

# AEROSPACE & DEFENSE IN ARIZONA





# ARIZONA IS AT THE FOREFRONT OF THE AEROSPACE & DEFENSE INDUSTRY

From cybersecurity to maintenance, repair and overhaul, the Aerospace & Defense industry flourishes in Arizona.

### Sustaining and expanding the state's industry are:

- Skilled, educated talent
- Specialized manufacturing capabilities
- Pro-business regulatory climate
- Culture of innovation
- A dry, sunny climate
- Miles of wide open space
- A strong commitment to America's military

Arizona's expertise ensures the state will remain at the forefront of the Aerospace & Defense industry's most critical advances.

### BAE SYSTEMS

BAE Systems manufactures body armor at its Phoenix facility.

### ( BOEING

Boeing builds and rebuilds the U.S. Armv's Apache helicopters in Mesa.

NORTHROP GRUMMAN

Northrop Grumman is developing

unmanned aerial systems in Sierra Vista

and recently acquired Orbital ATK, a

### **GENERAL DYNAMICS**

General Dynamics Mission Systems innovates in the fields of secure communications networks, radios, satellite technology and cybersecurity at its Scottsdale facilities.

ROBERTSON

Robertson Fuel Systems

fabricates aircraft fuel

tanks in Tempe.

### Ravtheon

Raytheon's guided missiles division is headquartered in Tucson.

#### satellite, launch vehicle and armament systems manufacturer with facilities in Chandler, Gilbert and Mesa.

Honeywell Aerospace

Honeywell Aerospace is

headquartered in Phoenix and

manufactures propulsion engines

and auxiliary power units.

communications

L3 Communications builds avionics systems at its Phoenix facility.

MD Helicopters is headquartered in Phoenix and manufactures several of its helicopter models in Arizona













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## IS A TOP FOUR STATE

FOR AEROSPACE MANUFACTURING ATTRACTIVENESS

(PwC, 2018)



# ARIZONA INDUSTRY HIGHLIGHTS AND RANKINGS

### Talent

- 54,084 employees:
  - 13,176 jobs in guided missiles and space vehicles
- \$89,265 average wages:
  - \$107,516 in search, detection and navigation instruments manufacturing
- \$103,469 in aerospace products and parts manufacturing
- \$77,291 in air transportation

### **Economic Impact**

- 563 establishments
- \$4.92 billion total annual payroll

- \$2.72 billion total exports
- \$11.2 billion was contributed to Arizona's GDP in 2017
- \$13.9 billion in total federal contracts
- \$10.69 billion in Department of Defense contracts

### **Rankings & Growth**

- 2nd largest employment in guided missile and space vehicle manufacturing
- 3rd largest aviation maintenance industry economic activity at \$4.12 billion
- 4th in the nation for aerospace manufacturing attractiveness

- 5th largest employment in aerospace and defense manufacturing
- 6th largest employment in aviation maintenance
- 8th largest employment in aviation and aerospace services
- 8th largest recipient of Department of Defense spending
- 11th largest exporter of A&D products in the nation

### ARIZONA'S INTERACTIVE A&D DATABASE HAS MORE THAN







# ARIZONA IS EDUCATING THE FUTURE AEROSPACE & DEFENSE TALENT PIPELINE

### Arizona State University has

around 21,000 students enrolled in engineering programs, including nearly 700 aerospace engineering students. *U.S. News and World Report 2018* ranked ASU fourth in the nation for their undergraduate Supply Chain Management & Logistics program.

### The University of Arizona in

Tucson offers a wide range of activities and academic opportunities to more than 2,600 engineering students. U.S. News and World Report 2018 ranked UA third nationwide for its management information systems program.

### Embry-Riddle Aeronautical

**University**, with a location in Prescott, AZ, is the only fully accredited aviation-oriented university in the world. It has a total undergraduate enrollment of 2,377. U.S. News and World Report 2018 ranked Embry-Riddle 1<sup>st</sup> in the country for its Aerospace, Aeronautical, Astronautical engineering programs.

### Northern Arizona University

has developed a curriculum that aligns perfectly with the state's aerospace & defense initiatives. This includes diverse astrophysics programs, mechanical engineering, aerospace studies, adaptive research and materials, composites and optics.

The Maricopa County Community College District (MCCCD) has 202,000 students enrolled. Many of the community colleges offer specialized programs in automation, welding and advanced manufacturing, each based on local employer input. Specialized programs are also offered for employers, including Boeing and Caterpillar.

### Western Maricopa Education

**Center** offers high school students opportunities to train for jobs in growing industries, including aerospace & defense. West-MEC students can complete a two-year program in aviation technology which prepares them for a career in aircraft repair and maintenance. After completing the program, the students can test for FAA airframe and powerplant certification. West-MEC also offers a two-year avionics and drone electronics program that allows students to test for the Federal Communications Commission certification

### Pima Community College's

Aviation Technology Programs are commercial aviation-oriented and provide pathways to the aviation maintenance field. Specifically, Pima Community College provides an aviation technology associate degree, an aircraft airframe mechanics certificate, an aircraft general mechanics certificate, an aircraft powerplant mechanics certificate, an aircraft structural repair certificate and an avionics technician certificate.

### The East Valley Institute of

**Technology** prepares high school students for careers in Aerospace & Defense through its aviation program, offering dual enrollment with the Maricopa County Community College System for pilot systems, aviation and ground school and flight training classes.

Embry-Riddle Aeronautical University's Prescott Campus **RANKED 1ST** in the nation for its Aerospace

in the nation for its Aerospace, Aeronautical, Astronautical engineering programs at schools where a doctorate is not offered

(U.S. News & World Report, 2018)

### ASU RANKED THE MOST INNOVATIVE UNIVERSITY ahead of MIT and Stanford

ahead of MII and Stanford for an unprecedented four consecutive years

(U.S. News & World Report, 2015, 2016, 2017 & 2018)

### UA IS RANKED AMONG THE TOP 50 public institutions in the nation

(U.S. News & World Report, 2018)



# ARIZONA IS STRONG ACROSS AEROSPACE & DEFENSE INDUSTRY SEGMENTS

#### **Top-Ranked Aviation Facilities**

Phoenix Sky Harbor, Arizona's largest airport, is ranked among the busiest 10 commercial airports in the United States, offering nonstop service to more than 120-plus destinations with more than 1,200 flights serving more than 120,000 passengers and moving 800 tons of air cargo every day. Tucson International Airport offers 20 nonstop destinations and serves an average of 3.4 million passengers annually. In all, there are 83 airports in Arizona.

SkyBridge Arizona is the nation's first and only inland international air logistics and joint U.S.-Mexico customs processing hub. Operating out of Phoenix-Mesa Gateway Airport, the first-of-its kind service will enable e-commerce companies, manufacturers and other commercial interests conducting business in Mexico and throughout Latin America to efficiently and cost-effectively transport goods between countries.

### Maintenance, Repair and Overhaul

Arizona is home to many MRO facilities, including 140 FAA-certified operations. Among these is Ascent Aviation Services near Tucson. One of the largest MRO facilities in the world, the 1,200-acre complex can accommodate up to 400 aircraft. Per the Aeronautical Repair Station Association's 2018 report "U.S. Employment & Economic Impact," Arizona's total aviation maintenance employment is 16,673, the sixth highest in the nation. Arizona's MRO operations have a total economic activity of \$4.12 billion, the third highest in the nation. Phoenix Sky Harbor: Ranked Among the

Top 10 Busiest Airports Nonstop service to 120+ destinations More than 1,200 flights serving 120,000 passengers and moving 800 tons of air cargo every day

### 3RD LARGEST

AVIATION MAINTENANCE INDUSTRY ECONOMIC ACTIVITY AT \$4.12 BILLION



## AEROSPACE • DEFENSE

### **Unmanned Aerial Systems**

Arizona serves as a hub for innovations in Unmanned Aerial Vehicle (UAV)/Unmanned Aerial Systems (UAS) technology. Four of the state's prominent universities (the University of Arizona, Arizona State University, Northern Arizona University and Embry-Riddle Aeronautical University) are engaged in UAS-related research projects. In addition, Arizona State University, Embry-Riddle Aeronautical University and the Unmanned Vehicle University offer degrees in UAS.

Arizona continues to evolve UAS technology with the creation of the AZSkyTech program. Established in 2018 by the Arizona Commerce Authority under Governor Ducey's direction, AZSkyTech positions the state as the premier place in the world to responsibly test, deploy and advance UAS technology and policy. AZSkyTech draws upon the collective strengths of national, state and private industry partners to safely advance the development and deployment of UAS in Arizona.

### Strategic U.S. Military Installations

Yuma's airport has unparalleled military ties and is home to one of the country's most prestigious defense aviation parks, the 120-acre Defense Contractor Complex (DCC). The DCC is located near the airport and Yuma Proving Grounds and supports defense contractors such as Boeing and other firms by providing a secure space to complete technical testing.

In addition, the Department of Defense has several military installations across the state including Davis-Monthan Air Force Base in Tucson, Fort Huachuca in Sierra Vista, and Luke Air Force Base in Glendale.



# \$10.69 BILLION IN DEPARTMENT OF DEFENSE CONTRACTS



## AEROSPACE • DEFENSE

### Cybersecurity

Arizona's cybersecurity professionals protect many of America's top companies. Large companies such as Honeywell, Charles Schwab, American Express and Securosis have some or all of their security teams based in the Valley, while other Arizona research firms such as ARTIS work to understand human and state behavior related to cyber warfare. Many of the top cybersecurity companies in the world have operations in Arizona including:

- BAE Systems Cisco
- EY
- LifeLock
- Raytheon

In March 2018, Governor Doug Ducey formed the Arizona Cybersecurity Team (ACT), a diverse team of experts from state, local and federal government, the private sector and higher education who work together to protect Arizonans from cyber-attacks.

Lockheed Martin

• IBM

The state's cybersecurity resources expand even further with the Arizona Cyber Warfare Range, a privately funded non-profit entity that provides a live-fire cyber warfare range with the goal of augmenting current cybersecurity resources in Arizona and driving innovation in cybersecurity techniques, technologies and training. Arizona is also home to Cyber Security Canyon, a cybersecurity coalition that seeks to attract and retain cyber talent in Arizona, provide a focal point for educational partnerships and promote the benefits of working in the state's cyber sector.

Fort Huachuca serves as the headquarters of the Network Enterprise Technology Command (NETCOM) 9th Signal Command. NETCOM leads global operations for the Army's portion of the Department of Defense Information Network and maintains and protects the Army's global network.





## AEROSPACE • DEFENSE

### Space

Northrup Grumman Innovation Systems produces satellites in the greater Phoenix area while scientists from around the world visit Arizona's Mount Graham International Observatory and the Lowell Observatory to conduct research on submillimeter wavelengths, extraplanetary systems and star positioning. Both Arizona State University and The University of Arizona have been instrumental in furthering research about Mars, including developing instruments used on the Mars rovers. Travel to space, once the exclusive purview of elite astronauts, is now being marketed to tourists and adventurers. In Tucson, World View Enterprises has developed a high-altitude balloon capsule capable of taking travelers and payloads more than 19 miles above the earth. Vector Space Systems, a Tucson-based startup which is developing small launch vehicles, has secured \$70 million Series B round to move into full operations.

### Optics

Optics and photonics have long been a key piece of modern innovation and the Tucson region, sometimes referred to as Optics Valley, is a leader in the state's \$3 billion optics industry. The University of Arizona serves as a hub for these innovations and is currently producing some of the largest and most advanced telescope mirrors for use in the Magellan Telescope. Southern Arizona manufacturers offer a wide range of precision-machined optical products and instruments as well as optical engineering services.

### **Steward Observatory Mirror Lab**

Located underneath the campus of The University of Arizona in Tucson, which offers one the largest astronomy graduate programs in the country, the Mirror Lab is helping astronomers capture the most miraculous images of the universe to better understand the secrets of our galaxy.

TUCSON IS CALLED OPTICS VALLEY, AS IT'S A LEADER IN THE STATE'S

\$3 BILLION OPTICS INDUSTRY

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## 2ND LARGEST EMPLOYMENT IN GUIDED MISSILE AND SPACE VEHICLE MANUFACTURING WITH 13,176 WORKERS



## ARIZONA OFFERS PROGRAMS DESIGNED TO ENHANCE THE SUCCESS OF AEROSPACE & DEFENSE COMPANIES



### Quality jobs tax credit program

Provides up to \$9,000 of income or premium tax credits over a three-year period for each net new job to the state and concurrent qualifying capital expenditures.



### Qualified facility tax credit program

Offers refundable income tax credits up to \$20,000 per qualifying net new job to eligible manufacturing companies that invest in one or more qualifying facilities.



### Research & development tax credit program

Provides income tax credits for increased R&D activities conducted in the state. Additional tax credits are available for R&D executed in collaboration with state universities.



### Military reuse zone tax credit program

Provides property tax exemptions and Transaction Privilege Tax (sales tax) exemptions to qualifying projects located in an MRZ.



### Foreign trade zone tax credit program

Provides up to an 80 percent reduction in state real and personal property taxes for businesses located in a foreign trade zone or sub-zone.



### Job training grant program

Grant to reimburse a portion of qualifying costs associated with hiring and training of net new employees.



### Additional depreciation program

Accelerates depreciation to substantially reduce business personal property taxes.



Public infrastructure funding program for manufacturing

Provides manufacturers a means of mitigating infrastructure costs by allowing construction Transaction Privilege Tax (sales tax) dollars to be redirected toward public infrastructure costs.





## ARIZONA IS DEVELOPING THE NEXT GENERATION OF AEROSPACE & DEFENSE TECHNOLOGIES

New technologies are and high-tech advances are at the heart of the Arizona's thriving aerospace & defense industry. Major universities are investing in cutting-edge research projects focused on the development of new technologies while companies like Northrup Grumman, Raytheon and Vector Space Systems are expanding the aerospace & defense industry statewide.



### **Automated Vehicles**

Arizona has taken a global lead in advancing the testing and development of automated vehicles, including the advancement of Unmanned Aerial Systems (UAS) technologies. Governor Ducey signed an executive order creating the Institute of Automated Mobility (IAM), a new consortium of global industry leaders, academia and government leaders collaborating on state-of-the-art research and testing in Arizona. What's more, the Arizona Commerce Authority established AZSkyTech, positioning Arizona as the best state to test, deploy and evolve UAS safely and effectively.



### Nanosatellites

Arizona's universities and aerospace & defense companies are advancing seemingly unlimited ways to put satellites to work in communications, navigation and environmental monitoring. The state's industry leaders are borrowing best practices of manufacturing technology from the mobile phone, defense and medical products industries.



### **Smart Materials**

Arizona is developing lighter, stronger and more connected materials to transform the aerospace & defense industry. This includes even-faster semiconductors, solar-powered turbines and materials that can withstand heats five times hotter than the sun.



### Internet of Things

Utilizing the Internet of Things within the aerospace & defense industry drives innovation, reduces downtime, saves energy and inspires new, quicker solutions. In Arizona, private industry leaders and nationally recognized research universities are leveraging universal connectivity to make internet access faster and cheaper for solving problems.





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