SULLIVAN	MISSOURI	FRANKLIN
RTI Advanced Forming, Inc.	WASHINGTON	MISSOURI	JOHNSON
SBD Aerospace	VLG LOCH LOYD	MISSOURI	CASS
Sifco Turban Component Service	KANSAS CITY	MISSOURI	PLATTE
Southwest Aviation & Manufacturing LLC	SOUTH WEST CIT	MISSOURI	MCDONALD
St Louis Industries	CUBA	MISSOURI	CRAWFORD
Tech Investments LLC	KANSAS CITY	MISSOURI	JACKSON
Tech Manufacturing LLC	WRIGHT CITY	MISSOURI	WARREN
The Boeing Company	HAZELWOOD	MISSOURI	WEBSTER
The Boeing Company	TROY	MISSOURI	LINCOLN
Todd Aviation LLC	ROLLA	MISSOURI	PHELPS
Trifecta Aerospace, LLC	SULLIVAN	MISSOURI	FRANKLIN
UI Power	LAKE OZARK	MISSOURI	CAMDEN
Ultrax Aerospace, Inc.	LEES SUMMIT	MISSOURI	JACKSON
Valent Aerostructures LLC	WASHINGTON	MISSOURI	FRANKLIN
Accurus Aerospace Corporation	TULSA	OKLAHOMA	TULSA
Accurus Aerospace Tulsa LLC	TULSA	OKLAHOMA	TULSA
Actibiomotion, LLC	CORALVILLE	IOWA	JOHNSON
Aero Automation, LLC	BROKEN ARROW	OKLAHOMA	TULSA

AGC Manufacturing Services, Inc.	TULSA	OKLAHOMA	TULSA
Aircraft Components Company	TULSA	OKLAHOMA	TULSA
Aircraft Systems	TULSA	OKLAHOMA	TULSA
Allied Automotive	GREENWOOD	ARKANSAS	CRAWFORD
American Airlines, Inc.	TULSA	OKLAHOMA	TULSA
American Drones LLC	MOORE	OKLAHOMA	POTTAWATOMIE
ARH Maintenance LLC	SPRINGDALE	ARKANSAS	WASHINGTON
Artisan Manufacturing LLC	COLLINSVILLE	OKLAHOMA	TULSA
Barrett Precision Engines, Inc.	TULSA	OKLAHOMA	TULSA
Black River Aerospace LLC	MOORE	OKLAHOMA	POTTAWATOMIE
Boeing Aerospace Operations, Inc.	ALTUS	OKLAHOMA	JACKSON
Carter Aerospace Manufacturing Company LLC	SKIATOOK	OKLAHOMA	TULSA
Cherokee Nation Diagnostic Innovations LLC	TULSA	OKLAHOMA	TULSA
Cr Avionics LLC	TULSA	OKLAHOMA	TULSA
Custom Air Inc	ROE	ARKANSAS	MONROE
Cymstar LLC	BROKEN ARROW	OKLAHOMA	TULSA
D C Jones Machine Co	GROVE	OKLAHOMA	DELAWARE
Dakota Air Frame	LARCHWOOD	IOWA	LYON
Davis Thorpe Company	MOORE	OKLAHOMA	POTTAWATOMIE
Delta Aerospace LLC	PARAGOULD	ARKANSAS	GREENE
Don Honeywell	TULSA	OKLAHOMA	TULSA
Drone Viu LLC	TULSA	OKLAHOMA	TULSA
Drones OK LLC	TULSA	OKLAHOMA	TULSA
Ducommun Labarge Technologies, Inc.	TULSA	OKLAHOMA	TULSA
Eaglecrest Aviation LLC	BROKEN ARROW	OKLAHOMA	TULSA
Estumkeda LTD.	BARTLESVILLE	OKLAHOMA	OSAGE
Facet (Oklahoma) LLC	STILWELL	OKLAHOMA	ADAIR
Ferra Aerospace, Inc.	GROVE	OKLAHOMA	DELAWARE
Gar - Mro Services, Inc.	WEST DES MOINES	IOWA	POLK
Get Threaded LLC	TULSA	OKLAHOMA	TULSA
Gillis Applied Technologies, Inc.	BROKEN ARROW	OKLAHOMA	TULSA
Goodrich Corporation	CARROLL	IOWA	CARROLL
Goodrich Corporation	WEST DES MOINES	IOWA	POLK
Green Country Aircraft LLC	TULSA	OKLAHOMA	TULSA
Greenwood Group, Inc.	PONCA CITY	OKLAHOMA	KAY
G'S Restoration Services, Inc.	TULSA	OKLAHOMA	TULSA
Hershey Flying Service	HERSHEY	NEBRASKA	LINCOLN
Hershey Flying Service	DAVID CITY	NEBRASKA	BUTLER
Hitco Carbon Composites, Inc.	ARKADELPHIA	ARKANSAS	CLARK
Honeywell	NEBRASKA CITY	NEBRASKA	OTOE
Honeywell	BENTONVILLE	ARKANSAS	BENTON
Honeywell	TULSA	OKLAHOMA	TULSA
iCES Corporation	CLEVELAND	OKLAHOMA	PAWNEE
Indy Aircraft LTD.	INDEPENDENCE	IOWA	BUCHANAN
J Stephens LLC	TULSA	OKLAHOMA	TULSA

Johnson Helicopter Services, LLC	RED OAK	IOWA	CEDAR
Kern Valley Industries	ROSE	OKLAHOMA	MAYES
LMI Aerospace, Inc.	TULSA	OKLAHOMA	TULSA
Mdfconsulting LLC	CEDAR RAPIDS	IOWA	LINN
Mena Aircraft Engines, Inc.	MENA	ARKANSAS	POLK
Mills County Choppers, Inc.	RED OAK	IOWA	CEDAR
Morton International LLC	BENTONVILLE	ARKANSAS	BENTON
National Ballooning LTD.	WINTERSET	IOWA	MADISON
Neosource, Inc.	TULSA	OKLAHOMA	TULSA
New Generation Drones	TULSA	OKLAHOMA	TULSA
Nordam	TULSA	OKLAHOMA	TULSA
Novel Chemical Solutions, Inc.	CRETE	NEBRASKA	CHASE
Onefire Aerospace Services	JENKS	OKLAHOMA	TULSA
Orizon Aerostructures	OWASSO	OKLAHOMA	TULSA
Ose - Rocket Tooling Systems LLC	NEWKIRK	OKLAHOMA	KAY
Owasso Cdj LLC	TULSA	OKLAHOMA	TULSA
PDES, Inc.	JOHNSTON	IOWA	POLK
Primus International, Inc.	TULSA	OKLAHOMA	TULSA
Pryer Machine & Tool Co.	TULSA	OKLAHOMA	TULSA
Pryer Technology Group	TULSA	OKLAHOMA	TULSA
Randy Mulkey	WELLSTON	OKLAHOMA	LINCOLN
Riverside Aerospace Corporation	CORALVILLE	IOWA	JOHNSON
Rocket Science Coaching LLC	ANKENY	IOWA	POLK
Rockwell Collins Asia-Pac Holdings LLC	CEDAR RAPIDS	IOWA	LINN
S&J Manufacturing, Inc.	SKIATOOK	OKLAHOMA	TULSA
Shenandoah Aviation, Inc.	SHENANDOAH	IOWA	PAGE
Shield Aerodynamics LLC	PINE BLUFF	ARKANSAS	JEFFERSON
Shoulders International	TULSA	OKLAHOMA	TULSA
Sky Lit Drones LLC	TEXARKANA	ARKANSAS	MILLER
Skyview Drone Solutions LLC	CEDAR RAPIDS	IOWA	LINN
Solid Path Services	TULSA	OKLAHOMA	TULSA
Space Warp Dynamics LLC	OMAHA	NEBRASKA	DOUGLAS
Spiral Solutions & Technologies, Inc.	GLENWOOD	IOWA	MILLS
Spirit AeroSystems	TULSA	OKLAHOMA	TULSA
Spirit AeroSystems	BROKEN ARROW	OKLAHOMA	TULSA
Spirit AeroSystems	SAND SPRINGS	OKLAHOMA	TULSA
Spirit AeroSystems	TULSA	OKLAHOMA	TULSA
St Croix Aircraft	CORNING	IOWA	ADAMS
Stetler Aerospace Auditing LLC	BIXBY	OKLAHOMA	TULSA
Tellico Engineering Services	TULSA	OKLAHOMA	TULSA
The Boeing Company	ALTUS	OKLAHOMA	JACKSON
The Boeing Company	OFFUTT AFB	NEBRASKA	SARPY
The Boeing Company	TULSA	OKLAHOMA	TULSA
The Boeing Employee Outdoor Adventure Club	MOORE	OKLAHOMA	POTTAWATOMIE
The Nordam Group, Inc.	TULSA	OKLAHOMA	TULSA



The Northern Republic Company	WEST DES MOINE	IOWA	POLK
Three Feathers Aero LLC	MARION	IOWA	LINN
Tulsa Turbine	BIXBY	OKLAHOMA	TULSA
United Aerostructures, Inc.	BROKEN ARROW	OKLAHOMA	TULSA
United Dynamics, Inc.	SHAWNEE	OKLAHOMA	POTTAWATOMIE
VIP Manufacturing Corporation	BLUEJACKET	OKLAHOMA	OTTAWA
Wahlert Enterprises LLC	WAUKEE	IOWA	DALLAS
Walden's Machine LLC	TULSA	OKLAHOMA	TULSA
West Drone Services LLC	CUMMING	IOWA	WARREN
Wilson Drone Services LTD.	ADEL	IOWA	DALLAS
Word Aerospace, Inc.	FAYETTEVILLE	ARKANSAS	WASHINGTON
Yaffe Metals	TULSA	OKLAHOMA	TULSA
Yankee Pacific	TULSA	OKLAHOMA	TULSA

## SECTION 8) A Community's Pro-Business Environment and Ability to Financially Support a Marketing Effort

The following organizations are present to assist in creating a pro-business environment.

### Southwest Johnson County Economic Development Corporation (SWJCEDC)

- This organization handles industrial recruiting for Gardner, Kansas, and the New Century AirCenter. SWJCEDC realizes the potential of aerospace development and is a key component in expanding, marketing and recruiting new aerospace industry.



### Kansas Department of Commerce

- This state agency targets aerospace and attends major aerospace events both in the U.S. and abroad. They have a successful track record of recruiting aerospace and will add depth and experience as a partner to the local recruiting effort.

### Kansas City Area Development Council

- KCADC represents the economic interest of all 18-counties in the Kansas City region, in both Missouri and Kansas. They are considered by many to be the number one regional economic development group in the United States, and they help local entities such as SWJCEDC in both recruiting and business support processes. Although they do not specifically target aerospace, they do have related expertise, and staff and have the desire to partner with SWJCEDC in aerospace recruiting efforts. KCADC also has strong research capabilities and the ability to help with Request for Proposals (RFPs).

## County Economic Research Institute Inc. (CERI)

- The County Economic Research Institute can provide specialized data on Johnson County as needed by SWJCEDC. Accurate, timely data is critical to an aerospace marketing and recruiting effort.

## Recent Successes

Recent successes show major corporations find the area to be pro-business:

### Honeywell

A consolidation by Honeywell Aerospace appears destined to bring even more jobs to Olathe.

The *Wichita Business Journal* reports that Honeywell Aerospace will move its repair and overhaul work from Wichita to Olathe by the end of the year. Our sister publication said the move would affect about 175 employees.

The news comes a day after the company said it would close its Renton, Wash., office as part of a move of repair and overhaul operations to Olathe. Some of the jobs from that facility will move to an office in Redmond, Wash., but the rest will move to Olathe.

Honeywell Aerospace has about 550 employees at its Olathe plant, in the Cedar Creek area southwest of the junction of Kansas Highways 7 and 10. Scott Sayres, director of communications for Honeywell, declined to discuss the number of jobs that might be added in Olathe. He did say that the company is giving notice, and the potential for relocation assistance, to employees affected by the moves.

The company, which has two buildings in Olathe, handles a number of functions locally, including manufacturing, engineering, aftermarket service, and sales and marketing, Sayres said. The move of repair and overhaul work to Olathe is part of a continuous process of looking for ways to better serve Honeywell Aerospace customers, he said.

### GARMIN

Olathe-based Garmin Ltd. reported that revenue from its aviation segment grew 22 percent in the fourth quarter of 2018, a direct result of expanding its North American headquarters.

Garmin (Nasdaq: GRMN) completed the first phase of a \$200 million expansion project with the opening of a 775,000-square-foot warehouse and manufacturing facility in October, more than doubling its North American manufacturing and distribution capacity. Phase two of the expansion will renovate the existing warehouse and manufacturing space into a research-and-development facility with supporting office space. This project is expected to be completed in the fall and will have room for as many as 2,600 additional associates once completed.

In a Wednesday filing with the Securities and Exchange Commission, Garmin said the Olathe facility houses the majority of product design and development work, as well as where "the majority of aviation panel-mount products are manufactured, and products are warehoused, distributed, and supported for North, Central and South America."

Garmin attributed "one of its core competencies and strengths" to its vertically integrated manufacturing capabilities at all of its facilities, including the Olathe location, according to the filing.

## Potential Political Influence Which Could Affect Defense Aerospace Contracts

### Rep. Sharice Davids' committees

- Committee on Transportation and Infrastructure
  - Subcommittee on Aviation
  - Subcommittee on Economic Development, Public Buildings and Emergency Management
  - Subcommittee on Highways and Transit

### Senator Jerry Moran's committees

- United States Senate Committee on Appropriations
  - Subcommittee on Department of Defense
- United States Senate Committee on Commerce, Science, and Transportation
  - United States Senate Commerce Subcommittee on Aviation Operations, Safety, and Security
- United States Senate Environment and Public Works Committee
  - Subcommittee on Transportation and Infrastructure

**Senator Pat Roberts does not serve on any defense, transportation, or aerospace committees.**

## SECTION 9) Proximity to University-Based Aerospace Programs and Research

- Kansas State University's College of Technology and Aviation offers both associate and bachelor's degrees in aviation maintenance and professional pilot, and an associate degree in avionics. [Click here to learn more \(https://polytechnic.k-state.edu/academics/degree-options/\)](https://polytechnic.k-state.edu/academics/degree-options/)

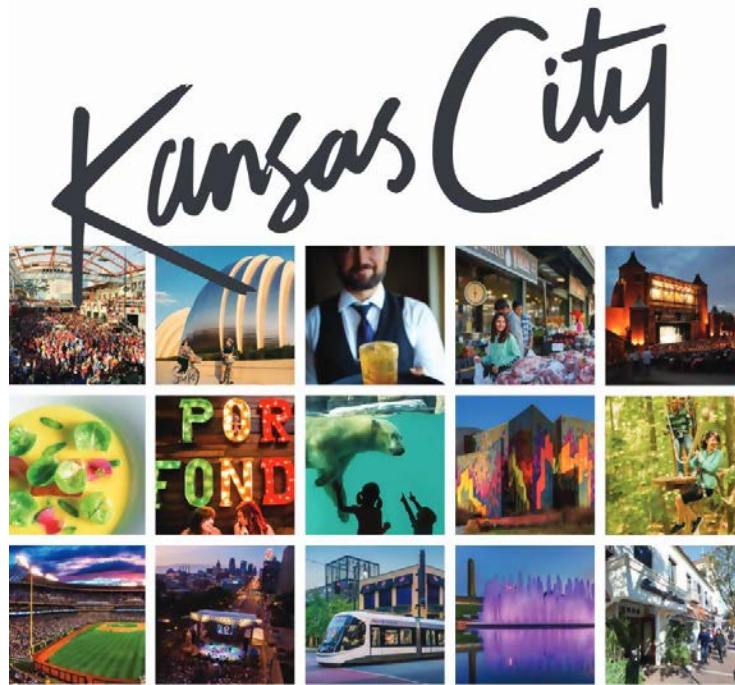


- The University of Kansas offers both undergraduate and graduate programs in Aerospace Engineering. [Click here to learn more \(http://ae.engr.ku.edu/\)](http://ae.engr.ku.edu/)



## SECTION 10) Quality of Life Assets in the Region, Which Are Essential to Attracting Executive Talent

The Kansas City MSA offers access to world-class education, housing, medical care, professional sports, cultural attractions, commercial air service and an unrivaled quality of life. Being only 30 minutes from downtown Kansas City, Southwest Johnson County offers access to all the above.



- **Quality of Life Assets**

- As part of the Kansas City MSA, Southwest Johnson County and the entire region have quick access to professional sports, world class medical care, executive housing, beautiful golf courses, outstanding museums, parks and recreation facilities, and first-class retail shopping opportunities.
- Johnson County was ranked in the top 25 counties to live in according to an analysis from 24/7 Wall St.
- Kansas City's Cost of Living is 2.5% below the national average
- The city's 12th Street became world-renowned for its jazz clubs, earning Kansas City the moniker the "Paris of the Plains." Today, live jazz can still be heard regularly at 40 clubs throughout the city.
- Every fall, Kansas City hosts 600 teams at the world's largest barbecue competition, the American Royal World Series of Barbecue.
- Kansas City is home to more than 200 fountains—more than any other city in the world except Rome.

## SWOT

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>• Major company presence already on site</li> <li>• Ample land for development</li> <li>• Support Organizations</li> <li>• Proximity to intermodal terminal</li> <li>• Proximity to Wichita aerospace cluster</li> <li>• Cost of labor</li> <li>• Proximity to Kansas City</li> <li>• Shortline railroad on site</li> <li>• Proximity to Aviation Institute of Maintenance</li> <li>• Length of runway</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• Lack of MRO hangar space available</li> <li>• Some infrastructure does not exist to the largest tracts of land</li> <li>• Several of the 10 core occupations had less workers than the nation average</li> <li>• Lack of dedicated funding stream for aerospace recruiting</li> <li>• Small staff of Southwest Johnson County EDC</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>• \$98 million in purchases by Aircraft Manufacturing companies located within a 1-hour drivetime from companies outside a 1-hour drivetime of Southwest Johnson County</li> <li>• \$16 million in purchases by Aircraft Engine and Aircraft Engine Parts Manufacturing companies located within a 1-hour drivetime from companies outside a 1-hour drivetime of Southwest Johnson County</li> <li>• \$34 million in purchases by Guided Missile and Space Vehicle Manufacturing companies located within a 1-hour drivetime from companies outside a 1-hour drivetime of Southwest Johnson County</li> <li>• \$7 million in purchases by Guided Missile and Space Vehicle Propulsion Unit and Propulsion Unit Parts Manufacturing companies located within a 1-hour drivetime from companies outside a 1-hour drivetime of Southwest Johnson County</li> <li>• Recruiting opportunities in high-cost regions where aerospace companies are leaving including Southern California, San Antonio, TX, Atlanta, GA region, and the Northeast Region.</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>• Losing current tenants of AirCenter</li> </ul>



## Marketing Strategy

### MARKETING STRATEGY 1

The below aerospace cluster regions around the United States offer the best recruitment opportunities given their high payroll, business location loss, and high cost of labor compared to the Southwest Johnson County region.

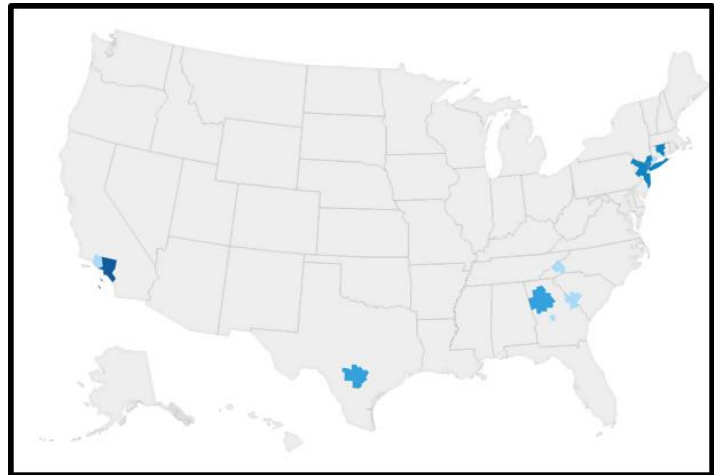
Clusters were identified as being high-risk if they met the following factors. Clusters that showed these factors signal that aerospace companies in these areas are dissatisfied with the region and are leaving to find more optimal locations.

- High labor cost
- Out-migration of aerospace companies
- General high cost of doing business

This presents an opportunity for the Southwest Johnson County region where labor, taxes, and other business costs are lower as it indicates that companies from these regions may be more likely to relocate.

We recommend annual recruiting missions based on this map due to the advantages you have against these regions.

- Southern California (Particularly Los Angeles and Thousand Oaks)
  - Lost 20 Aerospace companies in the last 5 years.
  - Average aerospace earnings in Southern California are \$121,077 or 39% higher than your regional wages
- San Antonio, TX
  - Lost 7 Aerospace companies in the last 5 years
  - Average aerospace earnings in San Antonio, TX are \$98,527 or 25% higher than your regional wages
- Atlanta, GA Region (Particularly Warner Robins, GA, Augusta, GA, and to Asheville, NC)
  - Lost 49 aerospace companies in the last 5 years
  - Average aerospace earnings in the Atlanta, GA Region are \$117,285 or 37% higher than your regional wages
- Northeast Region (Particularly New York, NY, Newark, NJ, Hartford, CT and Stamford, CT)
  - Lost 20 Aerospace companies in the last 5 years.
  - Average aerospace earnings in the Northeast Region are \$133,314 or 45% higher than your regional wages



We recommend hiring a lead generation firm to set you 5 prospect meetings per location in four different prospecting trips per year (for a total of 20 prospect meetings per year). Cost for such meetings typically run around \$1,400 per meeting.  $\$1,400 \times 20 = \$28,000$  plus the cost of travel estimated at \$2,000 per trip brings estimated cost to \$36,000 per year.

## MARKETING STRATEGY 2

Next Move Group, as part of our AERO Ready, contract will send 60 emails per week targeting not only the at-risk clusters identified, but also companies across the United States marketing the Southwest Johnson County region for Aerospace.

These emails will highlight your bullet point assets for aerospace companies to locate in your community. These emails give analytics which track the number of times they are opened and clicked. If an email is opened at least twice, Next Move Group will call the company which opened it and attempt to set a meeting or call with them for you.

### Example of our tracking system:

#### Opened

Export As CSV

Email Address	Opens ↑	First Name	Last Name	Address	Phone Number	Company
dean@duraflexinc.com >	16	Dean				Duraflex Inc.
MICHAEL.HOLMES@AERODESIGNMF... >	5	Mike				Cadence Aerospace Adm Oper

#### Subscriber activity for: [MICHAEL.HOLMES@AERODESIGNMFG.COM](mailto:MICHAEL.HOLMES@AERODESIGNMFG.COM)

07/12/2018	
11:29AM	Open
11:30AM	Open
11:30AM	Open
11:31AM	Open
11:40AM	Open

### Results we are getting:

 Thu 9/13/2018 10:49 AM  
John A. O'Toole, CECD <jotoole@beaufortscedc.org>  
RE: Hurricane

To: Chad Chancellor  
You replied to this message on 9/13/2018 10:53 AM.

Chad I am heading to Jacksonville. Going to get out of the way of potential tidal surges and catch an NFL game.

By the way, we have a request for a meeting from a Raleigh aerospace company as a result of the mailings. I will keep you posted.

Is Tornado Hydrovac dead for this region. If not I have a new site available near the Marine Corp Air Station.

Thanks for checking in. Maybe I'll see you guys at IEDC?

Best regards,

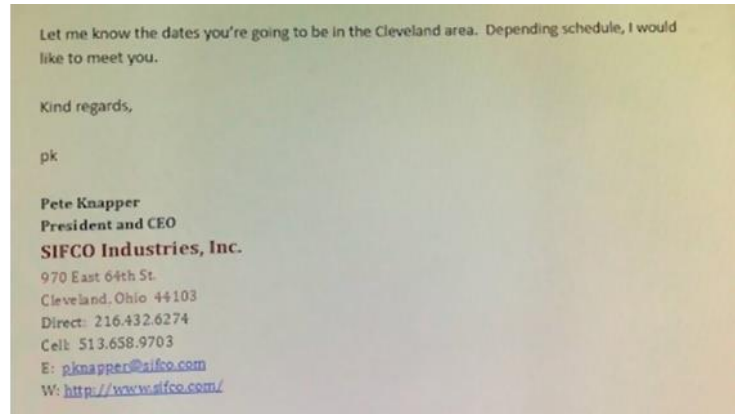
John

John A. O'Toole, CECD Executive Director  
Beaufort County Economic Development Corporation  
110 Traders Cross, Bluffton, SC 29909  
E-Mail [jotoole@beaufortscedc.org](mailto:jotoole@beaufortscedc.org)  
Office: (843) 705-8414  
Mobile: (860) 685-0689

### MARKETING STRATEGY 3

Create a new section of your website for aerospace recruiting with information contained within this document. Specifically, advantages in labor, infrastructure, and existing sites. Add caller ID tracking tools to the website which will reveal companies' names who interact with the site. Also add retargeting code which will keep advertisements of your community on display to visitors of your website for 7 days as they browse popular news and weather websites.

#### Results we are getting:



#### Example of caller ID tracking which identified the aerospace company:

### CALLER ID FOR THE PAGES

A new company has visited [thenextmovegroup.com](http://thenextmovegroup.com) for the first time!

#### Company Details

Harris Corporation

Company:



Address: 1025 West NASA Boulevard

Melbourne, Florida 32919 (United States)

Telephone: 321-727-9100

Website: [harris.com](http://harris.com)

Industry: Search And Navigation Equipment [3812]

Revenue: \$1,000,000,000+

No. Employees: 10,000 to 25,000

Social:

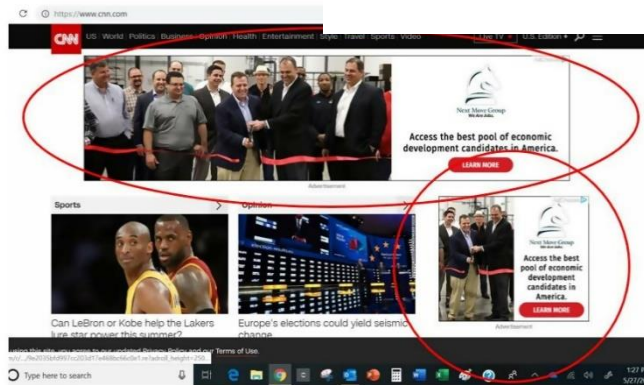
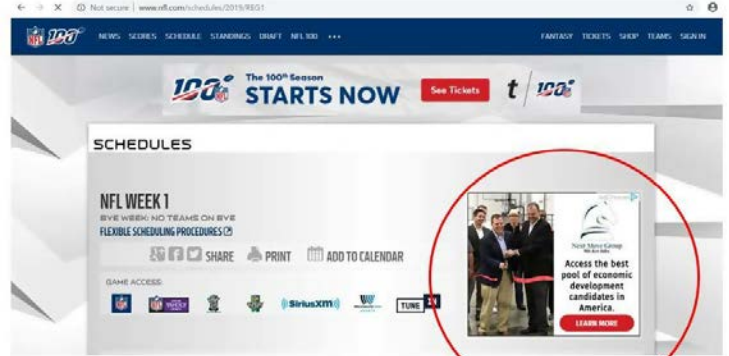
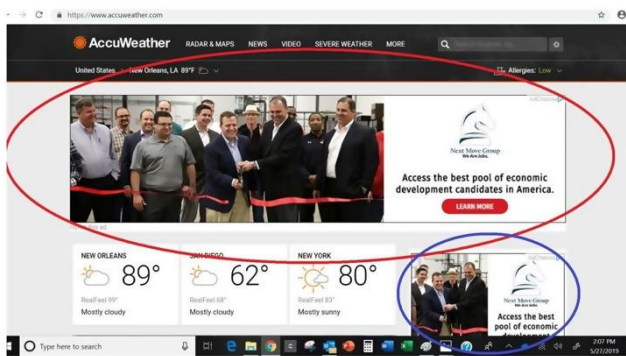
#### Website Activity (Clickpath)

New Clickpath started Apr 20, 2018 4:16pm

Source: Google, Not Provided

1.	thenextmovegroup.com (Home Page)	02:40
2.	siteselect	--:--

NOTE: This is the recorded clickpath at the time this alert was generated. View your LIVE Leads reports for more information.

**Example of retargeting on popular websites:****MARKETING STRATEGY 4**

Attend marketing events and invite a regional network of recruitment partners to spend a day in Southwest Johnson County.

**1. Attend the following trade shows and marketing events:**Domestic:

- a. **HAI-Heli Expo** - Focused on the helicopter industry, both military and commercial. (February; various nationwide locations)
- b. **NBAA** - The National Business Aviation Association Show specializes in commercial aviation. (October; various nationwide locations)
  - \$10,000
- c. **MRO** - This trade show concentrates on the maintenance, repair & overhaul of aircraft. (April; various nationwide locations)
  - \$10,000
- d. **Quad A** - Primarily United States Army military aircraft. (April; Nashville, TN)



International:

- e. **Paris Air Show** - Civilian and military aircraft; the world's largest airshow. Held in the odd years i.e., 2021, 2023, etc. (June; Le Bourget Airport, near Paris, France)
  - \$20,000
- f. **Farnborough Air Show** - held at Farnborough Airfield near London. This event is held on the even years alternating with the Paris Air Show. (June; Farnborough Airport, near London, England)
  - \$10,000
- g. **Singapore Air Show** - Held on the even years, four months prior to the Farnborough Air Show. (February; Singapore)
  - \$12,000-\$15,000



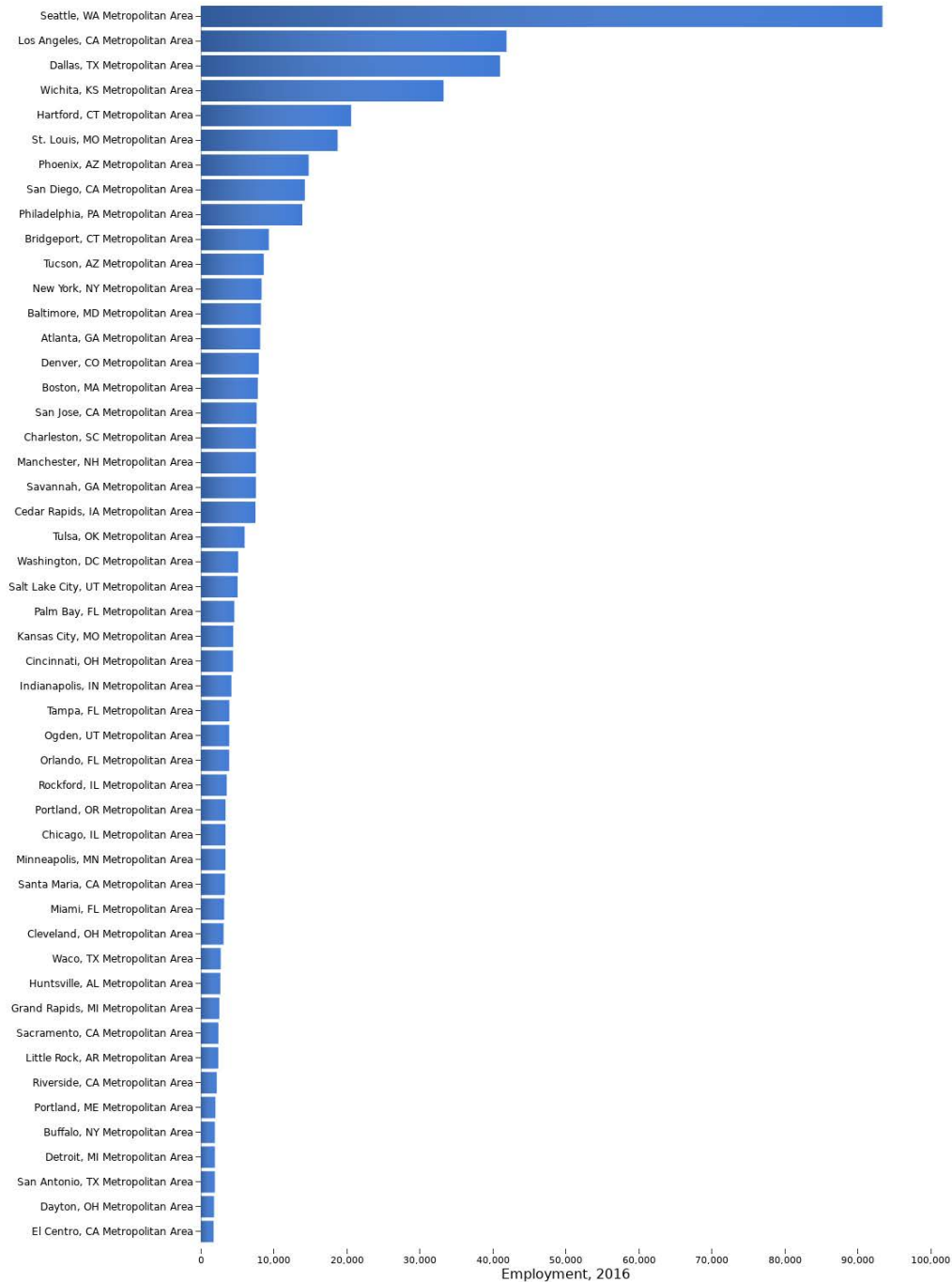
2. **Invite the Kansas Department of Commerce and Development Office, Evergy, Kansas City Area Development Council, and other recruiting partners** to spend a day in the region learning about your aerospace assets and meeting with key partners. Entertain them like you would a prospect. Provide them with an aerial view of the regional airports, sites, industrial buildings, and primary cities. Ask them to help you generate prospects, assist in recruiting and training, and provide research.





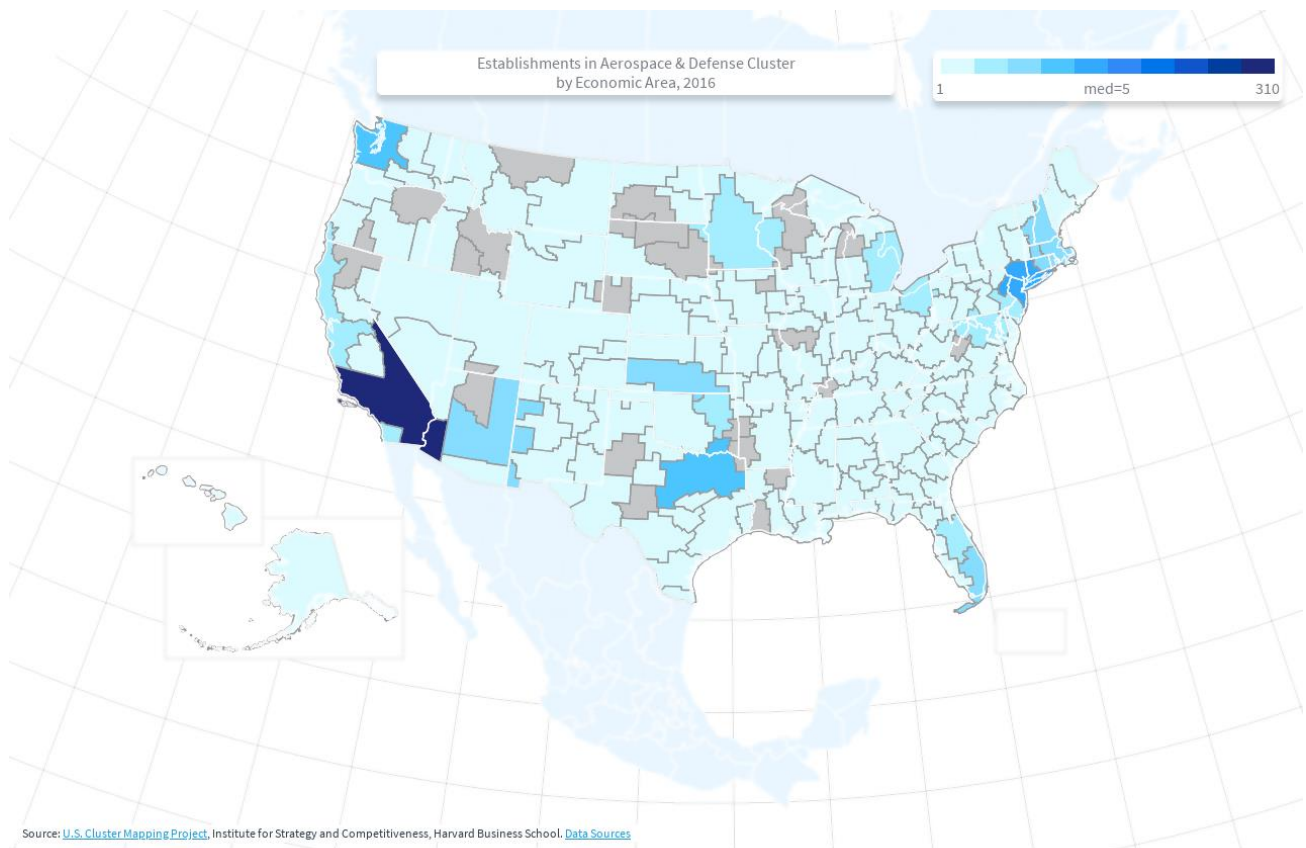
## Appendix A: Aerospace Vehicles and Defense Cluster

*Aerospace Vehicles and Defense Cluster*  
Employment by Metropolitan Statistical Area, 2016

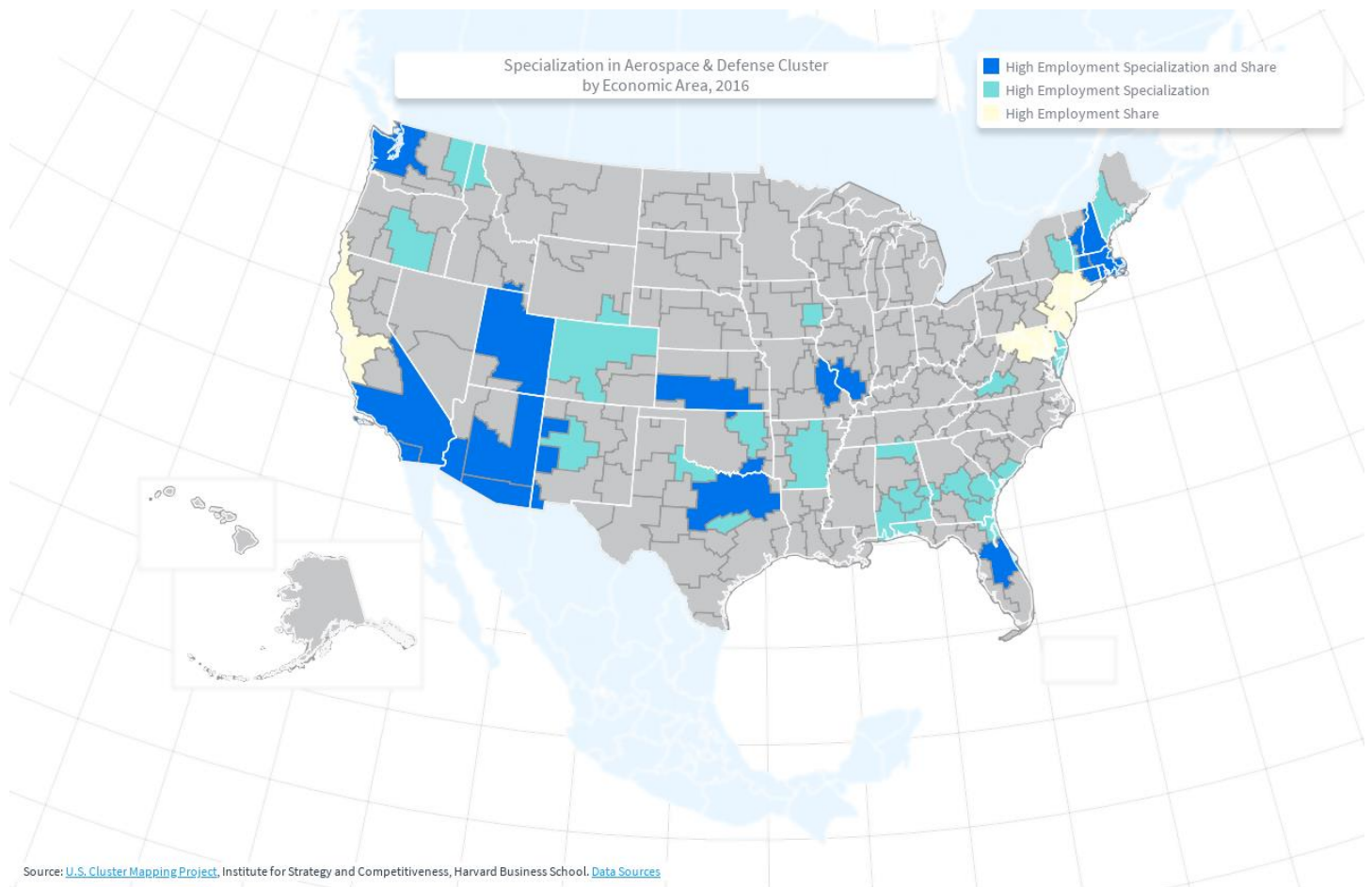


Source: [U.S. Cluster Mapping Project](#), Institute for Strategy and Competitiveness, Harvard Business School. [Data Sources](#)

## Appendix B: Establishments in Aerospace & Defense Cluster



## Appendix C: Specialization in Aerospace & Defense Cluster



## Gearing up: Increased military spending is expected to augment private sector gains

This report was provided to  
Research Consultants International (2134123247)  
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# IBISWorld Industry Report 33641a Aircraft, Engine & Parts Manufacturing in the US

August 2019

Dan Spitzer

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# About this Industry

## Industry Definition

Companies in this industry manufacture and overhaul complete aircraft, develop prototypes and convert aircraft. The industry also includes the manufacture, conversion and overhaul of aircraft engines and propulsion systems. Additionally, the industry makes related

parts and auxiliary equipment. For information on guided missiles, space vehicles and related equipment, which are excluded from this industry, see the Space Vehicle and Missile Manufacturing industry (IBISWorld report 33641b).

## Main Activities

### The primary activities of this industry are

Manufacturing and rebuilding aircraft  
 Manufacturing aircraft engines and engine parts  
 Manufacturing aircraft auxiliary parts

### The major products and services in this industry are

Aircraft  
 Aircraft engines and engine parts  
 Other aircraft parts and auxiliary equipment

## Similar Industries

### 33631 Automobile Engine & Parts Manufacturing in the US

This industry manufactures aircraft engine intake and exhaust valves, pistons and engine filters.

### 33632 Automobile Electronics Manufacturing in the US

This industry manufactures electrical equipment for aircraft engines and aircraft lighting fixtures.

### 33641b Space Vehicle & Missile Manufacturing in the US

This industry manufactures guided missiles and space vehicles.

### 48819 Aircraft Maintenance, Repair & Overhaul in the US

This industry provides repair services for aircraft and aircraft engines, including overhauling, conversion and rebuilding.

### 54171 Scientific Research & Development in the US

This industry conducts research and development, which may include the aerospace sector (except prototype production).

## Additional Resources

### For additional information on this industry

[www.faa.gov](http://www.faa.gov)  
 US Federal Aviation Administration  
[www.usitc.gov](http://www.usitc.gov)  
 US International Trade Commission  
[www.aia-aerospace.org](http://www.aia-aerospace.org)  
 Aerospace Industries Association

# Industry at a Glance

Aircraft, Engine & Parts Manufacturing in 2019

## Key Statistics Snapshot

Revenue

**\$240.5bn**

Annual Growth 14–19

**0.9%**

Annual Growth 19–24

**2.5%**

Profit

**\$25.0bn**

Exports

**\$121.0bn**

Businesses

**1,437**

### Market Share

The Boeing Company  
**31.1%**

GE Aviation  
**11.0%**

Lockheed Martin Corporation  
**9.1%**

United Technologies Corporation  
**8.6%**

p. 30

### Key External Drivers

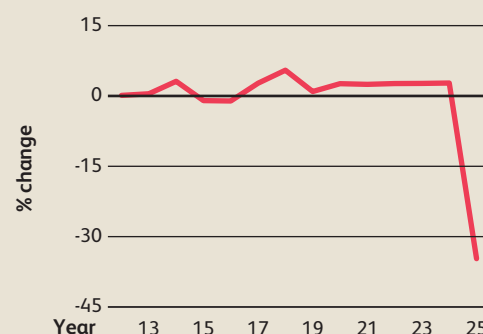
Demand from air transportation  
Federal funding for defense  
Non-NATO defense spending  
Trade-weighted index

p. 4

Revenue vs. employment growth

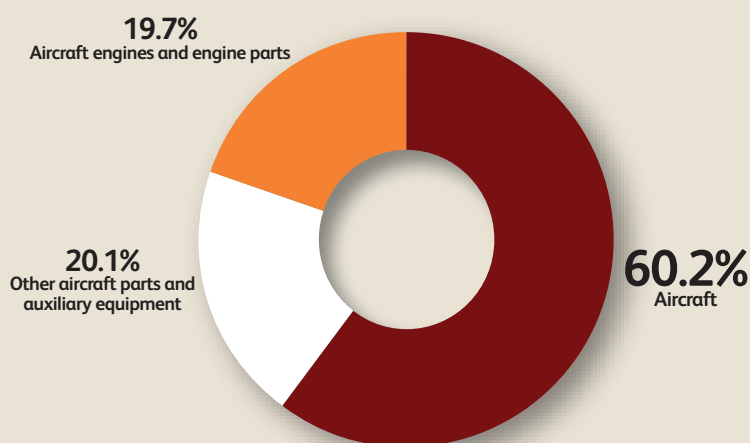


Demand from air transportation



SOURCE: WWW.IBISWORLD.COM

Products and services segmentation (2019)



SOURCE: WWW.IBISWORLD.COM

## Industry Structure

Life Cycle Stage	Mature	Regulation Level	Heavy
Revenue Volatility	Medium	Technology Change	High
Capital Intensity	Medium	Barriers to Entry	High
Industry Assistance	Medium	Industry Globalization	High
Concentration Level	Medium	Competition Level	Medium

FOR ADDITIONAL STATISTICS AND TIME SERIES SEE THE APPENDIX ON PAGE 44



# Industry Performance

Executive Summary | Key External Drivers | Current Performance  
Industry Outlook | Life Cycle Stage

## Executive Summary

The Aircraft, Engine and Parts Manufacturing industry develops and manufactures planes, rotorcraft, engines and related components for the civil and defense markets. After years of growth, the industry's revenue has recently slowed. The majority of this stagnation was due to falling defense spending, which reduced US demand for military aircraft and related components. However, some of the decline in growth was also caused by a slowdown in the commercial segment, as global demand moderated and operators switched

to a lesser degree, in developed nations has led to increased global air travel, encouraging airlines to increase their aircraft fleets. Moreover, older planes are being replaced by a new generation of fuel-efficient aircraft. This will lead to more demand throughout the entire supply chain as suppliers and manufacturers update their products and spend capital on research and development. Additionally, the United States government has recently begun to increase defense spending. This reversal ends several years of a downward trend on military spending, and thus is expected to bolster demand for defense contracts.

**Demand for large commercial aircraft and related components and parts is backed by strong demand dynamics**

production to newer generation products. Therefore, over the five years to 2019, industry revenue is expected to increase at an annualized rate of 0.9% to \$240.5 billion, including a 2.5% increase in 2019 alone.

Overall, this is expected to be a temporary stall in an otherwise long-term expansion cycle. In particular, demand for large commercial aircraft and related components and parts is backed by strong demand dynamics. Growth in emerging markets and,

Over the five years to 2024, industry revenue is forecast to rise at an annualized rate of 2.5% to \$272.6 billion. Global and domestic demand for commercial aircraft will continue to drive revenue growth. Moreover, the defense market is anticipated to pick up as the production of key industry platforms, such as the F-35 and updated legacy products, picks up. Consolidation will also continue, especially in the supply chain, as continued relatively high demand encourages a larger formation of suppliers that have the necessary capacity to handle these increases. Industry consolidation and increased emphasis on cost are also likely to bolster profit.

## Key External Drivers

### Demand from air transportation

When demand for air transport increases, so does the need for aircraft. Air transport operators may wish to increase their competitive edge by purchasing newer, more fuel-efficient models, a strategy that increases demand for manufacturers. The opposite is true when demand for air transport falls.

Demand from air transportation is expected to increase in 2019, representing a potential opportunity for the industry.

### Federal funding for defense

Public expenditure on defense and military vehicles indicates demand for industry

products. When military spending rises, a portion of that increase typically goes toward industry products. Federal funding for defense is expected to increase marginally in 2019, but funding uncertainty is expected to remain a threat to the industry.

### Non-NATO defense spending

Non-NATO defense spending is the sum of global military spending, excluding the 29 members of the North Atlantic Treaty Organization. Therefore, this driver excludes spending by most Western and developed states, focusing more on

# Industry Performance

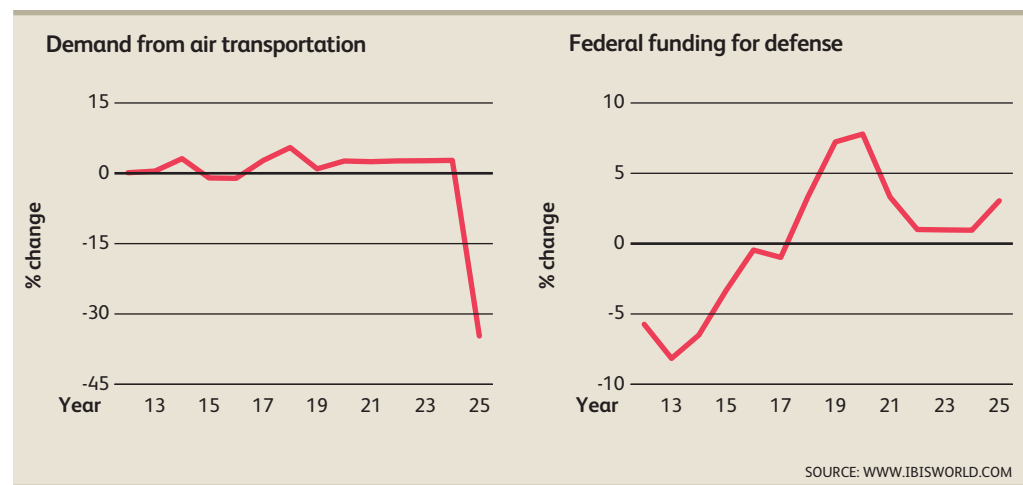
## Key External Drivers continued

developing nations. When non-NATO spending increases, the market for industry exports climbs. Non-NATO defense spending is expected to increase in 2019.

### Trade-weighted index

The trade-weighted index (TWI) measures the value of the US

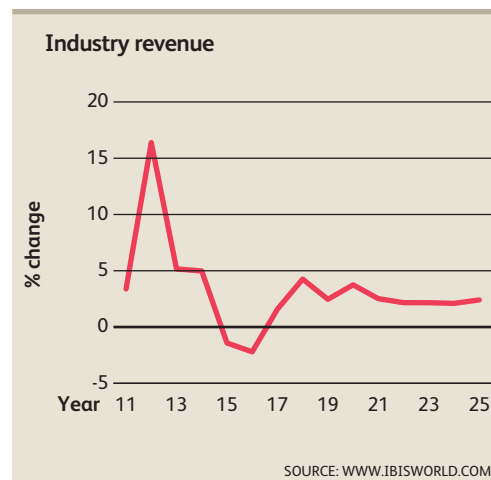
dollar against the currencies of its largest trading partners. A decreasing TWI leads to lower export prices and higher import prices. Therefore, industry operators benefit from a weak US dollar for stronger export demand. The TWI is expected to increase in 2019.



# Industry Performance

## Current Performance

The Aircraft, Engine and Parts Manufacturing industry lost some altitude over the five years to 2019. Participants in this industry produce aircraft, aircraft subsections, engines and parts for both military and commercial purposes. Well over half of the products sold are for commercial customers, but the most expensive and sophisticated items are made for military services, with the US Department of Defense buying the lion's share of these goods. Over much of the past five years, falling US defense spending caused the industry's defense segment to contract, partially offsetting gains from the commercial segment. Moreover, the commercial segment itself stalled during the end of the period as global demand slowed and producers switched production to newer



generation products. Therefore, over the five years to 2019, industry revenue is expected to increase marginally at an annualized rate of 0.9% to \$240.5 billion, including a 2.5% jump in 2019.

## The defense segment laggard

The industry's stagnation in revenue during the middle parts of the five-year period is primarily due to falling defense sales. The winding down of major wars and attempts to reduce the deficit (i.e. sequestration) have reduced military spending. Over the five years to 2019, federal funding for defense is expected to increase at an annualized 1.1% to \$614.7 billion, ending several years of decline from near-historic highs in 2010. In particular, according to the fiscal 2019 budget request, US military outlays on aircraft are expected

to have declined an annualized 4.1% during the current five-year period. Consequently, industry defense contractors' revenue began to fall. However, those with long-term contracts for top priority programs, such as the F-35 stealth fighter, have been less affected. Moreover, US combat operations against ISIS, increased tension with rivals and recent attempts to end sequestration and fund modernization have begun to reverse earlier spending reduction, trickling down to industry defense contractors.

## Commercial segment correction

During the middle of the five-year period, a slowdown in global economic growth caused by tempering emerging market performance led to a reduction in new aircraft orders and deliveries (exports account for 50.3% of industry revenue), as airlines focus on taking on planes already ordered. At the same time as

operators such as The Boeing Company (Boeing) began transitioning to the production of next-generation aircraft, demand for current models declined as customers waited for newer planes, reducing current production. Conversely, the slump in oil prices that occurred over the past five years has made older used

# Industry Performance

## Commercial segment correction continued

aircraft more price-competitive to operate, moderating demand for production of new, fuel-efficient models. In particular, demand for wide-body aircraft has declined the most as slowing air travel demand reduced the need for such aircrafts' capacity. In addition, increased range and capacity on newer narrow-body aircraft are encroaching on the wide-body market.

The industry also continues to encounter difficulty in the regional and business aircraft segment. After initially benefiting from a post-recessionary increase in demand, sales of business jets have drastically slumped. A large reason for this has been the excess availability of used jets manufactured during the prerecession boom. As a result, used jet prices have been low, forcing newer models to be sold at a lower price. Moreover, even exports have suffered as lower oil prices reduced demand from wealth oil-producing markets, while China's anticorruption campaign scared off buyers in the key market. In addition, sales of commercial helicopters have declined as the fall in oil price caused oil and gas production to slow, decreasing demand from the key oil and gas market.

Nevertheless, both international and domestic demand dynamics are perceived as long-term trends, meaning the recent fall in the performance of the commercial segment is considered a temporary correction within a long expansionary cycle. In the years before and during the early part of the five-year period, industry

performance has been defined by growth in the commercial segment, bolstered by global demand for commercial aircraft, especially large commercial aircraft produced by Boeing. In particular, overall economic growth in emerging markets has caused global air travel to climb, with foreign airlines demanding US commercial aircraft. This trend is readily apparent in countries such as China, where rapid economic growth and an under flown population has boosted industry exports.

Domestic demand for the industry's commercial products also increased as economic growth led to increased consumer air travel. The number of domestic and international trips by US residents increased at respective annualized rates of 3.6% and 5.0% over the five years to 2019. With increasing demand, US airlines were in a better position to purchase industry products. However, the majority of demand from the United States and other developed nations comes from the replacement of aging aircraft with newer, more fuel-efficient models. This trend has been further boosted on a global scale as airlines have sought to mitigate volatile fuel prices, which often make up their largest expense. Moreover, the overall increase in commercial aircraft manufacturing has trickled down to the engine and parts manufacturers, with much of the new improvements to aircraft fuel efficiency coming from next-generation engines.

## Trade performance

While domestic demand increased slightly over the past five years due to falling defense spending and, to a lesser degree, a slowdown in commercial aircraft production, exports expanded. Sales of military hardware to foreign governments boomed as geopolitical tensions in Asia and the Middle East,

**While domestic demand increased slightly, exports expanded**

combined with emerging market growth, encouraged more spending on such

# Industry Performance

## Trade performance continued

items. Notably, US allies such as Saudi Arabia and South Korea have bought US military equipment, including aircraft and parts. This has contributed to the industry's boom in exports while helping defense contractors offset weak domestic demand. As explained earlier, on the commercial side, export demand has been driven by global growth in air travel and the need to replace older aircraft with new fuel-efficient ones. However, the same factors that temporarily

reduced commercial revenue also slowed export growth. Therefore, over the five years to 2019, industry exports are expected to increase an annualized 1.2% to \$121.0 billion. The temporary slowdown in the commercial segment also caused a tempering of imports, which primarily consist of aircraft parts, engines and subsections. The value of industry imports is expected to increase at an annualized rate of 0.2% to \$52.3 billion during the five-year period.

## Other trends

Over the five years to 2019, the industry has experienced fluctuating trends. In the commercial segment, suppliers have increasingly merged to deal with the higher production volume of next-generation aircraft. Notably, to spread the cost and risk involved in developing these sophisticated products, original equipment manufacturers (OEMs) are demanding that their suppliers share in the risk. Moreover, after supply chain disasters on programs such as Boeing's 787, OEMs want to deal with fewer suppliers. This trend has created a domino effect in which OEMs' immediate suppliers (i.e. segment integrators) have become larger and taken on more responsibility and as a result, have demanded the same from their suppliers, encouraging merger and acquisition (M&A) activity down the supply chain. Moreover, OEMs have squeezed the supply chain to lower prices, further adding incentives for M&A activity.

In addition, defense contractors have been acquiring commercial aerospace businesses to diversify away from an initially weak defense market or spinning off their military-related divisions. In particular, M&A activity has been most prevalent among smaller defense companies, as the government is unlikely to approve mergers between already

## Defense contractors have been acquiring commercial aerospace businesses to diversify

highly concentrated OEMs. Nonetheless, this has not prevented OEMs from shuffling their various divisions between themselves, with United Technology Corporation recently selling off its Sikorsky unit (a helicopter company) to Lockheed Martin Corporation, while conversely merging with Raytheon. Since M&A activity has increased, industry enterprise growth is expected to be tempered, with the number of businesses climbing at an annualized rate of 1.4% to 1,437 over the five years to 2019. Moreover, defense segment restructuring and increased emphasis on automation are expected to start to reduce the labor workforce. Therefore, during the five-year period, industry employment is expected to increase at an annualized rate of 1.0% to 376,126 workers. Conversely, increased industry emphasis on costs, defense segment restructuring and relatively strong demand are expected to help industry profit rise to 10.4% of revenue.

# Industry Performance

## Industry Outlook

Over the five years to 2024, the Aircraft, Engine and Parts Manufacturing industry is anticipated to grow. Rising domestic and international demand for air travel will create further demand for more commercial aircraft and associated parts. In addition, airlines will seek to replace older models with

newer, more fuel-efficient ones. Moreover, increased military hardware exports and the expected jump in the defense budget should rekindle the defense segment. Therefore, over the five years to 2024, industry revenue is forecast to climb at an annualized rate of 2.5% to \$272.6 billion.

### Civil segment resumes growth

Over the five years to 2024, demand for commercial aircraft, especially large commercial aircraft, is expected to continue to drive industry growth, with The Boeing Company and its supplier ramping up production of new model aircraft. In the United States and many developed nations, airlines will continue to replace older aircraft with new, more fuel-efficient ones, especially given the recent recovery in oil prices. Moreover, as the economy continues to grow and consumer incomes rise, US air travel will grow, with the number of domestic and international trips by US residents forecast to increase at annualized rates of 1.6% and 3.2%, respectively, during the five-year period. As a result, airlines, especially mainline carriers, will expand their fleets. Nonetheless, despite stronger domestic demand and moderated economic growth in emerging markets, foreign airlines will still be the industry's primary growth market. Airlines in Asia, the Middle East and Latin America are anticipated to continue expanding their fleets to serve their increasingly wealthy and under-flown markets. As a result, industry exports are forecast to climb at an annualized rate of 2.7% to \$138.2 billion over the five years to 2024. The increase in US aircraft production and air travel is also projected to increase the supply of imported parts, components and complete aircraft, with the value of industry imports increasing an annualized 2.1% to \$58.1 billion during the coming five-year period.

### Profit is set to climb as worldwide demand for commercial aircraft increases industry revenue

Nevertheless, the commercial segment will endure several headwinds. A further slowdown in emerging market economic growth may reduce export demand. The rapid expansion of airlines in emerging markets may cause these airlines to create too much supply, leading to higher price competition and lower profit. Therefore, in the long run, many of these airlines may fail, with at least some curtailing their aircraft orders just as industry players ramp up production to fulfill their growing backlogs. Consequently, aircraft manufacturers might introduce too much supply into the market, lowering aircraft prices and forcing an industry slowdown. Demand for wide-body commercial aircraft will especially be hurt by these factors. Moreover, the production of new aircraft may run into snags as the supply chain continues to struggle to meet increased production, while new products run the risk of defects. Lastly, the recent trade tensions between the United States and China may hurt industry exports. For instance, China is already planning to impose a 25.0% tariff on US business jet exports, damaging an already-weakened segment of the industry.



# Industry Performance

## Defense segment gains altitude

Over the next five years, the industry's defense segment is anticipated to expand, with the largest defense cuts in the past amid increased geopolitical tensions. Over the five years to 2024, federal funding for defense is forecast to climb at an annualized rate of 2.8% to \$704.8 billion. In particular, a smaller number of high-value contracts will become increasingly important for defense contractors, including the F-35 stealth fighter, the KC-46 tanker, the T-X trainer and the development of the B-21 stealth bomber, which was recently awarded to Northrop Grumman Corporation. Moreover, the Pentagon is anticipated to bolster investment in the next generation of UAVs, while also upgrading their current fleet of aircraft.

However, much of this spending, and even the end of sequestration, is beholden to uncertain political

## The industry's defense segment is anticipated to expand

conditions. Defense contractors are also expected to continue to focus on exports. Continued geopolitical tensions in the Middle East, Asia and Europe will fuel increased military spending. For instance, non-NATO defense spending forecast to climb an annualized 6.2% to \$1.3 trillion over the five years to 2024. A good portion of this spending is expected to come from US allies buying US military aircraft and components, contributing toward the industry's growing exports. Even European allies are expected to import more US military hardware over the coming years, especially the F-35 fighter.

## Profit and other trends

Profit is set to climb as worldwide demand for commercial aircraft increases industry revenue. However, suppliers will still be under pressure to consolidate and create the necessary capacity to meet rising demand for commercial products and lower costs. Conversely, fewer large military contracts and more defense spending certainty will be what drive merger and acquisition activity in the defense segment. In some subsegments, there will not be enough contracts for multiple companies to operate the same product line, which will result in operators leaving certain fields or acquiring companies to diversify into the civil sector or other defense segments. The dependence on fewer contracts and the potential rejection of mergers between prime defense contractors will

also encourage collaboration between competitors when consolidation is not possible. Although consolidation among supplier and defense contractors is expected to continue, smaller operators are expected to enter the market and fill niche positions in the supply chain as the market moves toward a new generation of aircrafts.

IBISWorld forecasts the number of companies to increase at an annualized rate of 2.1% to 1,592 over the five years to 2024. Additionally, demand in the commercial segment will encourage companies to hire more workers, despite the increased use of automation. Therefore, industry employment is forecast to rise at an annualized rate of 2.3% to 420,400 workers during the same period.

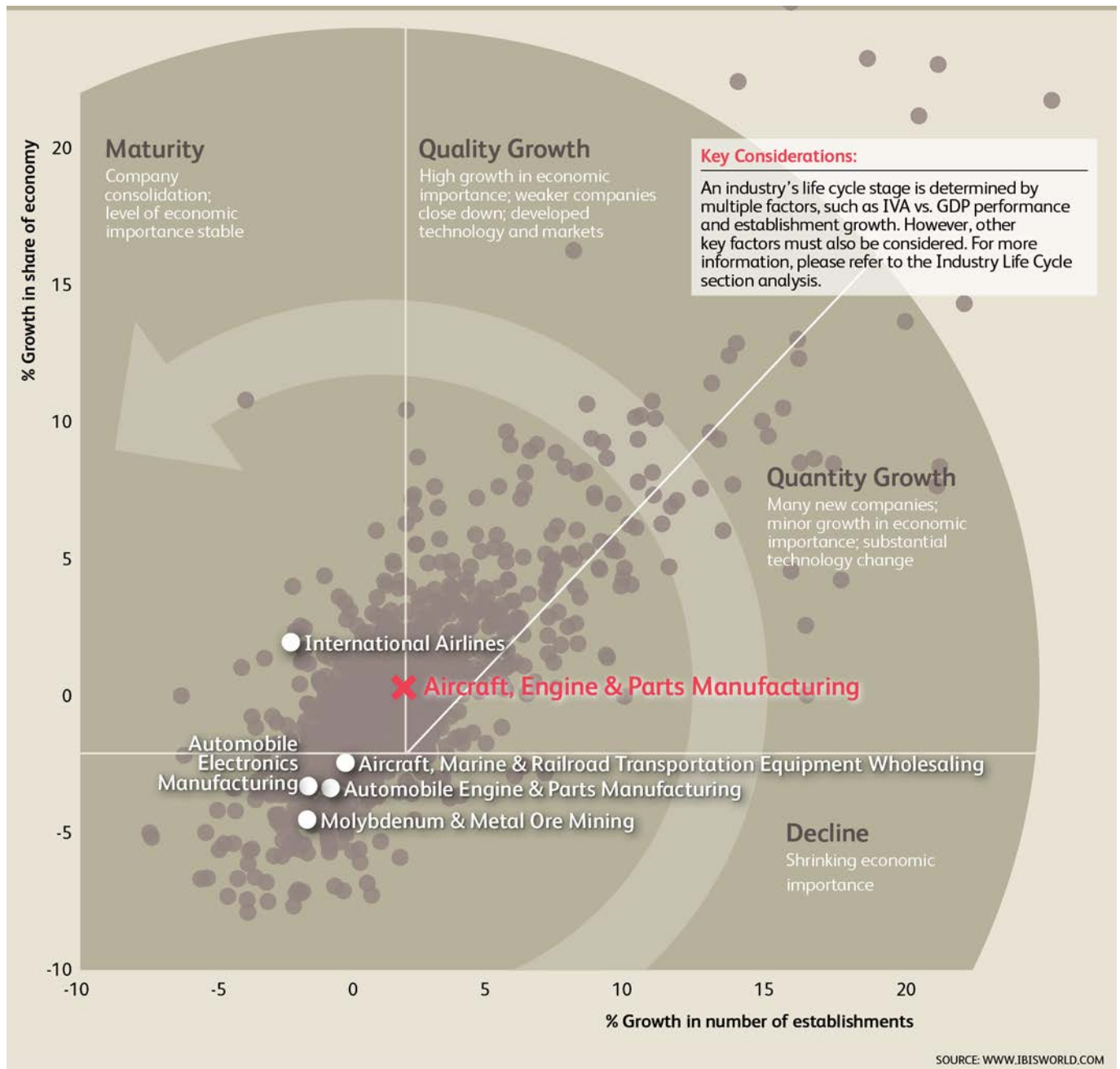
# Industry Performance

## Life Cycle Stage

Industry revenue typically grows in line with US GDP

Parts of the industry are going through consolidation

Cooperation is on the rise



# Industry Performance

## Industry Life Cycle

This industry  
is **Mature**

IBISWorld analysis reveals that the Aircraft, Engine and Parts Manufacturing industry is in the mature phase of its life cycle. Over the 10 years to 2024, industry value added (IVA), which measures an industry's contribution to the economy, is forecast to rise at an annualized rate of 2.4%, which is a greater rate than the US GDP's annualized growth of 2.0% during the same period. Since demand for air travel typically moves in line with economic growth, demand for aircraft and associated parts also moves along with GDP. In addition, military spending, which is a major industry revenue source, is usually associated with the amount of taxes the government can collect. During good economic times, tax receipts rise and defense spending can be increased; conversely, during recessions, tax income drops, and the defense budget may be cut to reduce the deficit.

Overall, while the commercial segment will continue to grow on the back of strong global demand for air travel, consolidation is expected. In particular, suppliers of aircraft parts have gone through various mergers and acquisitions

as pressure to reduce supply chain complexity mounts. Today the aerospace market's supply chain is notoriously complex, with over a thousand small to medium size suppliers serving only a couple of original equipment manufacturers (OEMs). This has created numerous cost overruns for OEMs because of difficulties in dealing with such a fragmented supply chain. Consequently, suppliers have merged to reduce complexity and achieve advantages associated with economies of scale, such as improved efficiency and ability to take on more production.

At the same time, initially weak domestic demand for defense products has forced contractors to restructure their operations and use acquisitions to enter the commercial segment or more promising defense businesses. Moreover, in the coming years, defense spending is going to be characterized by fewer, albeit more valuable, programs. Therefore, contractors might exit certain subsections of the market or increase cooperation with each other to pull resources together and reduce risk.

# Products & Markets

Supply Chain | Products and Services | Demand Determinants  
Major Markets | International Trade | Business Locations

## Supply Chain

### KEY BUYING INDUSTRIES

33641a	<b>Aircraft, Engine &amp; Parts Manufacturing in the US</b> Operators within the industry trade among themselves, with aircraft manufacturers often purchasing parts from aircraft parts manufacturers.
42386	<b>Aircraft, Marine &amp; Railroad Transportation Equipment Wholesaling in the US</b> Some aircraft parts and engines may be sold through wholesalers.
48111a	<b>International Airlines in the US</b> Airlines from the international-scheduled air transportation industry acquire planes to service passengers.
48111b	<b>Domestic Airlines in the US</b> Airlines from the domestic-scheduled air transportation industry acquire planes to service passengers.
48121	<b>Charter Flights in the US</b> The nonscheduled air transportation industry purchases various aircraft to service both commercial and military clients.

### KEY SELLING INDUSTRIES

21229	<b>Molybdenum &amp; Metal Ore Mining in the US</b> Because titanium is noted for its strength, lightness and resistance to corrosion, it is increasingly used in new composite materials in manufacturing commercial airplanes.
33111	<b>Iron &amp; Steel Manufacturing in the US</b> Steel is used in the manufacture of many aircraft parts and engines.
33361a	<b>Engine &amp; Turbine Manufacturing in the US</b> Engine, turbine and power transmission equipment are an integral part of an aircraft.
33411a	<b>Computer Manufacturing in the US</b> This industry provides computer equipment to aircraft manufacturers.
33411b	<b>Computer Peripheral Manufacturing in the US</b> This industry provides computer peripheral equipment to aircraft manufacturers.
33441a	<b>Semiconductor &amp; Circuit Manufacturing in the US</b> This industry provides electronics and avionics to aircraft manufacturers.
33441b	<b>Circuit Board &amp; Electronic Component Manufacturing in the US</b> This industry provides circuit boards and electronic components to aircraft manufacturers.

## Products and Services

The United States is the largest aircraft manufacturer in the world, with leading companies in large commercial aircraft, combat aircraft, helicopters, unmanned aerial vehicles and engines segments. Over most of the past five years, the Aircraft, Engine and Parts Manufacturing industry's commercial products gained market share and domestic defense sales fell. However, domestic spending on military aircraft and equipment has started to recover.

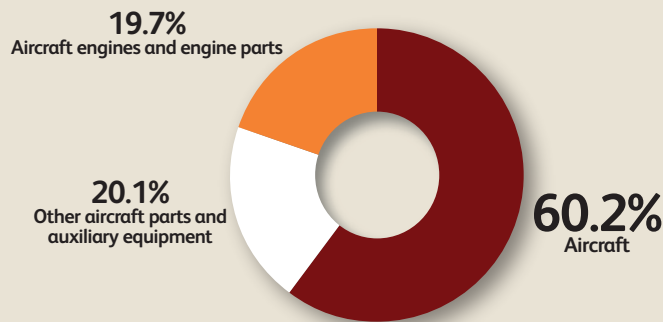
### Aircraft

Aircraft manufacturing dominates the industry, accounting for an estimated 60.2% of industry revenue. The segment broadly includes civilian and military aircraft and modifications to completed aircraft. Civilian aircraft include large commercial aircraft (LCA), medium or regional aircraft, business jets, helicopters and ultra-light aircraft. The LCA market (led by The Boeing Company) includes freighters that are built for logistic air transport. LCA

# Products & Markets

## Products and Services continued

Products and services segmentation (2019)



**Total \$240.5bn**

SOURCE: WWW.IBISWORLD.COM

manufacturers supply to nearly all of the commercial passenger airlines and freight and logistics companies that provide air transportation.

In addition, aircraft manufacturers are contracted to undertake military aircraft manufacturing for governments. Overall, military aircraft account for over a third of complete aircraft production. Military aircraft can include fixed or non-fixed wing aircraft. This segment can be further broken down into a variety of aircraft, such as bomber, attack, fighter, tanker, cargo, trainer and rotary. Moreover, the industry is increasingly investing in unmanned aerial vehicles (UAVs), especially for military purposes. UAVs are aircraft that can be remotely controlled or flown autonomously based on preprogrammed flight plans.

### Aircraft engines and engine parts

Military and civilian aircraft engines, engine parts and engine modification accounts for 19.7% of industry revenue. Examples of aircraft engines include turbine, shaft, jet and rocket engines. Civilian-related manufacturing accounts for over half of this segment's revenue, while defense-related sales have dropped. Engine fuel efficiency has been increased as oil price and environmental concerns

have created demand for more fuel efficient and clean means of propulsion. Besides improving efficiency, manufacturers have also used more composite materials to reduce weight and maintenance costs. Sales of engines and engine parts are expected to increase as a percentage of industry revenue as new fuel-efficient commercial aircraft require the industry's newest engine models.

### Other aircraft parts and auxiliary equipment

Other aircraft parts and auxiliary equipment include: civilian and military aircraft subassemblies and parts, aircraft mechanical power transmission equipment, propellers, helicopter rotors, research and development of parts (excluding engines) and landing gear. Since many aircraft parts wear and tear after use and have to be replaced, sales in this segment heavily depend on the amount of flying time aircraft receive. Some items, such as subassemblies have become more advanced as composite material use has increased, while others, such as fasteners, are more standardized and experience little innovation. The segment is estimated to make up 20.1% of industry revenue.

# Products & Markets

## Demand Determinants

Demand for the Aircraft, Engines and Parts Manufacturing industry is mainly dependent on activity among airlines and other air transportation providers. When airlines need to expand their fleets to accommodate a growing number of passengers, demand for products within the industry increases. Similarly, if airlines' capacities fall, industry operations will experience a drop in the number of orders. Demand is also driven by other factors, such as the introduction of new and more efficient models or involvement in war.

### Civil demand

Demand for industry civil products depends on several factors, many of which are macroeconomic in nature. Many airlines improve or expand their aircraft fleet based on the level of demand from passengers. Passenger numbers are generally influenced by the consumers' propensity to spend on vacations and air travel, in addition to the necessity to fly to remote locations. An increase in disposable income will lead to greater spending on air travel opposed to other products. Conversely, when incomes fall, people tend to deter any expenditure on discretionary services, such as air travel. Changes in passenger travel have historically been proportional to changes in GDP. When the economy is growing at a solid rate private and business travel tends to go up.

In particular, due to the industry's export orientation, global air travel is a key part of demand for aircraft. Rapid economic growth in emerging markets has enabled a new segment of the global population to be able to afford air travel. As a result, foreign airlines have rapidly expanded their capacity, driving demand for industry exports.

Related to demand for air travel, airlines financial position determines demand for commercial aircraft. Notably, increased airline profit, which is partially

driven by air travel volumes, enables airlines to finance more aircraft. When airline profitability drops, so does their ability to continue financing aircraft purchases. Interconnected to airlines financial condition are interest rates and the price of fuel. Increased interest rates make aircraft financing more expensive, decreasing demand for industry products. Similarly, increased fuel prices may decrease airlines' profit, thereby also decreasing demand for commercial aircraft.

Conversely, commercial aircraft are very costly, long-lived capital goods. As a result, purchases are typically based on expectations of long-term growth in air transport and replacement of older aircraft, rather than short-term conditions. Therefore, in response to higher fuel prices or even price volatility, airlines will typically increase purchases of newer, more fuel-efficient, aircraft to reduce operating costs. That is why there has been an uptick in demand for new airliners such as the 787 and in developing planes like the 777X because these aircraft are far more fuel efficient and cleaner than older generation planes. Moreover, airline companies in the developed world have increased purchases of new models as their relatively old fleet of planes come to the end of their life-cycle. The development of new planes may also increase demand for new industry products because older generation aircraft depreciate faster. Conversely, the initial fall in fuel prices over the past five years has reduced some incentives to buy new generation aircraft. Demand for slightly older used aircraft has increased because their lower price compensates for their reduced fuel efficiency amid lower fuel costs.

However, airlines are only buyers of commercial planes, general aviation and helicopters often have other demand determinants. General aviation aircraft such as business planes mostly rely on demand for wealthy individual and



# Products & Markets

## Demand Determinants continued

corporations. Similarly, helicopters are often sold for business travel. They are sold to civil government bodies, the oil and gas industry and other operations that take place in remote locations.

### **Volatile demand for military aircraft**

Another driver of demand for industry products is defense spending. National defense is considered to be one of the main roles of government and as a result, governments often allocate a significant amount of their budget to the armed services and relevant equipment. In turn, the defense budget itself is determined by a range of factors such as economic conditions, geopolitical tensions, war and technological advancements.

The United States has the world's largest defense budget, spending more on military aircraft than any other nation. This demand is possible due to the nation's large economy, which enables high spending, and global geopolitical commitments, which require a large air force. Recent geopolitical issues such as increased instability in the Middle East and tensions in Europe and Asia have

driven US military demand for industry products. However, actual war and conflict are the largest drivers of demand for the industry's military products. For instance, when the United States entered the Afghan and Iraq wars, demand jumped. Combat operations also increase demand for parts as aircraft suffer from wear and tear.

The improvement and release of new aircraft models and defense systems also typically leads to a surge in demand. Worldwide military forces constantly upgrade their aircraft and defense equipment to counter new threats. For instance, the development of more advanced and integrated air defense systems has been a driving factor for the development of the Air Force's B-21 stealth bomber.

The United States does generally sell military equipment and vehicles to its allies. Demand military exports is driven by geopolitical tensions, foreign economic growth and other factors to could lead to increased defense budgets around the world. However, strong export restrictions and regulations also limit industry defense exports.

## Major Markets

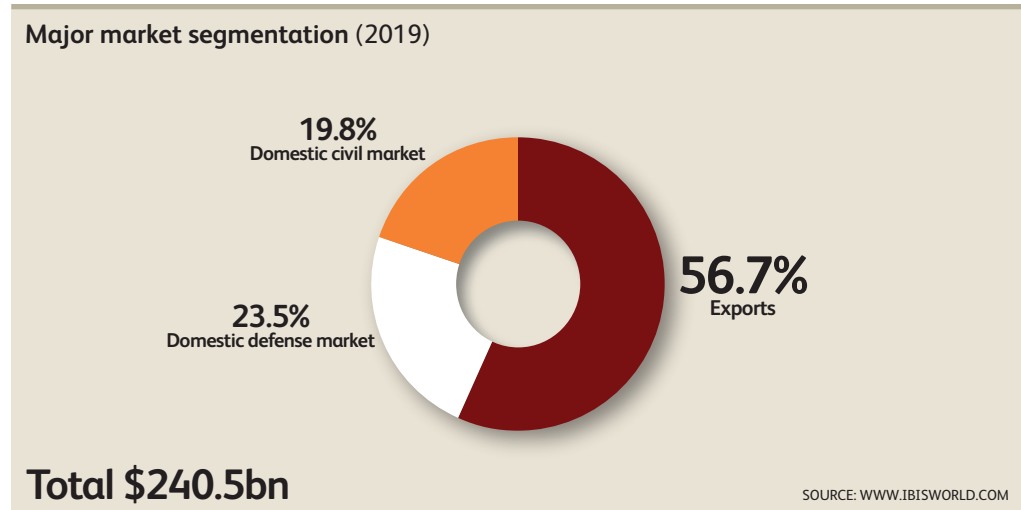
### **Exports**

The export market is estimated to account for 56.7% of Aircraft, Engine and Parts Manufacturing industry revenue. Most revenue generated by this market is made up of commercial aircraft sales to foreign airlines, leasing companies, manufacturers and parts distributors. Since US companies such as The Boeing Company hold such a strong position within the commercial aircraft market, any increase in demand by international airlines for new aircraft typically leads to increased demand for US planes. Defense-related exports only make an estimated 10.0% of total exports because of restrictions on the export of advanced weaponry. In addition, combat aircraft are

extremely expensive, with few nations able to afford them. Over the five years to 2019, export's share of revenue has increased as demand from emerging markets climbed. More and more people within these markets can afford air travel and as a consequence, airlines operating abroad have begun to purchase more commercial aircraft to meet demand. In addition, fuel price concerns have stimulated demand for more fuel-efficient aircraft and engines. Military-related exports have also risen as tensions in the Middle East and Asia have led to more defense spending by relevant nations. US-based defense contractors are also looked to exports to offset initially pressured US Department of Defense (DoD) spending.

# Products & Markets

## Major Markets continued



### Domestic defense market

The domestic defense market accounts for 23.5% of industry revenue. The United States has by far the largest defense budget in the world and as a result, it is the biggest consumer of defense-related industry products. Most US defense manufacturers derive more than half of their revenue from sales to the DoD or defense-related government organizations. The US Navy is currently the largest domestic defense market as it invests in F/A-18 and F-35 fighters, maritime patrol craft, helicopters and UAVs for both itself and the Marine Core. The US Air Force (USAF) is the second-largest market for industry domestic defense sales. While the USAF has the largest aircraft fleet in the military, it is currently buying a smaller number of planes than the Navy. Lastly, the US Army is the smallest defense market. Due to the ground-based nature of this branch, the army maintains a relatively small aircraft fleet mostly consisting of helicopters, UAVs and some small transport planes. Over the past five years, the wind-down of military operations in the Middle East and the overall decline in US defense spending has caused this market to shrink. However, in more recent years this spending decline has begun to reverse.

### Domestic civil market

The domestic civil market accounts for 19.8% of industry revenue. It is primarily composed of airlines, but also includes leasing companies, aircraft manufacturers, distributors, corporations, wealthy individuals and civil government agencies. After delaying orders for new aircraft due to the poor economic condition, domestic airliners have recently begun buying new planes (particularly fuel-efficient ones) to meet rising demand for air travel and reduce fuel costs. Original equipment manufacturers (OEMs) purchase parts from industry suppliers to assemble their aircraft. As global demand for commercial aircraft increased, so has demand for parts, with OEMs struggling to meet end market demand. Consequently, this market's share of industry revenue has climbed over the five years to 2019.

Wealthy individuals and various businesses are another source of demand in the domestic civil market, especially when it comes to general aviation and helicopter markets. Initially, sales of general aviation aircraft struggled as the impact of the recession and the bad publicity of using corporate jets forced companies to cut down on their fleets.

# Products & Markets

## Major Markets continued

Sales to small businesses and individuals dropped the most as these markets were hit hardest by the economic downturn. Conversely, sales of larger jets performed better as they relied on large corporations that fared well after the recession. Contrastingly, sales of civil helicopters initially did well as

increasing US oil and gas production led to strong demand from the sector's companies (helicopters are used to ferry employees and equipment to distant production sites). However, the recent plunge in oil prices has tempered oil and gas production, resulting in decreasing helicopter sales.

## International Trade

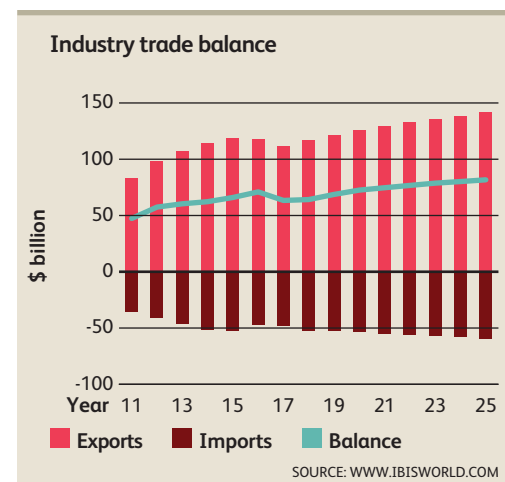
Level & Trend  
Exports in the industry are **High** and **Steady**

Imports in the industry are **Medium** and **Steady**

International trade plays a key role in the Aircraft, Engine and Parts Manufacturing industry. 50.3% of industry revenue is derived from exports, while an estimated 30.4% of domestic demand is satisfied by imports.

### Exports

The United States aerospace industry is the largest in the world. The Boeing Company (Boeing) is one of only two major large commercial aircraft (LCA) manufacturers (Airbus being the other) and US defense companies produce some of the most advanced military aircraft on the market. The industry's biggest export is fully completed aircraft, particularly commercial aircraft. Due to its dominance in the LCA market, any pick up in global demand for airlines typically leads to increased sales for Boeing and because the vast majority of its planes are built in the United States, export rise. US companies also dominate the aircraft engine market, with over half of the world's commercial aircraft using US company-built engines. In addition, because US combat aircraft are among the best in the world, foreign governments regularly buy them. For most of the past five years, rising global demand for air travel and tensions in the Middle East and Asia have led to strong demand for industry export, both commercial and military. Nevertheless, growth has recently slowed due to normalized demand and production transition to newer aircraft models.



IBISWorld estimates that over the five years to 2019, industry exports will grow at an annualized 1.2% to \$121.0 billion.

The industry's biggest export market is France, representing 10.6% of exports. Its strong economy has increased discretionary spending, with air travel skyrocketing. Consequently, demand for commercial aircraft and associated parts has rapidly increased. China is the second-largest export market at 9.0%, however, the recent trade dispute between the United States and China has led to China announcing 25.0% tariffs on industry products, mostly affected the general aviation and business jet segments. Moreover, military exports to China are for the most part prohibited due to an arms embargo. The other major export markets are Canada (8.5%) and Germany (7.8%). These countries are home to airlines that purchase US-built planes. Some of them

# Products & Markets

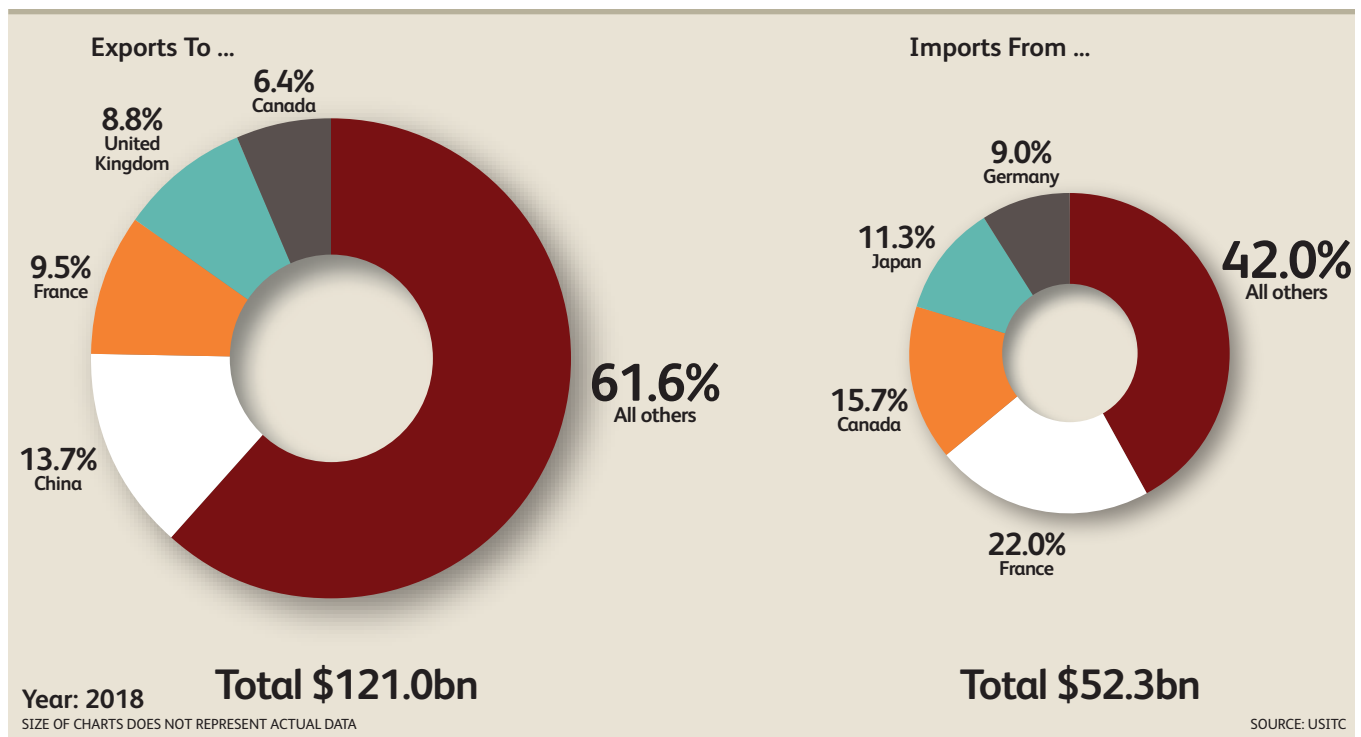
## International Trade continued

also have close military relationships with the United States, with their armed forces regularly buying US military equipment. Moreover, they mostly have advanced aerospace sectors that frequently import US inputs for their own manufacturing. Other key export markets include the Middle East and Japan.

### Imports

Over the five years to 2019, imports are expected to grow at an annualized rate of 0.2% to \$52.3 billion. Most imports consist of aircraft engines and other parts and subsections. For example, Boeing's new 787 airliner sources many of its subsections from Japan, which helps explain why 10.5% of imports originate there. Exports from Canada make up 13.7% of imports, as its proximity to the United States and membership in the North American Free Trade Agreement provides its suppliers with an advantage. Moreover, many US companies set up manufacturing subsidiaries in the

country. For instance, Bell manufactures most of its civil helicopters in Canada, and Pratt and Whitney's Canadian subsidiary is a leading maker of engines for business and regional plane and helicopters. In addition, Canada's Bombardier is one of the world's leading manufacturers of small- to mid-sized commercial aircraft. France is the biggest source of imports, representing 27.9%. The country is home to various manufacturers of commercial and business aircraft, such as Airbus and Dassault, making aircraft its largest export to the United States. Its second-biggest export segment to the United States comprises engines and engine parts. For instance, General Electric (GE) and Safran's joint venture, CFM International, is among the top manufacturers of LCA engines in the world. In particular, the majority of Boeing's aircraft are powered by either GE or CFM engines. The United Kingdom, which accounts for 8.5% of



# Products & Markets

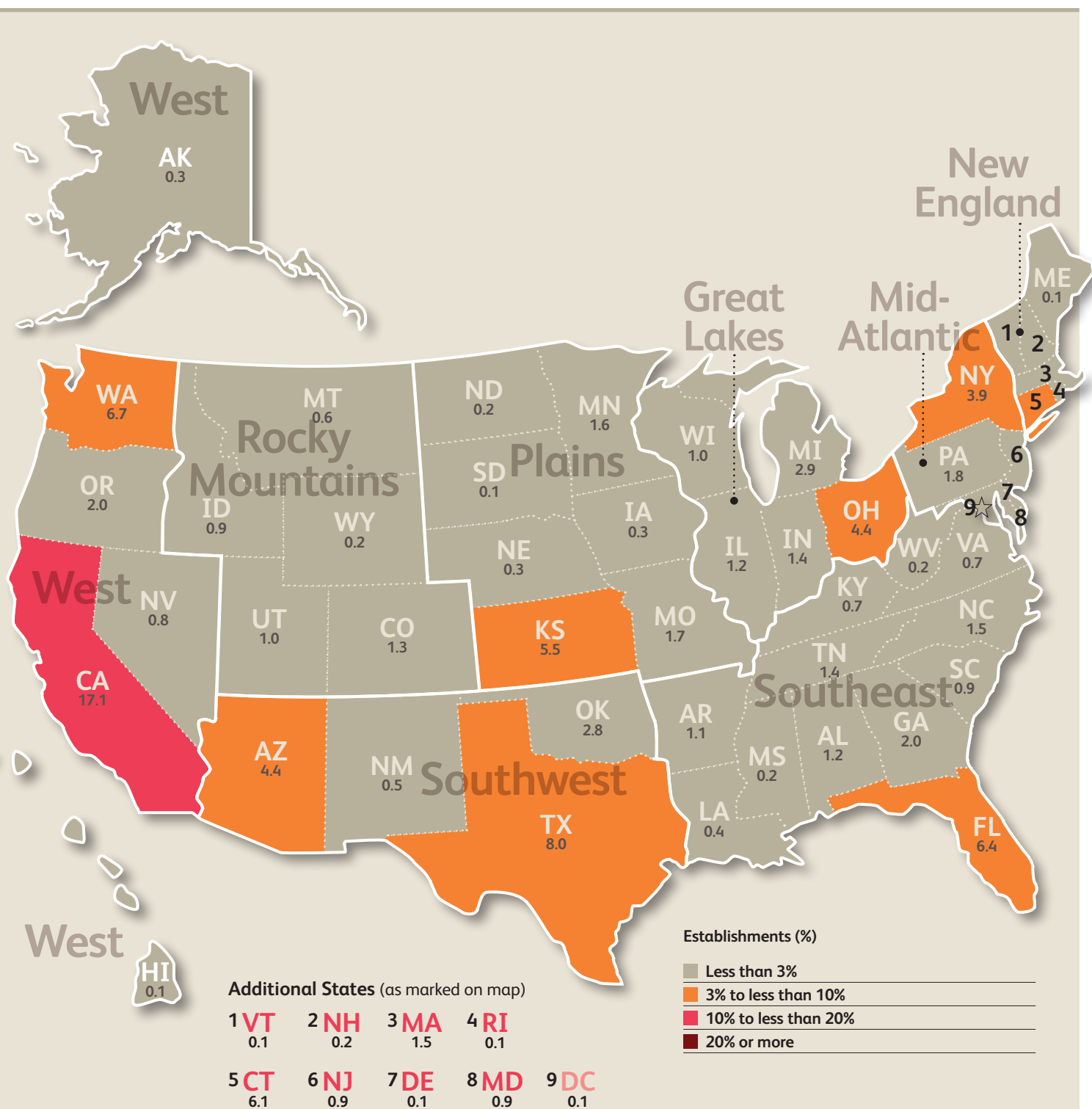
## International Trade continued

imports, is another major exporter to the United States, primarily exporting aircraft and engines. The United Kingdom is a major base of operations

for Rolls Royce, which provides many different aircraft engines for large operators including planes such as the Boeing 777 and 787.

# Products & Markets

## Business Locations 2019



SOURCE: WWW.IBISWORLD.COM



# Products & Markets

## Business Locations

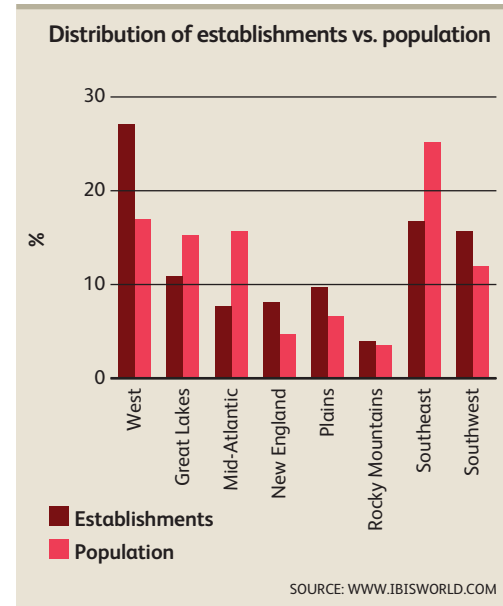
When choosing a location, Aircraft, Engine and Parts Manufacturing industry operators look at several factors, including government incentives, a source of skilled labor and locations of universities that do basic research. Suppliers tend to set up facilities near major original equipment manufacturers' factories to cut down on transportation costs, thereby forming manufacturing hubs. Defense contractors commonly spread their operations across multiple states to gain support from legislatures and government officials when it comes to contracts.

### The West

The West region accounts for 27.1% of industry establishments. California, with 17.1% of industry establishments, has by far the largest aerospace sector in the country with multiple manufacturers having facilities there. The state has many leading industry-relevant research centers and is home to a large portion of the technology community. Washington State has the fourth-largest share of establishments because it is the main base for The Boeing Company's manufacturing. Consequently, many suppliers have set up operations in the state and surrounding regions.

### The Southeast and Southwest

The Southeast and Southwest regions make up 16.7% and 15.7% of industry establishments, respectively. Most states in these regions are right-to-work states which weaken unions and lowers labor costs. In the Southeast, Florida is a major aerospace hub, accounting for 6.4% of total locations. The Southwest is dominated by Texas, which is home to



8.0% of industry facilities. The state is also where Lockheed Martin Corporation is manufacturing the F-35, the world's biggest defense program.

### Other regions

The Great Lakes region makes up 10.9% of industry establishments. The area has an extensive manufacturing base and is a major producer of aircraft input materials like steel. Therefore, companies with operations in the region can gain from lower supply transportation costs. The Plains region accounts for 9.7% of locations, with over half of those based in Kansas. New England has 8.1% of establishments, with Connecticut accounting for most of them. The Mid-Atlantic and Rocky Mountains regions make up 7.7% and 4.0% of industry facilities, respectively.

# Competitive Landscape

Market Share Concentration | Key Success Factors | Cost Structure Benchmarks  
Basis of Competition | Barriers to Entry | Industry Globalization

## Market Share Concentration

Level  
Concentration in this industry is **Medium**

The Aircraft, Engine and Parts Manufacturing industry exhibits a medium level of market concentration. With the four largest players accounting for an estimated 59.8% of total industry revenue. In the commercial aircraft segment, The Boeing Company (Boeing) dominates, as it is the only US manufacturer of medium to large size airliners (although Airbus has started a narrowbody facility). The defense sector is less concentrated but is still dominated by a handful of operators. The advanced technology and knowhow, combined with the resources and capacity required to be a successful defense contractor limits new entrants from entering the market. US engine manufacturing is primarily made up of General Electric and Pratt and Whitney. The least concentrated segment of the market is made up of aircraft part suppliers. Most original equipment manufacturers (OEMs) such as Boeing use hundreds of small to medium size contractors to supply its aircraft with parts ranging from fasteners to wings.

In fact, industry concentration has increased for most of the five years to 2019, as the advantages associated with size and military spending cuts and the need to streamline the supply chain have encouraged mergers and acquisitions (M&A) activity. In particular, aerospace's notoriously complex supply chain and concerns about suppliers' capacity to meet growing demand has encouraged recent M&A. The initial weakness in the defense market put pressure on military contractors to merge to gain a bigger share of a shrinking pie, but the already high concentration in these segments, especially among OEMs, might encourage resistance from anti-monopoly regulators. In more recent years, increase defense budget certainty has also boosted M&A as contractor gained a better idea of where to focus. Therefore, a large share of acquisitions conducted by defense contractors has been focused on diversifying into the commercial sector, refocusing on their core competencies or expanding their product lines.

## Key Success Factors

IBISWorld identifies 250 Key Success Factors for a business. The most important for this industry are:

### Economies of scope

Economies of scope provide more opportunities for larger businesses. Providing multiple outputs at the lowest cost, such as providing financial services with aircraft sales, improves trading opportunities and increases a business' range of customers.

### Well-developed internal processes

Efficient inventory and cost management systems help companies develop a competitive edge. Lower operational costs also improve profitability for operators.

### Establishment of export markets

Overseas markets represent a significant proportion of sales for businesses in this industry. Access to overseas markets can increase the

scale of operations and improve productivity and profit.

### Ability to accommodate environmental requirements

The ability to accommodate increasingly strenuous environmental requirements is an essential requirement in the twenty-first century. Americans increasingly demand more environmentally friendly aircraft with lower carbon emissions.

### Economies of scale

The ability to reap the benefits of economies of scale during production runs is a significant success factor. Larger-scale operations can achieve significant cost savings across product ranges.

# Competitive Landscape

## Key Success Factors continued

### Access to the latest available and most efficient technology and techniques

The use of up-to-date technology and new products will provide

a competitive edge over other players in this industry. Recently, a focus on fuel efficiency has been highly successful.

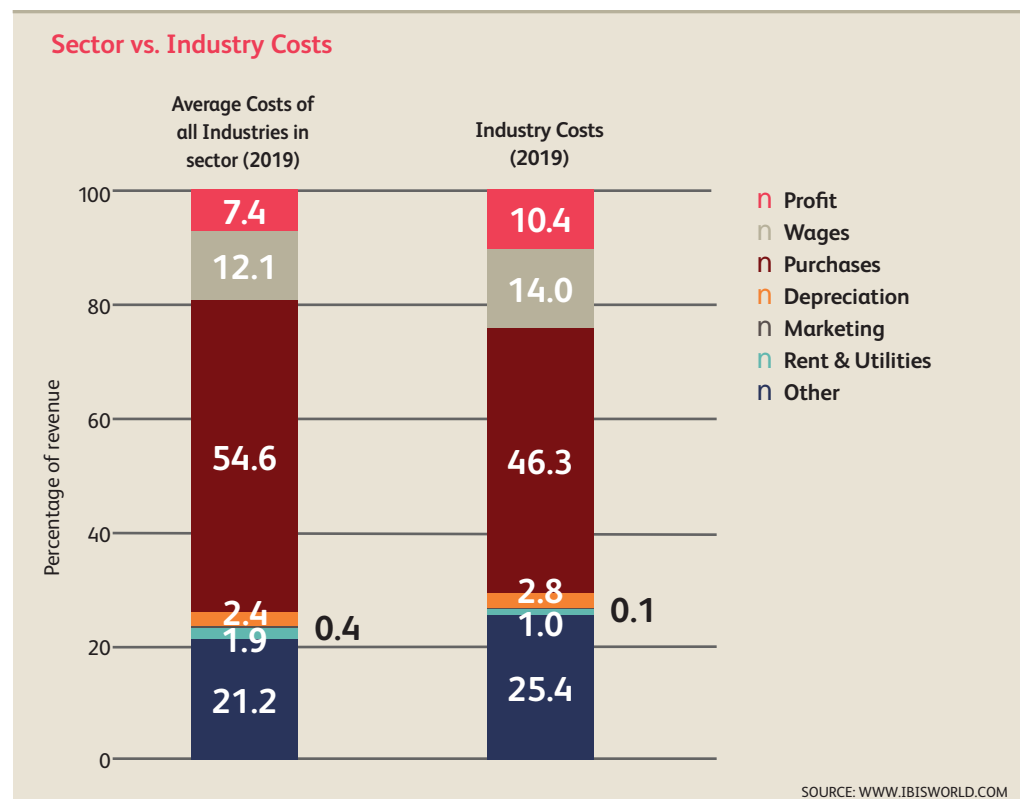
## Cost Structure Benchmarks

Cost structures in the Aircraft, Engine & Parts Manufacturing industry vary depending on the size of the company, specialization within the supply chain and the value of contracts gained.

### Wages

Labor costs include wages, salaries, fringe benefits and insurance and represent 14.0% of industry revenue. Industry wages are relatively high due to the need to employ skilled labor in the development of sophisticated aerospace products. Many workers have backgrounds in engineering and science and typically demand higher pay. A

shortage of people in these fields has also increased wages. Over the five years to 2019, wages share of revenue has remained high, but that is mostly due to the expected increase in average wages and employment in 2019. The long-term industry trend is toward lower wages as a share of revenue. Initially decreasing defense spending has resulted in restructuring and related layoffs in the defense segment. Moreover, operators are investing in increased automation to improve productivity. Companies like Boeing have also moved production to lower-cost states, where wages are lower due to a lack of unions.



# Competitive Landscape

## Cost Structure Benchmarks continued

### Purchases

Purchases form the bulk of industry expenses and include the acquisition of aircraft equipment, safety equipment and other materials (e.g., steel plates, copper tubing and aluminum, ferrous and nonferrous castings, electronic components). Raw materials used to construct or repair aircraft and their components vary depending on the specifications and size of the craft or engine being repaired or constructed. Since these costs consistently account for half of an average company's revenue, the industry is vulnerable to fluctuations in the price of materials and supplies. In 2019, purchases represent 46.3% of industry revenue.

### Profit

Profit, defined as earnings before interest and taxes, makes up an estimated 10.4% of industry revenue. In general, many suppliers have higher profit than original equipment manufacturers (OEMs) despite there being only a few OEMs and over 1,000 suppliers. The complex nature of the aerospace supply chain and lack of price transparency has made it easier for some suppliers to charge more for their components. In some cases, OEMs have provided suppliers with patent rights to certain components, giving the suppliers a monopoly. Lastly, many suppliers compete in the component aftermarket where profit tends to be higher. Over the five years to 2019, profit has increased as defense contractors cut costs and overall demand for industry products climbed. Moreover, OEMs such as The Boeing Company (Boeing) have used the prospect of being cut out of new aircraft production to put pressure on suppliers to reduce costs. This trend is expected to help OEM profit but put pressure on those down the supply chain. Additionally, the government has put

more emphasis on costs associated with defense contracts.

### Depreciation

An indication of the level of capital costs within the industry is reflected by the percentage of depreciation. Depreciation costs account for production machinery, communication equipment, office equipment, technology and software. The industry uses equipment and machinery that reflect the latest technology, but the costs of such investments are relatively low compared with the value of sales. Since the costs of machinery purchases are spread out, depreciation consistently registers as a marginal share of the average company's revenue; in 2019, for instance, depreciation is projected to account for only 2.8% of industry revenue.

### Marketing

Marketing costs are expected to account for 0.1% of industry revenue as operators do not selling products on the consumer level.

### Rent

Rent is not expected to make up a large portion of revenue at 0.4%. Most operators own, rather than lease, their facilities.

### Utilities

In 2019, utilities are expected to account for 0.6% of revenue and mainly include electricity, as most facilities rely on heavy machinery to manufacture their parts.

### Other

Other costs include computer hardware and software, communication services, repairs, insurance, contract-related expenses, R&D and maintenance. Collectively, these costs account for 25.4% of industry revenue.

# Competitive Landscape

## Basis of Competition

Level & Trend  
Competition in this industry is **Medium** and the trend is **Increasing**

### Commercial market

The commercial aircraft market supplies helicopters, general aviation, business, regional and large commercial aircraft (LCA) to buyers ranging from individual to airlines. Each one of these submarkets has its own dynamics and trends.

Moreover, due to the resources and know-how required, the number of competitors declines as the complexity, size and sophistication of the aircraft increases. For instance, the LCA market is a virtual duopoly made up of The Boeing Company (Boeing) and Airbus. The regional market (typically short to mid-range aircraft under 140 seats) has more competitors, with a stream of new players entering the market. The top two regional producers are Bombardier and Embraer, however, other players such as Commercial Aircraft Corporation of China (COMAC) and Sukhoi have developed regional jet aircraft as well. The business and general aviation market has even more competitors including, Bombardier (via Learjet, Challenger and Global models), Textron Inc. (via Cessna and Beechcraft) Embraer (via Legacy, Lineage and Phenom models), General Dynamics Corporation (via Gulfstream) and so on. Finally, the helicopter market is dominated by Bell, Sikorsky, Russian Helicopters, Airbus Helicopters and Leonardo. Nonetheless, no matter the product market, manufacturers typically compete on price, product features, delivery time, aftermarket service and ability to anticipate market trends.

When it comes to winning new orders, having a competitive price is essential. On many occasions, companies have to provide significant discounts to win contracts, especially if it means keeping aircraft production open to achieve economies of scale and thus, lower per unit price. Another important factor in winning contracts is the quality, features and efficiency of the aircraft. Companies with the most advanced, fuel-efficient,

least polluting, spacious, comfortable and easy to maintain aircraft will win the most orders. In addition, due to the sophisticated nature of Aircraft, Engine and Parts Manufacturing industry products, manufacturers are more likely to gain and keep customers by providing high-quality aftermarket services. This includes prompt part replacement, aircraft diagnostics and troubleshooting. Players have to also be able to anticipate market trends because of the expanse and long lead-time between development and introduction of aircraft. It can easily take as many as five years and billions of dollars to introduce a new plane, requiring companies to be confident that there will be sufficient demand for the aircraft in the future. Moreover, the inability of manufacturers to deliver an aircraft on time may push the buyer to seek an alternative supplier. For example, the delays of Boeing's 787 Dreamliner production, which was two years late on its target date, caused some 787 buyers to demand compensation for the delay.

### Defense market

Defense contracts are negotiated and awarded through a tender process and price is a major factor. Even though there are only a small number of participants in this industry, competition is intense between the players whose majority of revenue comes from contracts awarded by the Department of Defense or foreign governments.

Companies that invest in new equipment, conduct research and development and provide state-of-the-art technology in aerospace products will gain a competitive advantage because the industry requires a constant stream of innovation to maintain a lead in this sector. Businesses that have established brand recognition and a positive track record with the Department of Defense will find it easier to negotiate for future projects.

# Competitive Landscape

## Basis of Competition continued

Most manufacturers outsource some components to third-party providers that have greater expertise in their relative areas (e.g. engine) to ensure that the end product meets the required standards. Companies that can link with other providers will have an edge over others in meeting the requirements set by the buyer. In fact, more and more defense contractors are joining forces with competitors to win contracts. This enables them to split risk and reduce costs, which is becoming more important as defense spending is declining.

### Engine manufacturers

The aircraft engine market (particularly commercial engines) is essentially dominated by General Electric, Pratt and Whitney, Rolls Royce and various joint ventures involving the three and others. In terms of product features, companies that provide the most fuel efficient and easy to maintain engines can secure the most orders. Furthermore, a manufacturer that is able exclusively to supply engines for an aircraft model will reduce competition. However, companies like Boeing are increasingly offering their planes with multiple engine selections, in turn, increasing competition. An engine supplier's ability to provide quality aftermarket service is also essential because companies can earn as much as half of their revenue from such work.

### External competition

The Aircraft, Engine and Parts Manufacturing industry encounters strong competition from foreign-based

production. The LCA market is dominated by Boeing and Airbus, which are highly competitive with each other. They regularly switch places as the top LCA company and invest billions into technology that can help them get an advantage. However, this duopoly is coming under increased competition from other countries. For example, the Chinese government founded its own commercial aircraft company, the Commercial Aircraft Corporation of China (COMAC). Other competitors include Russian companies like Sukhoi and Tupolov.

In the defense space, US-based manufacturers endure tough competition. While US producers dominate sales to the Department of Defense, foreign contracts are harder to win. European defense contractors like Airbus Defense, BAE Systems, Thales and Leonardo offer highly advanced weapon systems and alternatives to US companies. For example, the Eurofighter (a fighter built by a consortium of European companies) has won out over US competition for contracts with Saudi Arabia and Sweden's Saab recently beat Boeing for a Brazilian fighter jet contract. Russian aerospace companies also provide strong competition, especially based on ease of maintenance and price, which is important to governments in emerging markets. Lastly, defense contractors often compete based on the "offset" they provide. These can include technology transfers and component contracts for local companies.



# Competitive Landscape

## Barriers to Entry

Level & Trend  
Barriers to Entry  
in this industry are  
**High and Steady**

In all Aircraft, Engine and Parts Manufacturing industry segments, the barriers to entry are formidable. High start-up costs, from land acquisitions to investment in technology, make it difficult for new entrants in this industry. Entry is more possible in the auxiliary and parts manufacturing segment; however, participants would be subject to the requirements of major players that outsource these activities.

The industry demands skilled labor and is on the leading edge of technology, constantly striving to create new products and improve existing ones. The industry invests a great deal of time and money in research and development (R&D) on aerospace products, and much of that work is performed by professionals and related workers. In addition, many more aerospace-related professionals work in the scientific R&D services industry, where a bachelor's degree (in some cases a master's or doctorate) in a specialized field, such as engineering, is required. Skilled labor may be hard to come by, depending on the labor market. Usually, during times of strong economic growth, demand for skilled labor is high and competition to secure the best workers increases.

### Barriers to Entry checklist

Competition	Medium
Concentration	Medium
Life Cycle Stage	Mature
Capital Intensity	Medium
Technology Change	High
Regulation and Policy	Heavy
Industry Assistance	Medium

SOURCE: WWW.IBISWORLD.COM

Regulations governing the licensing of manufacturers are an absolute barrier to entry. Licenses to supply product to the government are rarely issued to foreign companies, and domestic companies must demonstrate a high level of corporate governance. Also, security clearances, which are needed for workers on certain programs, are difficult to obtain and can delay or invalidate a worker's clearance. Defense contractors have to build relationships with lawmakers and government agencies to secure contracts and a substantial amount of money is spent on lobbying. Therefore, it can be difficult for new players beat incumbents over defense contracts.

## Industry Globalization

Level & Trend  
Globalization in  
this industry is  
**High and the trend is Increasing**

Globalization provides an opportunity to spread risk, access markets and gain access to capital. Using trade data as a proxy, the Aircraft, Engine and Parts Manufacturing industry exhibits a high level of globalization. US-based The Boeing Company (Boeing) is a major player in the global civilian aircraft industry, but along with Airbus, based in France, Bombardier, based in Canada, and Embraer, based in Brazil. Sales of civilian aircraft are global in nature, and major players in this industry have production and sales facilities worldwide. Many domestic operators, such as Boeing, set up subsidiaries overseas to

increase sales and clients. For instance, Boeing provided United Arab Emirates based Mubadala Aerospace with a \$2.5 billion manufacturing contract as part of aircraft sales to the country's national carrier. Globalization is higher in the civilian aircraft and parts manufacturing segment than in the military segment due to the need to safeguard military technology and intellectual property. IBISWorld forecasts that globalization of the military segment of the market will increase over the five years to 2024.

In the military segment, the United States has always been on the forefront of this industry; however, fewer new

# Competitive Landscape

## Industry Globalization continued

programs and a high budget deficit are driving major subsystems suppliers overseas for new launches (supported by more favorable incentives from foreign governments). Defense contractors, especially those contracted to the government, are increasingly looking toward overseas markets to sustain operations. On average, major US defense contractors derive 10.0% to 15.0% of total

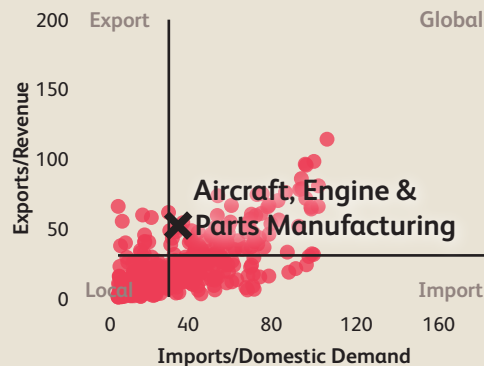
revenue from international sales. The current wave of globalization will result in greater collaboration between allied nations. This trend has already started with the United States opening development of the F-35 to international partners. In addition, defense contracts often agree to transfer over technology or award manufacturing contracts to foreign countries if it means winning a sale.

International trade is a major determinant of an industry's level of globalization.

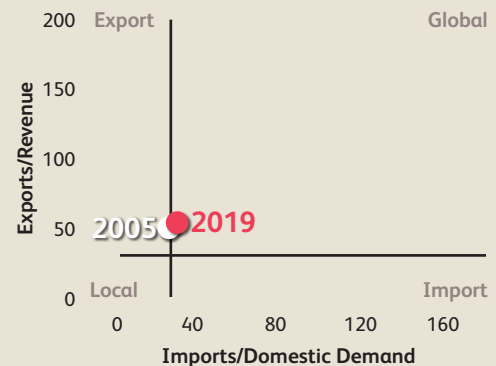
Exports offer growth opportunities for firms. However there are legal, economic and political risks associated with dealing in foreign countries.

Import competition can bring a greater risk for companies as foreign producers satisfy domestic demand that local firms would otherwise supply.

Trade Globalization



Going Global: Aircraft, Engine & Parts Manufacturing 2005–2019

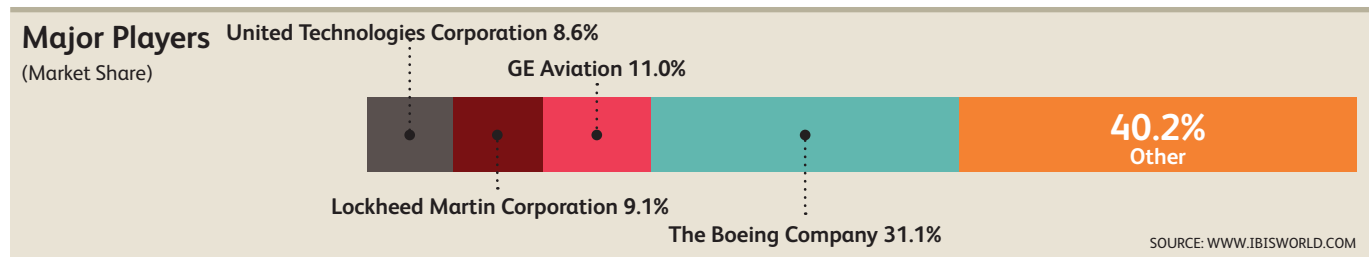


SOURCE: WWW.IBISWORLD.COM

# Major Companies

The Boeing Company | GE Aviation

Lockheed Martin Corporation | United Technologies Corporation | Other Companies



## Player Performance

**The Boeing Company**  
Market Share: 31.1 %

Headquartered in Chicago, The Boeing Company (Boeing) is the only US-based maker of large commercial jets and the second-largest defense contractor for the US government, behind Lockheed Martin Corporation. With \$101.1 billion in overall annual revenue and more than 153,000 employees in 2018, Boeing is one of the world's largest aerospace companies. The company's four main businesses are commercial airplanes; defense, space and security (BDS); global services; and Boeing capital, with only the former three being Aircraft, Engine and Parts Manufacturing industry-specific.

Boeing's commercial airplanes business is one of the two largest in the world (Airbus being the other), making up 60.0% of Boeing's total revenue. Its portfolio of aircraft families includes the single-aisle 737, the jumbo 747, the 767,

the twin-aisle 777 and the new 787. Most of these families have multiple models and can be built as airlines and freighters. The mid-sized 787 represents Boeing's newest generation of planes. The aircraft is made from advanced composite materials and engines that enable it to obtain a 20.0% improvement in fuel efficiency over current planes within its category. Moreover, the company is planning to produce the 737 Max and 777X, which are revamps of its current models, over the coming years. These aircraft will make more use of composite materials and be equipped with new, fuel-efficient engines. At the end of 2018, the commercial airplanes segment had an order backlog of \$412.3 billion.

The BDS business specializes in military, intelligence and space markets, with the US Department of Defense (DoD) being by far the largest customer.

## The Boeing Company (US industry-specific segment) - financial performance\*

Year	Revenue (\$ million)	(% change)	Operating Income (\$ million)	(% change)
2014	72,589.8	N/C	4,355.6	N/C
2015	76,593.4	5.5	4,124.8	-5.3
2016	75,580.1	-1.3	4,069.4	-1.3
2017	74,646.3	-1.2	6,716.2	65.0
2018	79,714.5	6.8	8,245.2	22.8
2019*	74,924.9	-6.0	7,592.2	-7.9

\*Estimates

SOURCE: ANNUAL REPORT AND IBISWORLD

# Major Companies

## Player Performance continued

Industry-specific operations come from the production of military aircraft and related components. Relevant products include the F/A-18 and F-15E fighter jets, the C-17 heavy transporter, P-8A Poseidon maritime aircraft, the AH-64 and CH-47 helicopters and many other aircraft such as tankers and unmanned aerial vehicles. In addition, BMA is a partner of Lockheed Martin Corporation in the production of the F-22 stealth fighter and with Bell Helicopter in the production of the V-22 Osprey tiltrotor aircraft. The division is also developing the KC-46 Pegasus tanker for the US Air Force. Other recent contract wins include the MQ-25 Stingray carrier-launched drone and contracts to produce the US Air Force's new trainer aircraft and Huey helicopter replacement. The company has also recently created a global services segment, which accounts for military and commercial aftermarket operations. Some of this segment's services, such as

the production and supply of aftermarket parts, are industry-specific.

### Financial performance

Over the five years to 2019, Boeing's commercial and military aircraft revenue is expected to grow at an annualized rate of 0.6% to an estimated \$74.9 billion. Strong demand for commercial aircraft was the primary reason for impressive performance during the majority of the five-year period. However, after two of its 737 Max planes crashed in late 2018 and early 2019 due to software assistance issues, the company has endured intense scrutiny from federal investigators and the airlines leading to a global grounding of that model, billions of dollars in damages and thousands of flight cancellations. The future of the 737 Max, which is Boeing's most popular model, still contends with uncertainty as the FAA has not given a timeline of when the plane will be cleared to fly again.

## Player Performance

**GE Aviation**  
Market Share: 11.0 %

Based in Boston, General Electric (GE) operates in more than 40 countries and employs 283,000 people worldwide. The company is a massive conglomerate with products and services ranging from durable

consumer goods and healthcare devices to aircraft leasing. In 2018, overall annual revenue for GE totaled \$121.6 billion. However, the company has recently announced plans to spin off a significant portion of its business.

### GE Aviation (US industry-specific segment) - financial performance\*

Year	Revenue (\$ million)	(% change)	Operating Income (\$ million)	(% change)
2014	19,192.0	N/C	3,978.4	N/C
2015	19,728.0	2.8	4,405.6	10.7
2016	20,992.0	6.4	4,259.2	-3.3
2017	21,610.4	2.9	4,296.0	0.9
2018	24,452.8	13.2	5,172.8	20.4
2019*	26,484.4	8.3	5,356.7	3.6

\*Estimates

SOURCE: ANNUAL REPORT AND IBISWORLD

# Major Companies

## Player Performance continued

The company operates in this industry through its GE Aviation subsidiary, which manufactures and services jet engines, aerospace systems and equipment and replacement parts. The company is a top supplier of engines to both the commercial and military aircraft markets, with more than half of its revenue coming from services and the rest from products. GE Aviation also has several joint ventures with engine and engine part manufacturers. Most notably, CFM International, which is a 50/50 venture with Safran Aircraft Engines, produces the best-selling CFM56 engine family, and the new LEAP engine and Engine Alliance (EA), which is a 50/50 venture with Pratt and Whitney, produces the GP7200 engine for the Airbus A380. Additionally, company-produced engines power an estimated two-thirds of the

DoD's rotorcraft, half of its bombers and three-fourths of its fighters. In 2013, GE acquired Avio SpA, an Italian manufacturer of aviation propulsion components and systems, for \$4.5 billion. Company revenue growth has been bolstered by increasing commercial orders, while military sales declined due to reduced defense spending.

### Financial performance

Over the five years to 2019, GE Aviation's industry-specific revenue is expected to climb at an annualized rate of 6.7% to \$26.5 billion. The company has greatly benefited from increased global aircraft sales, which boosted demand for its engines. Demand was particularly strong because a large portion of demand for new aircraft is based on more fuel-efficient engines that the company provides.

## Player Performance

**Lockheed Martin Corporation**  
Market Share: 9.1 %

Based out of Bethesda, MD, Lockheed Martin Corporation (Lockheed Martin) is a major global aerospace and defense company that is principally engaged in researching, designing, developing, manufacturing, integrating and sustaining advanced technology systems, products and services. At the end of 2018,

the company operated 380 locations worldwide and employed an estimated 105,000 people, with most operations, especially manufacturing, positioned within the United States. The company conducts operations through four segments: aeronautics, missiles and fire control (MFC), rotary and mission

### Lockheed Martin Corporation (US industry-specific segment) - financial performance\*

Year	Revenue (\$ million)	(% change)	Operating Income (\$ million)	(% change)
2014	15,143.4	N/C	2,064.2	N/C
2015	15,529.4	2.5	2,004.8	-2.9
2016	17,293.0	11.4	2,153.1	7.4
2017	19,410.0	12.2	2,620.1	21.7
2018	21,242.0	9.4	2,897.7	10.6
2019*	21,879.2	3.0	3,043.5	5.0

\*Estimates

SOURCE: ANNUAL REPORT AND IBISWORLD

# Major Companies

## Player Performance continued

systems (RMS) and space systems. However, only the aeronautics segment is industry-relevant. In 2018, 70.0% of the company's \$53.8-billion revenue was generated through contracts with the US government.

Aeronautics is Lockheed Martin's biggest division, bringing in more than 39.5% of the company's revenue. Products produced by aeronautics include the F-35 and F-22 stealth fighters, C-130 and C-5M transporters and the F-16 multirole fighter. An estimated 63.0% of this segment's revenue is sourced from US government deals. In particular, the F-35 program makes up more than half of the segment's revenue. The program includes the development, low-rate initial production and eventual mass production of aircraft. In recent years, Lockheed Martin has received criticism for cost overruns and delays associated with the F-35, but demand from the DoD and foreign governments remains strong.

Since November 2015, industry-specific revenue also includes Sikorsky sales. Sikorsky is a major military and civilian helicopter manufacturer and aftermarket service provider. Sikorsky helicopter models include the Black Hawk, the CH-53k and the S-76C++. The company has also recently introduced its S-97 RAIDER helicopter prototype. The new unit is aligned under the RMS segment, greatly increasing the company's industry market share.

### Financial performance

Revenue within the company's industry-specific operations is expected to increase at an annualized rate of 7.6% to \$21.9 billion over the five years to 2019. A large portion of this increase is due to the expansion and increased sales of the F-35 program. Legacy products such as the C-130 Hercules and F-16 Block 70 are expected to help growth during the outlook period as they each have extensive backlogs.

## Player Performance

**United Technologies Corporation**  
Market Share: 8.6 %

United Technologies Corporation (UTC) was founded in 1975 with headquarters in Hartford, CT. UTC manufactures technology products and services to building systems and aerospace industries worldwide through four primary segments: Otis; UTC climate, controls and security; UTC aerospace systems; and Pratt and Whitney. However, only the last two segments are industry-relevant. In 2018, the company generated more than \$66.5 billion in revenue and employed 240,00 people worldwide.

Pratt and Whitney manufactures commercial, military, business jet and general aviation aircraft engines and parts, and provides fleet management for engines. UTC aerospace systems produces aerospace products and offers aftermarket services, including power generation, management and

distribution systems; flight, engine-control and environmental-control systems; fire protection and detection systems; auxiliary power units; and propeller systems.

Over the five years to 2019, UTC has won several important contracts. For example, Pratt and Whitney is under contract to build engine and propulsion components for the F-35 Lightning II stealth fighter. Earlier in 2016, the Air Force announced that Pratt and Whitney would supply the engines for the new B-21 stealth bomber. UTC is also a major shareholder in International Aero Engines, a joint-venture company that manufactures engines for small- to medium-sized commercial airliners.

UTC has also participated in merger and acquisition activity. In September 2015, UTC completed its sale of Sikorsky



# Major Companies

## Player Performance continued

Helicopters to Lockheed Martin Corporation for \$9.0 billion. Sikorsky is one of the largest helicopter manufacturers in the world and a key defense contractor. However, due to lackluster US defense spending, faltering commercial sales and Sikorsky's status as the only platform manufacturing business in UTC's portfolio, the company sold off the division. In 2016, UTC dismissed a takeover attempt by Honeywell before announcing in 2017 that it will acquire Rockwell Collins, a major avionics and aerospace components producer. Further in 2019, Raytheon, a major United States defense contractor announced that it was merging with UTC. Together, they are expected to generate \$74 billion in

revenue, creating one the largest aerospace and defense companies.

### Financial performance

Over the five years to 2019, UTC's industry-specific revenue is expected to increase at an annualized rate of 4.8% to \$20.6 billion. For most of the past five years, the company has benefited from strong demand from the commercial aircraft market, which has helped mitigate volatile revenue from the Sikorsky segment, which was heavily dependent on US military spending. Moreover, starting in 2015, revenue started to drop due to the sale of Sikorsky. After accounting for the Sikorsky sale, revenue once again began to climb.

## United Technologies Corporation (US industry-specific segment) - financial performance\*

Year	Revenue (\$ million)	(% change)	Operating Income (\$ million)	(% change)
2014	16,300.8	N/C	1,821.0	N/C
2015	15,848.9	-2.8	1,230.7	-32.4
2016	16,059.6	1.3	1,525.1	23.9
2017	17,023.5	6.0	1,399.7	-8.2
2018	19,709.3	15.8	1,675.7	19.7
2019*	20,630.5	4.7	1,698.0	1.3

\*Estimates

SOURCE: ANNUAL REPORT AND IBISWORLD

## Other Company Performance

**General Dynamics Corporation**  
Market Share: 2.8 %

Formed in 1952, Falls Church, VA-based General Dynamics Corporation is a leading aerospace and defense company. Its 105,600-strong global workforce generated \$36.2 billion in 2018. While the company produces everything from ships to ammunition and land combat vehicles, its industry-specific segment is the aerospace group, which produces and services the Gulfstream business-jet

line and performs completions for other original equipment manufacturers. The aerospace group is the only part of the company that does not make most of its money from military-related contracts. Most aircraft and parts are manufactured in the United States, but international customers represent the majority of the company's backlog. In 2019, the company is expected to bring

# Major Companies

## Other Company Performance continued

in an estimated \$6.8 billion in industry-specific revenue.

## Other Company Performance

**Textron Inc.**  
Market Share: 2.1 %

Based out of Providence, RI, Textron Inc. (Textron) is a conglomerate that has aircraft, defense, industrial and finance businesses. In 2018, the company employed an estimated 35,000 people worldwide and generated \$13.9 billion in revenue. Textron contributes to the Aircraft, Engine and Parts Manufacturing industry through its Textron aviation and Bell subsidiaries, in addition to its Textron systems segment. The company's Bell subsidiary supplies helicopters, tiltrotor aircraft (such as the V-22) and helicopter parts to military and commercial markets. However, most of Bell's commercial helicopters are produced in Canada, so only military products count for this industry. Textron Systems manufactures network-centric warfare systems for the DoD, but its

industry-specific activities primarily come from its unmanned aerial vehicle production. Textron aviation was formed from the merger of its Cessna subsidiary and the recently acquired Beechcraft Corporation (Beechcraft). Beechcraft is a producer of general aviation aircraft under the Beechcraft and Hawker brands and was one of Cessna's main rivals. The company also had defense product offerings such as trainer and surveillance aircraft. Cessna itself is a staple among smaller general aviation companies, but sales have greatly suffered since the recession. The acquisition of Beechcraft will strengthen the company's civilian sales and diversify it away from declining defense spending. IBISWorld expects Textron to bring in an estimated \$4.9 billion in industry-specific revenue in 2019.

# Operating Conditions

Capital Intensity | Technology & Systems | Revenue Volatility  
Regulation & Policy | Industry Assistance

## Capital Intensity

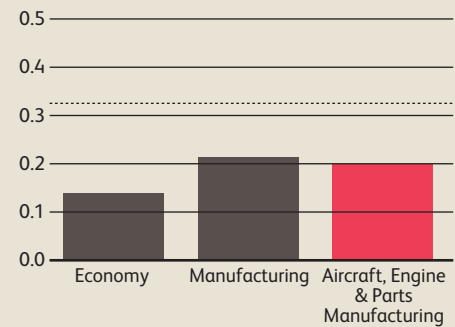
### Level

The level of capital intensity is **Medium**

The Aircraft, Engine and Parts Manufacturing industry exhibits a medium level of capital intensity. For every dollar spent on labor, industry operators will spend \$0.20 on capital. Manufacturing facilities require massive amounts of investment. Many aeronautics products are extremely sophisticated and the production lines needed to make them are very advanced. Capital intensity is also increased because many industry products are one of a kind and thus require new investment in production equipment and methods. This is particularly true for new military aircraft. Programs like the F-35 stealth fighter required companies to develop completely new technology, which not only necessitated investment in new tools

### Capital Intensity

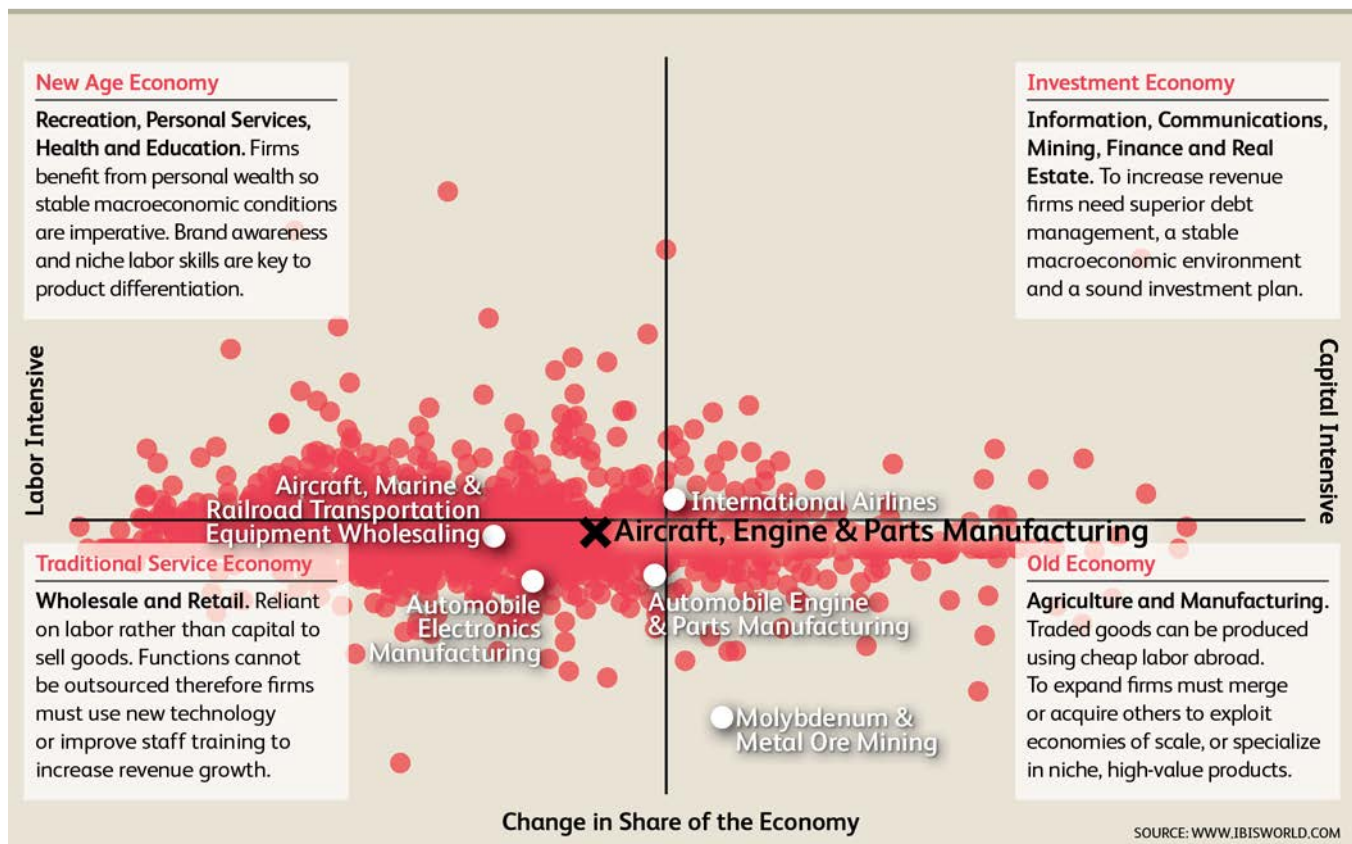
Capital units per labor unit



Dotted line shows a high level of capital intensity  
SOURCE: WWW.IBISWORLD.COM

during the development stage but also the retooling of existing facilities to accommodate new production.

## Tools of the Trade: Growth Strategies for Success



# Operating Conditions

## Capital Intensity continued

Additionally, defense-related production, especially if deals with top-secret technology, cannot be outsourced to lower cost countries as it would endanger national security. Therefore, defense-related capital costs cannot typically be reduced through the offshoring of manufacturing. However, offshoring is more prevalent in the commercial segment, as the technology is not as sophisticated and secret. Nevertheless, offshoring is not as big as in other industries because production typically requires highly skilled labor, which is harder to find in global centers of lower cost production.

Industry capital intensity is also weighed down by very high wage costs. Due to the sophistication of aerospace

products, workers must be highly skilled. As a result, average wages are high, especially for engineers and management. The shortage of engineering and science related workers in the United States has also increased wage costs, as competition for labor rises.

Over the five years to 2019, capital intensity has remained relatively stagnant. Nonetheless, initial defense cuts and industry consolidation has also put pressure on companies to reduce their workforce. At the same time companies invested in automation to lower payroll, improve productivity and production time. Lastly, the development of new military and civil aircraft has forced operators to retool and expand facilities.

## Technology and Systems

### Level

The level of technology change is **High**

The Aircraft, Engine and Parts Manufacturing industry has a high level of technological innovation. The aerospace sector is one of the most advanced in the economy, building highly sophisticated products such as fighter jets, jet engines and advanced electronics. To manufacture these products, industry players invest significant resources into research and development (R&D), new manufacturing processes and specialized equipment.

### The manufacturing aspect

Aerospace manufacturing processes and materials are distinguished from many other manufacturing industries by the stringency of the industry's requirements for safety, reliability and efficiency in operations. Components need to be manufactured with greater accuracy and closer tolerances, and a high degree of attention has to be given to assembly. Materials with extremely high strength and low weight are necessary, such as titanium-rich composite materials.

In recent years, a significant portion of aerospace manufacturing innovation has revolved around new manufacturing techniques such as additive manufacturing (AM) and advances in machine tools such as computer numerical control (CNC) machines (machine tools that are controlled by computers and carry out preprogrammed commands) and robotics.

AM, more commonly known as 3D printing, is a series of process by which 3D objects are created from electronic data by laying down successive layers of material. Through this technology almost any shape can be created, enabling the production of highly complex shapes beyond the ability of traditional machine tools. Originally, 3D printing was used to create models, but in more recent years, parts and components have been printed. For instance, General Electric and Pratt & Whitney both use 3D printing to produce components for their new generation of jet engines, while The Boeing Company and Northrop Grumman use the technology to build

# Operating Conditions

## Technology and Systems continued

parts for their aircraft such as the 787 Dreamliner and X-47B unmanned aerial vehicle (UAV). AM-related innovation has increasingly centered on moving beyond the manufacturing of plastic objects, which have limited use in aircraft, to the production of metal objects made out of alloys such as titanium.

More conventional machine tools have also undergone some innovation in recent years. Operators have invested in more automated CNC machines that use more axes, as this enhances the complexity of shapes machines can produce. These machines require less human intervention, because a greater number of axes means that operators are less likely to have to reorient work pieces manually. Increased automation also involves machines that self-clean through chip evacuation systems. The cleaning requirements of most CNC machines are quite intensive, since they necessarily collect pieces of material that have been cut away.

Industry operators are also increasing their use of robotics. Traditionally, robots in the aerospace industry have been limited to tasks such as drilling holes because the relatively large size of aircraft would require too many robots to cover a particular space. However, advances are being made to introduce mobile robots that can maneuver around aircraft and accurately carry out tasks such as painting and structural inspection.

Besides using more advanced equipment, manufacturers are introducing new software and communications tools to streamline the industry's notoriously complex supply chains. Software companies such as SAP have introduced supply chain management solutions that include integration of supplier networks (i.e. supplier synchronization such sharing orders, inventory, or production forecasts) and data analysis of supply chains to identify bottlenecks and create

benchmarks. Similar solutions have also included order automation and shared manufacturer-supplier resource planning.

## Product innovation

Within the commercial segment of the industry, product innovation has been geared toward building more fuel-efficient aircraft. Often high fuel prices and increasing scrutiny of aircraft pollution have increased demand for aircraft that can burn less fuel. Virtually all commercial aircraft recently introduced or in development are built around fuel efficiency technology such as new engines and increased use of lighter composite materials. This includes Boeing's 787 Dreamliner, 737 MAX and 777X.

Both General Electric and Pratt & Whitney have introduced or are developing many more fuel-efficient engines. For instance, General Electric has introduced the GEnx engine that is currently used on Boeing's Dreamliner and 747-8. Using composite materials, carbon fiber and new component designs, General Electric claims that the GEnx offers up to 15.0% better fuel consumption than other engines.

Commercial aircraft are also being built with new avionics systems. This includes the replacement of analog cockpit systems with all electronic ones and the introduction of fly-by-wire control systems that optimize wing configuration for the lowest possible fuel consumption. Onboard electronic aircraft management systems are also helping centralize and control multiple complex systems such engine monitoring.

However, despite multiple technological breakthroughs over the years, the basic design of commercial aircraft has stayed the same. Aside from the Dreamliner, almost all the other large commercial airliners being developed in the United States or Europe are based around older models. For instance, the 737 MAX is just an updated version of the



# Operating Conditions

## Technology and Systems continued

original 737, but with increased use of composite material, new more fuel-efficient engines and advanced avionics.

Far more technological innovation has occurred in the military segment of the industry. Unlike commercial aircraft manufacturers, defense contractors receive substantial R&D funding and subsidies from the government, which is constantly looking to develop new platforms to enhance capabilities and obtain military superiority.

The largest US military development program is the 5th generation, F-35 jet fighter. The fighter incorporates multiple advanced features such as stealth technology and advanced avionics, software and networking capabilities, which represent the direction in which military aircraft technology is headed. Stealth technology is used to reduce the radar cross-section of aircraft, making them undetectable to traditional radar systems. This technology includes the use of particular shapes in aircraft design, radar absorbent materials and internal weapon bays. The F-35 is also equipped with advanced avionics such as active electronically scanned array (AESA) radar, which can perform various roles simultaneously while reducing detectability. The aircraft is also extremely software-intensive, using software to oversee complex systems; controlling, analyzing and managing sensor data. Software-intensive systems are supposed to be easier and less expensive to upgrade than hardware-intensive systems, which require replacement or even aircraft modification. However, the planes software system has had multiple glitches and related development costs are rising. The fighter is also expected to be capable of networking with other F-35s and other platforms. This includes target acquisition and guidance for other aircrafts' missiles and sharing of situational awareness data. Technologies

such as AESA radar, advanced networking capabilities and to a smaller degree, stealth technology features, are also being installed on older generation and non-fighter aircraft.

However, one of the most rapidly developing and potentially revolutionary technologies worked on by the industry in recent years are unmanned aerial vehicles (UAVs). UAVs are remotely piloted aircraft, different from a missile because it is capable of controlled, sustained and level flight. Today's operational UAVs encompass a wide range of sizes, weights, speeds and operating altitudes ranging from the four-pound Raven that flies for one hour at 50 knots and normally below 1000 feet, to the largest operational UAV, the Global Hawk, which weighs 15,000 pounds, and flies at 400 knots for more than 30 hours at 65,000 feet. However, there has also been substantial progress in the development of micro UAVs. One of the smallest of these UAVs is Harvard University's Robobee, which weight 80mg and has a mere 3cm wingspan.

The mission capabilities of UAVs are also rapidly changing. Currently, most operational UAVs are used by the military for intelligence, surveillance, reconnaissance and precision strike missions. However, they are relatively easy to detect and defeat, making them vulnerable in "contested" airspace. Therefore, UAVs are being developed that can operate in such airspace. For instance, General Atomics' Avenger and Northrup Grumman's RQ-180 include stealth features such as internal weapon bays and radar absorbent materials. Along with increased stealth, new military UAVs are also taking on increased combat roles. BAE's Taranis is being developed as the first unmanned jet fighter, being able to attack both ground and air targets.

On the commercial front UAVs are being developed that can monitor



# Operating Conditions

## Technology and Systems continued

weather, act as communication relays (also used for the military), deliver cargo and carry out search and rescue missions, among other tasks.

Over the past five years, there has also been a rapid change in the propulsion systems used by UAVs. Currently, turboprop

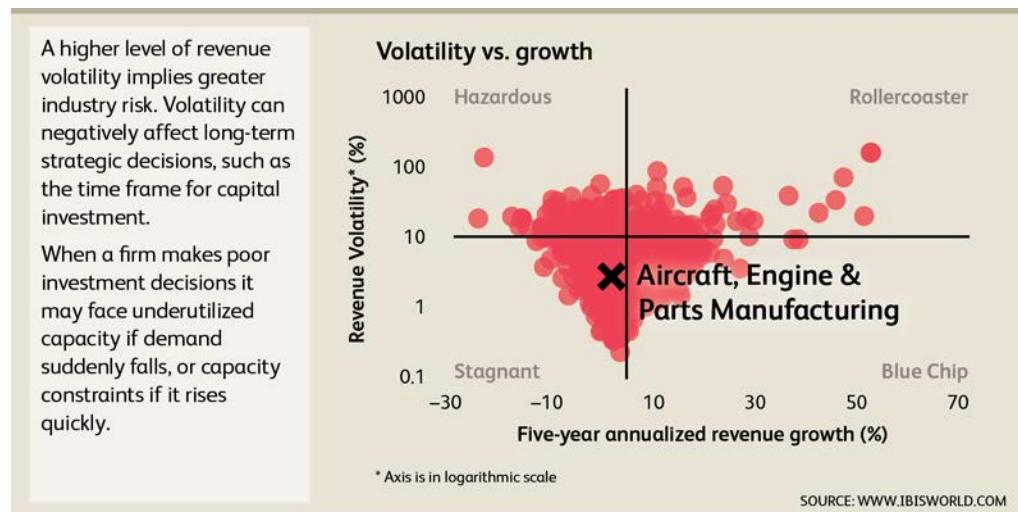
engines power most UAVs. However, the development of UAVs for higher altitude or contested airspace missions has increased the use of jet engines. Manufacturers are also increasingly turning to alternative sources of propulsion such as solar and even hydrogen power.

## Revenue Volatility

Level  
The level of volatility is **Medium**

The level of volatility is moderate based on the absolute changes in revenue year-to-year. Recently, when military spending dropped, strong demand from a recovered air transportation market helped the commercial aircraft sector mitigate losses from a weaker military

market. In general, long-term contracts, a healthy backlog and a strong replacement and servicing market help reduce volatility. Over the coming years, volatility is forecast to decline low as a large backlog of commercial aircraft orders keeps revenue coming in.



## Regulation and Policy

Level & Trend  
The level of Regulation is **Heavy** and the trend is **Increasing**

The Aircraft, Engine and Parts Manufacturing industry is highly regulated. Due to the fatal nature of aircraft accidents, everything from the manufacturing process to airworthiness and repair procedures come under strict government oversight.

### Civil regulation

In the United States, commercial aircraft products are required to comply with Federal Aviation Administration

regulations governing production and quality systems, airworthiness and installation approvals, repair procedures and continuing operational safety. Rules pertaining to the certification of aircraft and airworthiness standards are under Title 14 of the Federal Aviation Rules. Provisions within this title include: production certificates, airworthiness certificates, export airworthiness approvals and approval of engines, materials, parts, processes and

# Operating Conditions

## Regulation and Policy continued

appliances. The Parts Manufacturer Approval is a combined design and production approval for modification and replacement parts. It enables a manufacturer to manufacture and sell these parts for installation on type-certified products.

Internationally, similar requirements exist for airworthiness, installation and operational approvals. Furthermore, these requirements are generally administered by the national aviation authorities of individual nations and, in the case of Europe, coordinated by the European Joint Aviation Authorities. Compliance with these regulators and regulations is vital to US manufacturers because of the export-intensive nature of the industry.

The FAA also heavily regulates the domestic operation of UAVs. Currently, hobbyist or recreational use of UAVs is permitted as long as the UAV is flown at an altitude of less than 400 feet, is within sight of the operator and stays clear of people, stadiums, airports and other objects (recent requirements also force hobbyist to register their drones). However, civil, public and commercial use of UAVs in US airspace is far more restricted. In 2015, as part of a 2012 Congressional order, the FAA gave a notice of proposed rulemaking outlining how it intends to regulate small UAVs for commercial use. The now in effect rules include the restriction of UAV flights to daytime and within the visual-line-of-sight and require pilot certification.

### International standards

Industry operators also usually comply with domestic and international nongovernmental standards and certifications. For instance, certification through the International Aerospace Quality Group is prominent for players in the international aerospace industry. The main standard is referred to as: AS 9100 in the Americas, EN 9100 in Europe and

JISQ 9100 in Asia. The certification serves to identify recognized suppliers in the aerospace sector and harmonize world aerospace standards. The standards were developed from the International Organization for Standardization's ISO 9000 standards.

### Government procurement and defense regulation

Government contracts are heavily regulated and manufacturers deal with numerous US government agencies and entities, including all the branches of the US military, NASA and Homeland Security. Similar government authorities exist in international markets. All federal procurement must comply with federal acquisition regulation (FAR). These regulations govern the policies and procedures for acquisition, including planning, contract formation and contract administration. To obtain contracts, companies have to comply with FAR. Moreover, many agencies could alter or expand on FAR through supplements. For example, the Defense Federal Acquisition Regulation is a FAR supplement governing military-related acquisitions.

Due to the sensitive nature of the industry's military-related projects, there are multiple regulations that provide the government with oversight of defense contractors. The National Industrial Security Program (NISP) is the government-wide authority for managing the needs of the private sector to access classified government information. NISP is implemented by the Department of Defense's Defense Security Service (DSS). The DSS is responsible for personnel security investigations, supervising industrial security, and performing security education and awareness training. This includes clearing and evaluating contractors' facilities to handle sensitive information and acting as a liaison between the government and private contractors regarding classified

# Operating Conditions

## Regulation and Policy continued

information. The DSS is also responsible for security oversight and clearance of companies operating under foreign ownership, control or influence (FOCI). In FOCI companies, a foreign interest has either the direct or indirect power to decide matters affecting the management or operations of the company in a manner which may result in unauthorized access to classified information or may adversely affect the performance of classified contracts.

The foreign sale of the industry's military-related equipment is also heavily regulated. The Arms Export Control Act (AECA) gives the president authority to control the import and export of defense articles and defense services. The Act also places certain restrictions on American arms traders and manufacturers, prohibiting them from the sale of sensitive technologies to certain parties and requiring documentation of such trades to allies. The implementation of the AECA is done through International Traffic in Arms Regulations (ITAR) which control the sale of items on the US Munitions List, which is a list of articles, services and related technology designated as defense- and space-related by the government. Under the act, the US Department of State's Directorate of Defense Trade Controls is responsible for enforcing and interpreting the sale of items on the munitions list. This includes reviewing all munitions list items that are being exported and ensuring these items are not transferred to unauthorized third parties. All arms traders and industry manufacturers have to register with the Department of State.

The Bureau of Industry and Security under the US Department of Commerce controls goods and technology that have both civilian and military strategic use through the Export Administration Act. Industry goods under the Department of

Commerce oversight are far less restricted. Both the Obama and Trump administrations have sought to loosen arms export regulations, moving thousands of items off the US Munitions List and put them under the Department of Commerce oversight to boost US defense-related exports, including many industry products.

Many UAVs are also covered by the Missile Technology Control Regime (MTCR), an informal grouping of 34 countries designed to prevent the proliferation of systems capable of delivering weapons of mass destruction. The regime requires State and Commerce Department authorization to export UAVs that can fly farther than 300 kilometers and carry more than 500 kilograms. Under MTCR guidelines, export of UAVs carries a "strong presumption of denial" of an export license. However, in early 2015, the Obama administration lightened restrictions on UAV exports. The new policy, the details of which are still classified, permits export sales of UAVs, even armed ones, to allies through government programs and with the recipient nation's agreement to "end use assurances." The Trump administration has further reduced this regulation by permitting contractors to go through direct commercial sales instead of foreign military sales (a process by which the Pentagon acts as the middleman) and eliminating rules that classify unarmed UAVs with laser designators as strike enabling, which reduces their MTCR oversight.

In addition to these regulations, operators wishing to export industry products for both civilian and defense-related purposes have to comply with the Foreign Corrupt Practices Act, which prohibits bribery of foreign persons to win or retain business.

# Operating Conditions

## Industry Assistance

### Level & Trend

The level of Industry Assistance is **Medium** and the trend is **Steady**

The United States has been heavily involved in supporting the development, production, marketing and sale of aircraft and their components. Support is provided for a variety of reasons, such as to create employment, avoid dependence, stimulate technical and economic growth, and foster national prestige.

The government provides numerous tax benefits for companies within the Aircraft, Engine and Parts Manufacturing industry. Some of these incentives include: the FSC Repeal and Extraterritorial Income Exclusion Act of 2000 and government funding; and tax-related incentives including grants and funding to start-up companies in this industry. The FSC act provides favorable tax treatment to goods manufactured in the United States and goods manufactured by US-owned companies operating overseas. In addition, in response to the declining availability of financing in traditional

capital markets, the Export-Import Bank of the United States has dramatically increased its financial support of US aircraft exports worldwide.

In the defense sector, the government typically helps cover the costs associated with technology and product development. In addition, strict regulations for defense contractors makes it more difficult for competition to arise. Lastly, the United States may help the industry sell to foreign countries by negotiating contracts and providing financing to purchasing governments.

There are no tariffs imposed on aircraft or aircraft parts in the United States; however, tariffs are applicable from countries that the United States has no official trade relations with, such as Cuba and North Korea. In addition, high tariffs may be imposed on industry products for multiple reasons, such as anti-dumping actions.

# Key Statistics

## Industry Data

	Revenue (\$m)	Industry Value Added (\$m)	Establishments	Enterprises	Employment	Exports (\$m)	Imports (\$m)	Wages (\$m)	Domestic Demand	Federal funding for defense (\$b)
2010	173,056.7	45,460.9	1,620	1,297	320,877	75,848.0	31,446.0	28,142.0	128,654.7	721.6
2011	178,912.1	49,757.1	1,590	1,278	335,204	82,716.4	35,371.3	29,570.3	131,567.0	719.1
2012	208,241.4	55,178.2	1,628	1,326	357,809	98,387.7	40,926.2	31,383.3	150,779.9	677.9
2013	218,989.7	55,681.9	1,616	1,321	356,871	106,699.8	46,300.2	31,358.1	158,590.1	622.5
2014	229,902.0	58,535.2	1,647	1,343	357,668	113,998.1	51,732.1	32,121.5	167,636.0	582.1
2015	226,648.7	58,695.5	1,699	1,357	351,722	118,597.9	52,588.6	31,854.1	160,639.4	562.7
2016	221,648.1	56,286.8	1,711	1,366	351,934	118,042.6	47,071.1	31,361.4	150,676.6	560.1
2017	225,169.3	61,529.7	1,731	1,381	356,413	111,306.2	47,926.7	31,780.3	161,789.8	554.7
2018	234,754.3	63,629.5	1,771	1,411	368,247	116,672.0	52,517.8	32,895.2	170,600.1	573.2
2019	240,537.7	65,282.5	1,805	1,437	376,126	120,979.3	52,258.2	33,620.1	171,816.6	614.7
2020	249,554.0	67,619.9	1,848	1,470	386,933	126,137.7	53,560.2	34,644.9	176,976.5	662.6
2021	255,839.7	69,242.7	1,888	1,501	395,369	129,444.9	54,773.7	35,423.7	181,168.5	684.5
2022	261,372.8	70,730.8	1,927	1,531	403,270	132,466.5	55,727.7	36,143.3	184,634.0	691.4
2023	267,018.5	72,308.3	1,964	1,561	411,667	135,497.9	56,755.6	36,901.5	188,276.2	698.1
2024	272,629.7	73,884.0	2,004	1,592	420,400	138,227.5	58,069.8	37,682.8	192,472.0	704.8
Sector Rank	3/193	1/193	60/193	61/193	2/193	1/184	6/184	1/193	6/184	N/A
Economy Rank	43/694	39/694	499/694	479/694	87/694	1/216	7/216	38/694	7/216	N/A

## Annual Change

	Revenue (%)	Industry Value Added (%)	Establishments (%)	Enterprises (%)	Employment (%)	Exports (%)	Imports (%)	Wages (%)	Domestic Demand (%)	Federal funding for defense (%)
2011	3.4	9.5	-1.9	-1.5	4.5	9.1	12.5	5.1	2.3	-0.3
2012	16.4	10.9	2.4	3.8	6.7	18.9	15.7	6.1	14.6	-5.7
2013	5.2	0.9	-0.7	-0.4	-0.3	8.4	13.1	-0.1	5.2	-8.2
2014	5.0	5.1	1.9	1.7	0.2	6.8	11.7	2.4	5.7	-6.5
2015	-1.4	0.3	3.2	1.0	-1.7	4.0	1.7	-0.8	-4.2	-3.3
2016	-2.2	-4.1	0.7	0.7	0.1	-0.5	-10.5	-1.5	-6.2	-0.5
2017	1.6	9.3	1.2	1.1	1.3	-5.7	1.8	1.3	7.4	-1.0
2018	4.3	3.4	2.3	2.2	3.3	4.8	9.6	3.5	5.4	3.3
2019	2.5	2.6	1.9	1.8	2.1	3.7	-0.5	2.2	0.7	7.2
2020	3.7	3.6	2.4	2.3	2.9	4.3	2.5	3.0	3.0	7.8
2021	2.5	2.4	2.2	2.1	2.2	2.6	2.3	2.2	2.4	3.3
2022	2.2	2.1	2.1	2.0	2.0	2.3	1.7	2.0	1.9	1.0
2023	2.2	2.2	1.9	2.0	2.1	2.3	1.8	2.1	2.0	1.0
2024	2.1	2.2	2.0	2.0	2.1	2.0	2.3	2.1	2.2	1.0
Sector Rank	12/193	19/193	49/193	65/193	62/193	88/184	156/184	24/193	18/184	N/A
Economy Rank	36/694	52/694	239/694	311/694	313/694	97/216	183/216	136/694	21/216	N/A

## Key Ratios

	IVA/Revenue (%)	Imports/Demand (%)	Exports/Revenue (%)	Revenue per Employee (\$'000)	Wages/Revenue (%)	Employees per Est.	Average Wage (\$)	Share of the Economy (%)
2010	26.27	24.44	43.83	539.32	16.26	198.07	87,703.39	0.29
2011	27.81	26.88	46.23	533.74	16.53	210.82	88,215.83	0.31
2012	26.50	27.14	47.25	581.99	15.07	219.78	87,709.64	0.34
2013	25.43	29.19	48.72	613.64	14.32	220.84	87,869.57	0.34
2014	25.46	30.86	49.59	642.78	13.97	217.16	89,808.15	0.35
2015	25.90	32.74	52.33	644.40	14.05	207.02	90,566.13	0.34
2016	25.39	31.24	53.26	629.80	14.15	205.69	89,111.59	0.32
2017	27.33	29.62	49.43	631.77	14.11	205.90	89,167.06	0.34
2018	27.10	30.78	49.70	637.49	14.01	207.93	89,329.17	0.34
2019	27.14	30.42	50.30	639.51	13.98	208.38	89,385.21	0.34
2020	27.10	30.26	50.55	644.95	13.88	209.38	89,537.21	0.35
2021	27.06	30.23	50.60	647.09	13.85	209.41	89,596.55	0.35
2022	27.06	30.18	50.68	648.13	13.83	209.27	89,625.56	0.35
2023	27.08	30.14	50.74	648.63	13.82	209.61	89,639.20	0.35
2024	27.10	30.17	50.70	648.50	13.82	209.78	89,635.59	0.36
Sector Rank	13/193	67/184	12/184	66/193	43/193	8/193	5/193	1/193
Economy Rank	284/694	75/216	16/216	188/694	297/694	19/694	44/694	39/694

Figures are in inflation-adjusted 2019 dollars. Rank refers to 2019 data.

SOURCE: WWW.IBISWORLD.COM

Provided to: Research Consultants International (2134123247) | 14 October 2019

## Industry Financial Ratios

	Apr 2014 - Mar 2015	Apr 2015 - Mar 2016	Apr 2016 - Mar 2017	Apr 2017 - Mar 2018	Apr 2017 - Mar 2018 by company revenue		
					Small (<\$10m)	Medium (\$10-50m)	Large (>\$50m)
<b>Liquidity Ratios</b>							
Current Ratio	2.2	2.3	2.3	2.3	2.0	2.5	2.6
Quick Ratio	0.9	0.9	0.9	1.0	1.0	1.0	1.0
Sales / Receivables (Trade Receivables Turnover)	8.2	8.0	8.1	7.6	9.1	7.6	6.7
Days' Receivables	44.5	45.6	45.1	48.0	40.1	48.0	54.5
Cost of Sales / Inventory (Inventory Turnover)	3.3	3.1	3.2	3.0	3.4	2.7	3.5
Days' Inventory	110.6	117.7	114.1	121.7	107.4	135.2	104.3
Cost of Sales / Payables (Payables Turnover)	12.4	12.0	12.7	11.3	11.9	11.1	11.6
Days' Payables	29.4	30.4	28.7	32.3	30.7	32.9	31.5
Sales / Working Capital	4.6	4.4	4.2	3.9	5.0	3.8	3.8
<b>Coverage Ratios</b>							
Earnings Before Interest & Taxes (EBIT) / Interest	6.1	5.2	4.3	4.9	5.3	5.1	2.1
Net Profit + Dep., Depletion, Amort. / Current Maturities LT Debt	3.4	2.8	4.4	2.4	2.3	3.0	1.6
<b>Leverage Ratios</b>							
Fixed Assets / Net Worth	0.5	0.5	0.5	0.5	0.4	0.5	1.1
Debt / Net Worth	1.0	1.1	1.5	1.4	1.6	1.2	3.5
Tangible Net Worth	37.4	34.1	30.0	35.7	33.5	41.1	25.0
<b>Operating Ratios</b>							
Profit before Taxes / Net Worth, %	16.5	17.6	17.3	20.1	21.3	19.1	19.6
Profit before Taxes / Total Assets, %	7.1	6.9	6.1	6.1	7.5	7.1	4.1
Sales / Net Fixed Assets	8.7	9.0	7.8	6.9	9.2	6.7	5.9
Sales / Total Assets (Asset Turnover)	1.4	1.4	1.3	1.3	1.5	1.2	1.1
<b>Cash Flow &amp; Debt Service Ratios (% of sales)</b>							
Cash from Trading	29.4	28.7	27.4	29.6	36.8	27.5	19.1
Cash after Operations	8.0	7.5	7.1	8.3	9.4	7.7	8.4
Net Cash after Operations	7.7	6.6	6.8	7.9	7.6	7.9	8.0
Cash after Debt Amortization	1.0	-0.1	1.7	1.1	1.4	1.0	2.5
Debt Service P&I Coverage	2.1	1.8	2.1	2.5	2.9	2.6	1.2
Interest Coverage (Operating Cash)	7.8	5.6	4.9	6.4	6.2	7.3	4.0
<b>Assets, %</b>							
Cash & Equivalents	9.5	9.8	9.4	10.5	11.7	10.8	7.7
Trade Receivables (net)	18.9	18.7	18.2	18.4	19.0	18.5	17.4
Inventory	33.0	32.3	31.7	30.7	30.3	32.2	27.3
All Other Current Assets	4.1	3.6	3.4	5.0	4.0	4.8	6.9
Total Current Assets	65.6	64.3	62.7	64.6	64.9	66.3	59.3
Fixed Assets (net)	20.5	20.7	21.9	21.8	24.1	21.1	20.2
Intangibles (net)	9.4	9.3	10.4	8.9	4.5	8.0	17.6
All Other Non-Current Assets	4.6	5.7	5.1	4.8	6.5	4.5	2.9
Total Assets	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total Assets (\$m)	10,046.5	12,058.2	9,693.5	10,979.3	374.9	4,147.0	6,457.5
<b>Liabilities, %</b>							
Notes Payable-Short Term	9.2	8.9	9.1	7.5	9.9	7.2	4.5
Current Maturities L/T/D	3.0	3.8	3.0	3.6	6.0	2.8	1.9
Trade Payables	9.8	8.9	9.7	10.1	11.0	9.5	10.1
Income Taxes Payable	0.3	0.2	0.1	0.3	0.2	0.4	0.2
All Other Current Liabilities	9.1	9.8	10.7	8.9	8.2	9.2	9.2
Total Current Liabilities	31.5	31.6	32.6	30.3	35.3	29.1	25.9
Long Term Debt	14.3	17.4	18.4	18.4	19.1	15.0	26.4
Deferred Taxes	0.8	0.6	0.6	0.6	0.1	0.7	1.1
All Other Non-Current Liabilities	6.5	7.1	8.0	6.1	7.5	6.1	4.1
Net Worth	46.8	43.4	40.4	44.6	38.0	49.1	42.6
Total Liabilities & Net Worth (\$m)	10,046.5	12,058.2	9,693.5	10,979.3	374.9	4,147.0	6,457.5
Maximum Number of Statements Used	293	325	261	277	81	142	54

**Source:** RMA Annual Statement Studies, [rmahq.org](http://rmahq.org). RMA data for all industries is derived directly from more than 260,000 statements of member financial institutions' borrowers and prospects.

**Note:** For a full description of the ratios refer to the Key Statistics chapter online.





# Jargon & Glossary

## Industry Jargon

**787** The Boeing Company's class of commercial passenger aircraft that experienced production delays before beginning service and has since suffered equipment failures and a global grounding.

**LARGE COMMERCIAL AIRCRAFT** Large commercial aircraft are the largest category of commercial planes and can carry large amounts of passengers.

### ORIGINAL EQUIPMENT MANUFACTURER (OEM)

Operators that assemble complete aircraft, which they sell under their name. Examples include The Boeing Company, Lockheed Martin Corporation and Northrup Grumman Corporation.

**UNMANNED AERIAL VEHICLES (UAV)** Aircraft that fly without a human crew on board.

## IBISWorld Glossary

**BARRIERS TO ENTRY** High barriers to entry mean that new companies struggle to enter an industry, while low barriers mean it is easy for new companies to enter an industry.

**CAPITAL INTENSITY** Compares the amount of money spent on capital (plant, machinery and equipment) with that spent on labor. IBISWorld uses the ratio of depreciation to wages as a proxy for capital intensity. High capital intensity is more than \$0.333 of capital to \$1 of labor; medium is \$0.125 to \$0.333 of capital to \$1 of labor; low is less than \$0.125 of capital for every \$1 of labor.

**CONSTANT PRICES** The dollar figures in the Key Statistics table, including forecasts, are adjusted for inflation using the current year (i.e. year published) as the base year. This removes the impact of changes in the purchasing power of the dollar, leaving only the "real" growth or decline in industry metrics. The inflation adjustments in IBISWorld's reports are made using the US Bureau of Economic Analysis' implicit GDP price deflator.

**DOMESTIC DEMAND** Spending on industry goods and services within the United States, regardless of their country of origin. It is derived by adding imports to industry revenue, and then subtracting exports.

**EMPLOYMENT** The number of permanent, part-time, temporary and seasonal employees, working proprietors, partners, managers and executives within the industry.

**ENTERPRISE** A division that is separately managed and keeps management accounts. Each enterprise consists of one or more establishments that are under common ownership or control.

**ESTABLISHMENT** The smallest type of accounting unit within an enterprise, an establishment is a single physical location where business is conducted or where services or industrial operations are performed. Multiple establishments under common control make up an enterprise.

**EXPORTS** Total value of industry goods and services sold by US companies to customers abroad.

**IMPORTS** Total value of industry goods and services brought in from foreign countries to be sold in the United States.

**INDUSTRY CONCENTRATION** An indicator of the dominance of the top four players in an industry. Concentration is considered high if the top players account for more than 70 % of industry revenue. Medium is 40 % to 70 % of industry revenue. Low is less than 40 %.

**INDUSTRY REVENUE** The total sales of industry goods and services (exclusive of excise and sales tax); subsidies on production; all other operating income from outside the firm (such as commission income, repair and service income, and rent, leasing and hiring income); and capital work done by rental or lease. Receipts from interest royalties, dividends and the sale of fixed tangible assets are excluded.

**INDUSTRY VALUE ADDED (IVA)** The market value of goods and services produced by the industry minus the cost of goods and services used in production. IVA is also described as the industry's contribution to GDP, or profit plus wages and depreciation.

**INTERNATIONAL TRADE** The level of international trade is determined by ratios of exports to revenue and imports to domestic demand. For exports/revenue: low is less than 5 % , medium is 5 % to 20 % , and high is more than 20 % . Imports/domestic demand: low is less than 5 % , medium is 5 % to 35 % , and high is more than 35 % .

**LIFE CYCLE** All industries go through periods of growth, maturity and decline. IBISWorld determines an industry's life cycle by considering its growth rate (measured by IVA) compared with GDP; the growth rate of the number of establishments; the amount of change the industry's products are undergoing; the rate of technological change; and the level of customer acceptance of industry products and services.

**NONEMPLOYING ESTABLISHMENT** Businesses with no paid employment or payroll, also known as nonemployers. These are mostly set up by self-employed individuals.

**PROFIT** IBISWorld uses earnings before interest and tax (EBIT) as an indicator of a company's profitability. It is calculated as revenue minus expenses, excluding interest and tax.

**VOLATILITY** The level of volatility is determined by averaging the absolute change in revenue in each of the past five years. Volatility levels: very high is more than  $\pm 20\%$ ; high volatility is  $\pm 10\%$  to  $\pm 20\%$ ; moderate volatility is  $\pm 3\%$  to  $\pm 10\%$ ; and low volatility is less than  $\pm 3\%$ .

**WAGES** The gross total wages and salaries of all employees in the industry. The cost of benefits is also included in this figure.

# At IBISWorld we know that industry intelligence is more than assembling facts

## It is combining data with analysis to answer the questions that successful businesses ask

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Identify high growth, emerging & shrinking markets  
Arm yourself with the latest industry intelligence  
Assess competitive threats from existing & new entrants  
Benchmark your performance against the competition  
Make speedy market-ready, profit-maximizing decisions

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### Who is IBISWorld?

We are strategists, analysts, researchers, and marketers. We provide answers to information-hungry, time-poor businesses. Our goal is to provide real world answers that matter to your business in our 700 US industry reports. When tough strategic, budget, sales and marketing decisions need to be made, our suite of Industry and Risk intelligence products give you deeply-researched answers quickly.

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Region Name	2016 Employment	2016 Establishments
Seattle, WA Metropolitan Area	93390	99
Los Angeles, CA Metropolitan Area	41894	237
Dallas, TX Metropolitan Area	41004	91
Wichita, KS Metropolitan Area	33267	80
Hartford, CT Metropolitan Area	20607	65
St. Louis, MO Metropolitan Area	18756	18
Phoenix, AZ Metropolitan Area	14788	77
San Diego, CA Metropolitan Area	14257	49
Philadelphia, PA Metropolitan Area	13911	36
Bridgeport, CT Metropolitan Area	9328	12
Tucson, AZ Metropolitan Area	8634	16
New York, NY Metropolitan Area	8333	94
Baltimore, MD Metropolitan Area	8250	10
Atlanta, GA Metropolitan Area	8143	16
Denver, CO Metropolitan Area	7949	15
Boston, MA Metropolitan Area	7817	51
San Jose, CA Metropolitan Area	7656	17
Charleston, SC Metropolitan Area	7560	7
Manchester, NH Metropolitan Area	7560	7
Savannah, GA Metropolitan Area	7560	4
Cedar Rapids, IA Metropolitan Area	7500	2
Tulsa, OK Metropolitan Area	6010	34
Washington, DC Metropolitan Area	5124	24
Salt Lake City, UT Metropolitan Area	5050	13
Palm Bay, FL Metropolitan Area	4601	10
Kansas City, MO Metropolitan Area	4457	14
Cincinnati, OH Metropolitan Area	4421	22
Indianapolis, IN Metropolitan Area	4195	15
Tampa, FL Metropolitan Area	3916	27
Ogden, UT Metropolitan Area	3905	13
Orlando, FL Metropolitan Area	3894	16
Rockford, IL Metropolitan Area	3560	5
Portland, OR Metropolitan Area	3402	20
Chicago, IL Metropolitan Area	3392	23
Minneapolis, MN Metropolitan Area	3381	26
Santa Maria, CA Metropolitan Area	3323	9
Miami, FL Metropolitan Area	3205	81
Cleveland, OH Metropolitan Area	3124	29
Waco, TX Metropolitan Area	2735	6
Huntsville, AL Metropolitan Area	2675	10
Grand Rapids, MI Metropolitan Area	2545	9
Sacramento, CA Metropolitan Area	2420	10
Little Rock, AR Metropolitan Area	2409	8
Riverside, CA Metropolitan Area	2186	40
Portland, ME Metropolitan Area	2005	5
Buffalo, NY Metropolitan Area	1935	5

Detroit, MI Metropolitan Area	1935	28
San Antonio, TX Metropolitan Area	1931	15
Dayton, OH Metropolitan Area	1818	13
El Centro, CA Metropolitan Area	1760	2
Binghamton, NY Metropolitan Area	1760	2
Rutland, VT Micropolitan Area	1750	1
Pittsfield, MA Metropolitan Area	1750	1
Jacksonville, FL Metropolitan Area	1644	12
Camden, AR Micropolitan Area	1500	4
Greenville, SC Metropolitan Area	1413	6
Albuquerque, NM Metropolitan Area	1322	14
Rochester, NY Metropolitan Area	1247	8
Crestview, FL Metropolitan Area	1185	5
Akron, OH Metropolitan Area	1184	10
Bakersfield, CA Metropolitan Area	1135	5
Asheville, NC Metropolitan Area	1125	2
Mobile, AL Metropolitan Area	1125	4
Daphne, AL Metropolitan Area	1075	5
Houston, TX Metropolitan Area	960	16
Austin, TX Metropolitan Area	945	8
Greensboro, NC Metropolitan Area	945	6
Clarksburg, WV Micropolitan Area	925	2
New Haven, CT Metropolitan Area	913	15
Spokane, WA Metropolitan Area	863	10
Columbus, GA Metropolitan Area	810	4
Montgomery, AL Metropolitan Area	810	3
Salem, OR Metropolitan Area	810	3
Nashville, TN Metropolitan Area	780	5
Providence, RI Metropolitan Area	770	8
Sebastian, FL Metropolitan Area	760	2
Arkansas City, KS Micropolitan Area	760	3
Bellingham, WA Metropolitan Area	760	3
Douglas, GA Micropolitan Area	760	2
Muskegon, MI Metropolitan Area	760	2
Salisbury, MD Metropolitan Area	750	3
Fort Wayne, IN Metropolitan Area	750	3
Concord, NH Micropolitan Area	750	1
Iowa City, IA Metropolitan Area	750	1
Charlottesville, VA Metropolitan Area	750	2
Decatur, AL Metropolitan Area	750	1
South Bend, IN Metropolitan Area	750	4
Blacksburg, VA Metropolitan Area	750	2
Cumberland, MD Metropolitan Area	750	1
Port St. Lucie, FL Metropolitan Area	750	4
Wilmington, NC Metropolitan Area	750	1
Troy, AL Micropolitan Area	750	1
Wilson, NC Micropolitan Area	750	1

Milledgeville, GA Micropolitan Area	750	1
Roanoke, VA Metropolitan Area	750	1
Davenport, IA Metropolitan Area	750	2
Amarillo, TX Metropolitan Area	750	1
Terre Haute, IN Metropolitan Area	750	2
Urbana, OH Micropolitan Area	750	1
Madisonville, KY Micropolitan Area	750	1
San Francisco, CA Metropolitan Area	733	16
Hot Springs, AR Metropolitan Area	610	4
Sandpoint, ID Micropolitan Area	608	5
Mount Vernon, WA Metropolitan Area	474	6
Deltona, FL Metropolitan Area	455	9
Worcester, MA Metropolitan Area	445	4
Duluth, MN Metropolitan Area	435	3
Coffeyville, KS Micropolitan Area	435	2
Durham, NC Metropolitan Area	435	2
Prescott, AZ Metropolitan Area	410	5
Santa Rosa, CA Metropolitan Area	380	5
Oxnard, CA Metropolitan Area	378	15
Stockton, CA Metropolitan Area	375	2
Kinston, NC Micropolitan Area	375	1
Johnstown, PA Metropolitan Area	375	1
McAlester, OK Micropolitan Area	375	1
Columbus, OH Metropolitan Area	375	5
Williamsport, PA Metropolitan Area	375	1
Magnolia, AR Micropolitan Area	375	3
Dothan, AL Metropolitan Area	375	1
Tullahoma, TN Micropolitan Area	375	3
McAllen, TX Metropolitan Area	375	1
Louisville/Jefferson County, KY Metropolitan Ar	375	1
Danville, IL Metropolitan Area	375	2
Des Moines, IA Metropolitan Area	375	1
Rocky Mount, NC Metropolitan Area	375	1
Lansing, MI Metropolitan Area	375	2
Syracuse, NY Metropolitan Area	375	2
North Port, FL Metropolitan Area	357	8
Milwaukee, WI Metropolitan Area	355	8
Bend, OR Metropolitan Area	353	12
Charlotte, NC Metropolitan Area	312	10
Oklahoma City, OK Metropolitan Area	306	13
Gulfport, MS Metropolitan Area	295	3
Toledo, OH Metropolitan Area	295	6
Scranton, PA Metropolitan Area	264	5
Springfield, MA Metropolitan Area	245	5
Boulder, CO Metropolitan Area	245	3
Anniston, AL Metropolitan Area	235	2
Carson City, NV Metropolitan Area	235	4

Reading, PA Metropolitan Area	235	3
Dublin, GA Micropolitan Area	235	2
Orangeburg, SC Micropolitan Area	235	2
Visalia, CA Metropolitan Area	235	2
Wichita Falls, TX Metropolitan Area	235	3
Fayetteville, AR Metropolitan Area	195	4
Memphis, TN Metropolitan Area	191	7
Fresno, CA Metropolitan Area	185	3
Yakima, WA Metropolitan Area	185	2
Lancaster, PA Metropolitan Area	185	2
Niles, MI Metropolitan Area	185	2
Richmond, VA Metropolitan Area	185	2
Racine, WI Metropolitan Area	180	5
Thomasville, GA Micropolitan Area	175	1
Cullman, AL Micropolitan Area	175	1
Shelby, NC Micropolitan Area	175	1
New Orleans, LA Metropolitan Area	175	1
Kerrville, TX Micropolitan Area	175	1
Barnstable Town, MA Metropolitan Area	175	2
Stillwater, OK Micropolitan Area	175	1
Kearney, NE Micropolitan Area	175	1
Lincoln, NE Metropolitan Area	175	1
Ithaca, NY Metropolitan Area	175	2
Helena, MT Micropolitan Area	175	2
Longview, WA Metropolitan Area	175	1
Goldsboro, NC Metropolitan Area	175	2
Grand Forks, ND Metropolitan Area	175	1
Port Angeles, WA Micropolitan Area	175	1
Marinette, WI Micropolitan Area	175	1
Brownsville, TX Metropolitan Area	175	1
Elkhart, IN Metropolitan Area	175	1
Kingsport, TN Metropolitan Area	175	1
Albany, GA Metropolitan Area	175	1
Parsons, KS Micropolitan Area	175	1
Eugene, OR Metropolitan Area	175	3
Vallejo, CA Metropolitan Area	175	1
Athens, GA Metropolitan Area	175	1
Angola, IN Micropolitan Area	175	1
Meadville, PA Micropolitan Area	175	1
Naples, FL Metropolitan Area	175	1
Danville, KY Micropolitan Area	175	1
Claremont, NH Micropolitan Area	175	2
Pueblo, CO Metropolitan Area	175	1
Cedar City, UT Micropolitan Area	175	2
Coeur d'Alene, ID Metropolitan Area	152	3
Lafayette, LA Metropolitan Area	130	4
Pittsburgh, PA Metropolitan Area	130	4



Beaumont, TX Metropolitan Area	120	2
Ocala, FL Metropolitan Area	120	2
Gainesville, FL Metropolitan Area	120	2
Fort Collins, CO Metropolitan Area	102	6
Lake Havasu City, AZ Metropolitan Area	89	4
Colorado Springs, CO Metropolitan Area	80	4
Las Vegas, NV Metropolitan Area	80	4
Lakeland, FL Metropolitan Area	80	4
Cape Coral, FL Metropolitan Area	80	4
Lawrence, KS Metropolitan Area	80	3
Anchorage, AK Metropolitan Area	78	7
Owensboro, KY Metropolitan Area	70	2
Knoxville, TN Metropolitan Area	70	4
Albany, NY Metropolitan Area	70	3
Warner Robins, GA Metropolitan Area	70	5
Hays, KS Micropolitan Area	70	2
Oshkosh, WI Metropolitan Area	70	2
Virginia Beach, VA Metropolitan Area	70	2
Pensacola, FL Metropolitan Area	70	4
Springfield, MO Metropolitan Area	70	2
Battle Creek, MI Metropolitan Area	70	2
Ann Arbor, MI Metropolitan Area	70	2
Urban Honolulu, HI Metropolitan Area	70	3
Santa Cruz, CA Metropolitan Area	70	3
Janesville, WI Metropolitan Area	60	1
Columbus, MS Micropolitan Area	60	1
Billings, MT Metropolitan Area	60	1
Riverton, WY Micropolitan Area	60	1
Mason City, IA Micropolitan Area	60	1
Burlington, NC Metropolitan Area	60	1
Fremont, NE Micropolitan Area	60	1
Peoria, IL Metropolitan Area	60	1
Somerset, KY Micropolitan Area	60	1
Medford, OR Metropolitan Area	60	1
Burlington, VT Metropolitan Area	60	1
Moultrie, GA Micropolitan Area	60	1
Fergus Falls, MN Micropolitan Area	60	1
Eau Claire, WI Metropolitan Area	60	2
California, MD Metropolitan Area	60	1
Missoula, MT Metropolitan Area	60	1
Canton, OH Metropolitan Area	60	1
Elizabeth City, NC Micropolitan Area	60	1
LaGrange, GA Micropolitan Area	60	1
Montrose, CO Micropolitan Area	60	2
Raleigh, NC Metropolitan Area	60	2
Whitewater, WI Micropolitan Area	60	1
Durant, OK Micropolitan Area	60	2

Crescent City, CA Micropolitan Area	60	1
Bemidji, MN Micropolitan Area	60	1
Minot, ND Micropolitan Area	60	1
Erie, PA Metropolitan Area	60	1
Talladega, AL Micropolitan Area	60	1
Barre, VT Micropolitan Area	60	2
Fargo, ND Metropolitan Area	60	2
Ozark, AL Micropolitan Area	60	2
Tiffin, OH Micropolitan Area	60	1
Allentown, PA Metropolitan Area	60	2
Saginaw, MI Metropolitan Area	60	1
Coshocton, OH Micropolitan Area	60	1
Norwich, CT Metropolitan Area	60	1
Hood River, OR Micropolitan Area	60	2
Dunn, NC Micropolitan Area	60	1
Florence, AL Metropolitan Area	60	1
Uvalde, TX Micropolitan Area	60	2
Winston, NC Metropolitan Area	60	1
Olympia, WA Metropolitan Area	60	1
Abilene, TX Metropolitan Area	60	2
Longview, TX Metropolitan Area	60	1
Alma, MI Micropolitan Area	60	1
Ada, OK Micropolitan Area	60	2
Yankton, SD Micropolitan Area	60	1
Reno, NV Metropolitan Area	50	7
Las Cruces, NM Metropolitan Area	46	3
Boise City, ID Metropolitan Area	43	7
Birmingham, AL Metropolitan Area	30	4
Moses Lake, WA Micropolitan Area	20	3
Rapid City, SD Metropolitan Area	20	2
Findlay, OH Micropolitan Area	20	2
Utica, NY Metropolitan Area	20	2
Kalispell, MT Micropolitan Area	20	2
Cookeville, TN Micropolitan Area	20	2
Fallon, NV Micropolitan Area	20	2
El Paso, TX Metropolitan Area	20	2
Bowling Green, KY Metropolitan Area	20	2
Torrington, CT Micropolitan Area	20	2
San Luis Obispo, CA Metropolitan Area	20	2
Lynchburg, VA Metropolitan Area	20	2
Sioux City, IA Metropolitan Area	10	1
Shreveport, LA Metropolitan Area	10	1
Sebring, FL Metropolitan Area	10	3
Albert Lea, MN Micropolitan Area	10	1
Salinas, CA Metropolitan Area	10	2
Alexandria, MN Micropolitan Area	10	1
Coos Bay, OR Micropolitan Area	10	1

St. George, UT Metropolitan Area	10	1
Yuba City, CA Metropolitan Area	10	1
Altus, OK Micropolitan Area	10	1
Provo, UT Metropolitan Area	10	1
Danville, VA Micropolitan Area	10	1
Panama City, FL Metropolitan Area	10	1
Omaha, NE Metropolitan Area	10	1
Ocean City, NJ Metropolitan Area	10	1
Myrtle Beach, SC Metropolitan Area	10	1
El Campo, TX Micropolitan Area	10	1
Modesto, CA Metropolitan Area	10	1
Elko, NV Micropolitan Area	10	1
Ellensburg, WA Micropolitan Area	10	1
York, PA Metropolitan Area	10	1
Midland, TX Metropolitan Area	10	2
Arkadelphia, AR Micropolitan Area	10	1
Mansfield, OH Metropolitan Area	10	1
Gainesville, TX Micropolitan Area	10	1
Gloversville, NY Micropolitan Area	10	1
Wenatchee, WA Metropolitan Area	10	2
Logan, UT Metropolitan Area	10	1
Lewiston, ME Metropolitan Area	10	1
Huntington, IN Micropolitan Area	10	1
Adrian, MI Micropolitan Area	10	1
Lewiston, ID Metropolitan Area	10	1
Trenton, NJ Metropolitan Area	10	2
Laredo, TX Metropolitan Area	10	1
Albemarle, NC Micropolitan Area	10	1
Kingston, NY Metropolitan Area	10	1
Kennewick, WA Metropolitan Area	10	1
Marietta, OH Micropolitan Area	10	1
Kalamazoo, MI Metropolitan Area	10	1
Marion, IN Micropolitan Area	10	1
Kahului, HI Metropolitan Area	10	1
Joplin, MO Metropolitan Area	10	1
Houma, LA Metropolitan Area	10	1
Mexico, MO Micropolitan Area	10	1
Homosassa Springs, FL Metropolitan Area	10	1
Mineral Wells, TX Micropolitan Area	10	1
Hickory, NC Metropolitan Area	10	1
Harrisburg, PA Metropolitan Area	10	1
Big Rapids, MI Micropolitan Area	10	1
Grants Pass, OR Metropolitan Area	10	1
Newport, OR Micropolitan Area	10	1
North Platte, NE Micropolitan Area	10	1
North Vernon, IN Micropolitan Area	10	1
Flint, MI Metropolitan Area	10	1

Oxford, NC Micropolitan Area	10	1
Farmington, NM Metropolitan Area	10	1
Paris, TN Micropolitan Area	10	1
Bozeman, MT Micropolitan Area	10	1
East Stroudsburg, PA Metropolitan Area	10	2
Prineville, OR Micropolitan Area	10	2
Pullman, WA Micropolitan Area	10	1
Corvallis, OR Metropolitan Area	10	1
Rolla, MO Micropolitan Area	10	1
Roseburg, OR Micropolitan Area	10	1
Columbia, SC Metropolitan Area	10	1
College Station, TX Metropolitan Area	10	1
Chico, CA Metropolitan Area	10	1
Shelbyville, TN Micropolitan Area	10	1
Show Low, AZ Micropolitan Area	10	1
Chattanooga, TN Metropolitan Area	10	1
Sonora, CA Micropolitan Area	10	1
Charleston, WV Metropolitan Area	10	1
Sulphur Springs, TX Micropolitan Area	10	1
Carbondale, IL Metropolitan Area	10	1
Taos, NM Micropolitan Area	10	1
Bremerton, WA Metropolitan Area	10	2
Topeka, KS Metropolitan Area	10	1
Springfield, OH Metropolitan Area	10	1
Spartanburg, SC Metropolitan Area	10	1
Centralia, WA Micropolitan Area	10	1
Bay City, MI Metropolitan Area	10	1
Baton Rouge, LA Metropolitan Area	10	1
Bangor, ME Metropolitan Area	10	1
Augusta, GA Metropolitan Area	10	1
Lafayette, IN Metropolitan Area	10	1
Aerospace Vehicles and Defense Totals (Metrop	560840	2289