



# ARIZONA'S AEROSPACE AND DEFENSE INDUSTRY





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# AEROSPACE & DEFENSE THRIVES IN ARIZONA

A dry, sunny climate, miles of wide open space, an innovative culture, advanced manufacturing capabilities, a pro-business regulatory climate and an unwavering commitment to America's military sustain and expand Arizona's aerospace and defense (A&D) industry. Arizona's core capabilities ensure the state will remain at the forefront of the A&D industry's most critical advances.

## LEADING NAMES IN THE INDUSTRY CALL ARIZONA HOME

# ARIZONA'S A&D INDUSTRY HIGHLIGHTS

## LABOR MARKET INFORMATION

# 52,592 Employees

## \$5.5B

Total Annual Payroll

## 541

Establishments

## AVERAGE EMPLOYEE WAGE IN ARIZONA FOR FOUR MAIN INDUSTRIES

# \$97,656

Search, Detection and Navigation  
Instruments Manufacturing

## \$88,920

Aerospace Products  
and Parts Manufacturing

## \$63,284

Air Transportation

## \$47,476

Support Activities for  
Air Transportation

## ARIZONA A&D EXPORTS

# \$3.5 Billion

 Total A&D Exports in 2014

## \$2.2B

From Civilian Aircraft,  
Engines and Parts

## \$414M

From Bombs, Grenades,  
Torpedoes, etc.

## \$133M

Growth in Powered  
Aircraft Exports from  
2013 to 2014

## FEDERAL SPENDING

# \$9.9 Billion

 In Federal Contracts in 2014

## \$8.7B

 Department of Defense  
Contracts in 2014

## TOP 10 State

for Department of Defense Contract Spending

## ARIZONA NATIONAL RANKINGS

# #2

 Largest Employment in Space and Defense Systems  
Manufacturing with 11,700

## #2

 Largest Employment in  
Guided Missiles  
and Space Vehicles  
Manufacturing

## #4

 Largest Employment in  
Aviation and Aerospace  
Manufacturing with  
31,800

## #7

 Largest Employment in  
Aviation and  
Aerospace Services  
with 19,800

## MAINTENANCE AND REPAIR OPERATIONS

## #2

 Maintenance Repair and Overhaul  
(MRO) Economic Impact at \$4.2 Billion

## #6

 Maintenance Repair and Overhaul  
(MRO) Employment at 17,822

## EDUCATION AND WORKFORCE

# 78 College Programs

Related to Aerospace and Defense Careers

## #1

 Embry-Riddle Aeronautical University's  
Aerospace/Aeronautical/Astronautical  
Engineering Program Among Schools  
Without Doctorate Programs

## #3

 Embry-Riddle Aeronautical  
University for Master Degree  
Programs in Aerospace/Aeronautical/  
Astronautical Engineering

# ARIZONA IS A TOP 10 STATE FOR A&D GOVERNMENT CONTRACTS

2014  
U.S. Department of Defense executed  
**20,000+** transactions in Arizona, totaling

## \$8.7 Billion

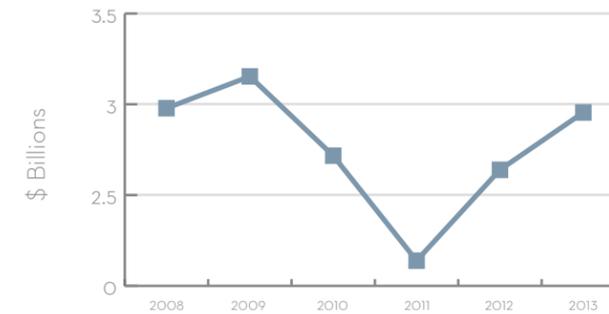
Top 10 State Nationally.

TABLE 1: TOP ARIZONA DOD CONTRACTORS BY TOTAL REVENUE, 2014:

CONTRACTOR	VALUE OF AWARDS (MILLIONS USD)	PRIMARY LINE OF BUSINESS
RAYTHEON	4,168.6	GUIDED MISSILES
BOEING	1,785.0	AIRCRAFT MANUFACTURING
HONEYWELL	471.1	AIRCRAFT ENGINES AND PARTS
GENERAL DYNAMICS	338.3	COMMUNICATIONS EQUIPMENT
ORBITAL SCIENCES	161.1	GUIDED MISSILES AND TARGETS
NORTHROP GRUMMAN	103.9	AEROSPACE SYSTEMS
TRAX INTERNATIONAL	96.0	RESEARCH AND DEVELOPMENT

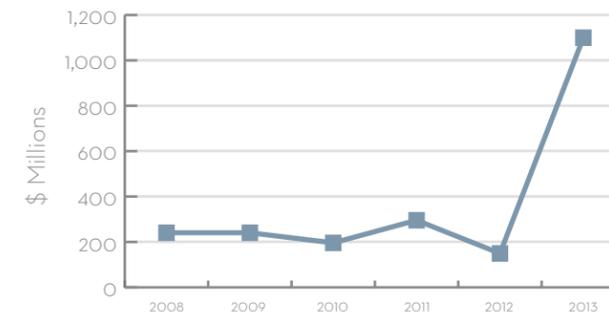
USASPENDING.GOV

DOD SPENDING IN ARIZONA BY YEAR  
Guided Missiles



Arizona rank: #1 (\$2.96B, 43.5%)

DOD SPENDING IN ARIZONA BY YEAR  
Airframe Structural Components



Arizona rank: #2 (\$1.1B, 20.3%)

#1 R&D-Defense Systems (Basic Research)

#3 Medical General Health Care

#4 Rotary Wing Aircraft



# ARIZONA IS STRONG ACROSS A&D INDUSTRY SEGMENTS

Arizona's strength in the A&D sector is broad, with excellence and innovation that are impacting a number of critical and emerging segments. Arizona manufactures more guided missiles and space vehicles than any other state, and ranks in the top ten for aeronautical and navigation equipment, aircraft, aircraft engines and parts, and guided missile parts.

## **MAINTENANCE, REPAIR AND OVERHAUL**

It takes highly trained technicians and specialized facilities to provide FAA-certified service to the industry's most advanced aircraft like Boeing, Airbus and McDonnell Douglas, and no state in America is better equipped to provide that service than Arizona.

Arizona is home to many MRO facilities, including 188 FAA-certified operations. Among these is Marana Aerospace Solutions near Tucson. It is the largest MRO facility in the world, a 460-acre facility that has been in operation for more than 30 years. Other certified facilities include helicopter repair stations ASI Services in Phoenix and Vertical Aviation in Scottsdale. Certified aircraft repair stations including AeroTurbine in Goodyear and Scott Instrument Company in Prescott are abundant across the state.

According to the Aeronautical Repair Station Association's 2015 report U.S. Employment & Economic Impact by State, Arizona's total aviation maintenance employment in 2014 was 17,822, the 6th highest in the nation. Arizona's MRO operations have a total economic activity of \$4.2 billion, the 2nd highest in the nation behind California.

According to the same report, in the past year, total MRO employment in Arizona grew by four percent, with total employment now ranking 6th among the states. With approximately half as many aviation maintenance workers as California and 60 percent of the workers in Texas, Arizona produced respectively 93 and 122 percent of each state's aviation economic activity, which speaks to the efficiency of Arizona's MRO employees. Arizona's MRO productivity surpasses that of its competing states and solidifies Arizona's position as a leading MRO state.

## **UNMANNED AERIAL SYSTEMS**

Arizona serves as a hub for innovations in Unmanned Aerial Vehicle (UAV) and Unmanned Aerial Systems (UAS) technology. Four of the state's prominent universities (University of Arizona, Arizona State University, Northern Arizona University and Embry-Riddle University) are engaged in UAS-related research projects. Several universities and community colleges offer degrees specific to unmanned aerial systems technology. The new private Unmanned Vehicle University in Phoenix exclusively offers workforce development and degree programs related to Unmanned Aerial Systems.

The Unmanned Aerial Systems Association estimates that 494 Arizonans are employed directly in UAS fields with a total economic impact of more than \$93 million. The employment figure is projected to swell to more than 2,100 by 2025. Until recently, UAS mainly supported military and security operations, but that is rapidly changing. Unmanned aircraft promise new ways to increase efficiency, save money, enhance safety and even save lives in the civilian and private sectors. Interest is growing in a broad range of uses such as aerial photography, surveying land and crops, monitoring forest fires and environmental conditions, and protecting borders and ports.

**Global advances in satellite technology are enhancing our communications and surveillance capabilities for applications that range from defense and security to weather observation.**

**Of the top 20 cybersecurity companies in the world, half have operations in Arizona including Intel, IBM, Boeing, General Dynamics, Northrop Grumman and Raytheon.**

**SPACE**

Firms with a presence in Arizona are contributing significantly to these advances. For example, Iridium, with its commercial gateway in Tempe, is deploying the world's largest global satellite network in 2015 and in Chandler, Orbital Sciences is designing and engineering its next generation of satellite launch vehicles. 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.<sup>10</sup>

**CYBERSECURITY**

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

The Security Engineering for Future Computing Laboratory (SEFCOM), operated by Arizona State University, is a leading research lab in cybersecurity and defense, as well as an Information Assurance Center that focuses on trustworthy information systems.

The University of Advancing Technology in Tempe, AZ is one of the few fully STEM-based universities in the nation and offers degrees that include network security and technology forensics.

The AZSecure Cybersecurity Fellowship Program was created by the University of Arizona (UA) in 2013 with a \$4.2 million grant from the National Science Foundation. Students serve a qualifying, paid summer internship and also commit to working in government service in a qualified agency for two years following graduation. The program recruits heavily from within the state of Arizona.

The Intelligence and Security Informatics Project has been run by UA's Artificial Intelligence Lab for the past decade. Its six critical mission areas in its quest to enhance the government's ability to fight terrorism and crime are intelligence and warning, order and transportation security, domestic counter-terrorism, protecting critical infrastructure, defending against catastrophic terrorism, and emergency preparedness and responses.

An additional project at UA focuses on understanding cyber attackers and attacks via social media and is funded through 2016 by a separate NSF grant of \$1.2 million. These endeavors produce top recruits for government security agencies and cybersecurity firms alike.

**BORDER SECURITY/OPTICS**

**Optics and photonics technologies are changing the profile of border security, and the Tucson region - sometimes referred to as Optics Valley - is a hub for those innovations.**

Southern Arizona is recognized globally as a leading producer of large (8.4M+) and ultra-lightweight (<5 KG/M2) mirrors. Interferometers, 3D projection devices, surface profilers, bio-optical devices and military instrumentation are also produced by industry leaders in southern Arizona. According to an article published by the American Planning Association, "the optics industry was born in Tucson in 1942 out of the area's large number of telescopes and its traditional strengths as a center for astronomical study."

**Zonge**, a geophysical engineering company based in Tucson, has developed a unique underground surveillance system that includes lasers, detectors and fiber optics that could be used to monitor the U.S.-Mexican border continuously. Notably, the technology can distinguish between a person and an animal moving across the border. The company has installed and tested the system, known as Helios, along the Mexican border near Tucson. The University of Arizona's Lowell Institute for Mineral Resources led the project to evaluate the system.

**Strongwatch**, a Tucson company, won an Arizona Innovation Challenge grant in 2013 for its mobile surveillance camera systems that utilize laser "targeting" for intrusion deterrence. Strongwatch's mobile "Freedom on the Move" systems, which can collect data on the move as well as sitting still, are deployed along the U.S.-Mexico border by about a dozen enforcement and counterterrorism agencies, including a system used by the Pima County Sheriff's Department.

**The University of Arizona's Center for Excellence in Border Security and Immigration (BORDERS)** is a Department of Homeland Security-funded center researching new technologies for implementation along international borders. The center has developed the AVATAR Kiosk for Deception Detection, an automated interviewing platform with an embedded artificial agent that is designed to flag suspicious behavior at a port-of-entry that should be investigated more closely by a trained officer.

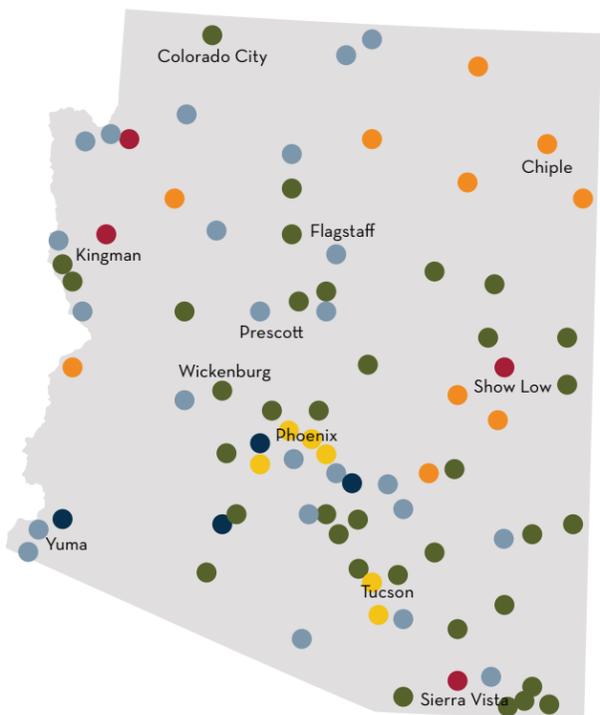
In addition to cutting-edge applications in border security, the optics and photonics innovations of Arizona companies benefit other segments of the aerospace and defense sector. Precision positioning equipment and opto-electronics technologies maximize the efficiency of military targeting systems. Other industries benefit from Arizona's expertise in optics and photonics as well, including the biotechnology, astronomy, data storage, healthcare and telecommunications sectors.

**Advanced optical technologies for precision missile guidance systems are a part of Arizona's defense industry.**

# AVIATION FACILITIES OVERVIEW

There are 83 airports in Arizona. Phoenix Sky Harbor, Arizona's largest airport, is ranked among the busiest 10 commercial airports in the U.S., with more than 1,200 flights serving more than 100,000 passengers and moving 800 tons of air cargo every day. Tucson International Airport offers 110 flights daily and serves an average of 3.6 million passengers annually. Yuma's airport has unparalleled military ties and is home to one of the country's most prestigious new 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 activities.

**Arizona's impressive transportation infrastructure, strategic Southwest location and pro-business climate provide companies operating in Arizona with a tremendous competitive advantage. Three of the world's largest economies—California, Texas and Mexico—are immediately accessible from Arizona.**



- ARIZONA AIRPORTS**
- Military
  - Commercial Service - Primary
  - Commercial Service - Other
  - General Aviation - Public Use Airports
  - General Aviation - Public Secondary Use
  - Native American Airports
  - Reliever Airports

ARIZONA DEPARTMENT OF TRANSPORTATION

# U.S. MILITARY INSTALLATIONS

**The history of aerospace and defense in Arizona is one of innovation and productivity. With some of the U.S. military's most innovative systems being developed in Arizona, it is not surprising that the manufacturers who supply them have found a home here.**

The state's unique facilities and world-class university research capabilities have facilitated the R&D and engineering efforts, while the state's industry supply chain, comprising almost 1,900 companies has made it possible for large A&D manufacturers to produce advanced aerospace and defense products. Embry-Riddle Aeronautical University, Luke Air Force Base and Fort Huachuca have led the way in specialized training for both military and civilian aeronautical careers.

The mission of Luke Air Force Base remains to "forge innovative airmen to power the world's greatest air force." It is home to the world's largest F-16 Fighter base and is the jet's main training site.

**Critical defense installations include Luke Air Force Base in Phoenix, Davis-Monthan Air Force Base in Tucson, Fort Huachuca in Sierra Vista and the Yuma Proving Grounds, Marine Corps Air Station Yuma, all of which are developing technologies and processes that are indispensable to America's security.**

Fort Huachuca is home to the Army Electronic Proving Ground, the capabilities of which include the Electromagnetic Environmental Test Facility, the 300-acre Antenna Test Facility, and the Communication Systems and Networks facility, where comprehensive testing of Command, Control, Communications, Computers and Intelligence (C4I), as well as System of Systems (SoS) testing is executed.

United States Department of Defense employment is a critical factor in the aerospace and defense-related employment in the state. The department's primary concentrations of employment are at four major defense installations. Davis-Monthan Air Force Base is the largest overall employer, as well as the largest employer of military personnel. Fort Huachuca is the largest employer of civilians. One outlier in the data is the distribution of employment at Yuma Proving Ground, where 96 percent of the workforce is civilian.

TABLE 2: PERSONNEL BY MILITARY INSTALLATION

FACILITY	MILITARY EMPLOYMENT (% OF TOTAL)	CIVILIAN EMPLOYMENT (% OF TOTAL)	TOTAL EMPLOYMENT
DAVIS-MONTHAN AFB	81%	19%	7,848
FORT HUACHUCA	61%	39%	7,733
LUKE AFB	82%	18%	6,124
YUMA	85%	15%	4,278
PHOENIX	26%	74%	1,384
TUCSON	24%	76%	1,311
OTHER	57%	43%	1,088
YUMA PROVING GROUND	4%	96%	756
MESA	57%	43%	278
WILLCOX	100%	0%	134
STATE TOTAL	69%	31%	30,934

OFFICE OF PERSONNEL MANAGEMENT, 2009 (MOST RECENT AVAILABLE DATA) CITED BY C2ER IN AEROSPACE AND DEFENSE IN ARIZONA, 2011

# STRATEGIC A&D PARTNERSHIPS

Private A&D employers, public agencies, educational institutions and civic organizations in Arizona often work together to support the aerospace and defense sector.

**AEROSPACE AND DEFENSE RESEARCH COLLABORATORY AT ARIZONA STATE UNIVERSITY**  
 The Aerospace and Defense Research Collaboratory (ADRC) is a broad coalition of academic and industry partners committed to developing and advancing technologies used in commercial and military applications. Projects under the ADRC include fixed wing and unmanned system control simulation, flight vehicle and engine design, characterization and optimization, decision support and information management systems, emergency management training and simulation, sensor design and characterization and visual analytics for data synthesis.

## ARIZONA SPACE GRANT CONSORTIUM

The AZSGC mission is to expand opportunities for Americans to learn about and participate in NASA's aeronautics and space programs and to integrate research with education to help build a diverse, scientifically literate citizenry and a well-prepared science, engineering and technology workforce. The consortium has provided opportunities for individual students at the secondary and postsecondary levels that range from designing a lunar greenhouse to deploying satellite prototypes in weather balloons.

## COGNITIVE ENGINEERING RESEARCH INSTITUTE

CERI is an independent, not-for-profit research institute founded by partners from private industry, academia and government agencies. Leveraging active relationships with the Phoenix-Mesa Gateway Airport and Arizona State University, the institute has conducted research in RPA (Remotely Piloted Aircraft) human system integration, unmanned underwater vehicle operations, military planning, extreme environments and homeland and cyber security.

## DEFENSE AND SECURITY RESEARCH INSTITUTE AT THE UNIVERSITY OF ARIZONA

The institute enables the university to expand its presence in the broad research areas funded by defense and security-related federal agencies and industry, including materials, energy, medical technologies and environmental research.

## PLANETARY AEOLIAN LABORATORY

The Planetary Aeolian Laboratory (PAL) is a unique facility, operated under a NASA grant awarded to Arizona State University, for conducting experiments and simulations of aeolian processes (windblown particles) under different planetary atmospheric environments. The laboratory enables research into the challenges of entering and exiting various planetary environments.

## SCIENCE FOUNDATION ARIZONA

SFAZ's purpose is to diversify and strengthen Arizona's economy by investing in scientific and engineering areas of greatest economic importance to Arizona, facilitating strategic collaborations between Arizona research institutions and industry and supporting effective education in science, technology, engineering and mathematics (STEM).

# A&D CREATES HIGH-VALUE JOBS IN ARIZONA

The A&D industry has long been one of Arizona's largest and most important employers. Companies in the industry have found a high-quality and reliable supply of the talented workers that are key to their success.

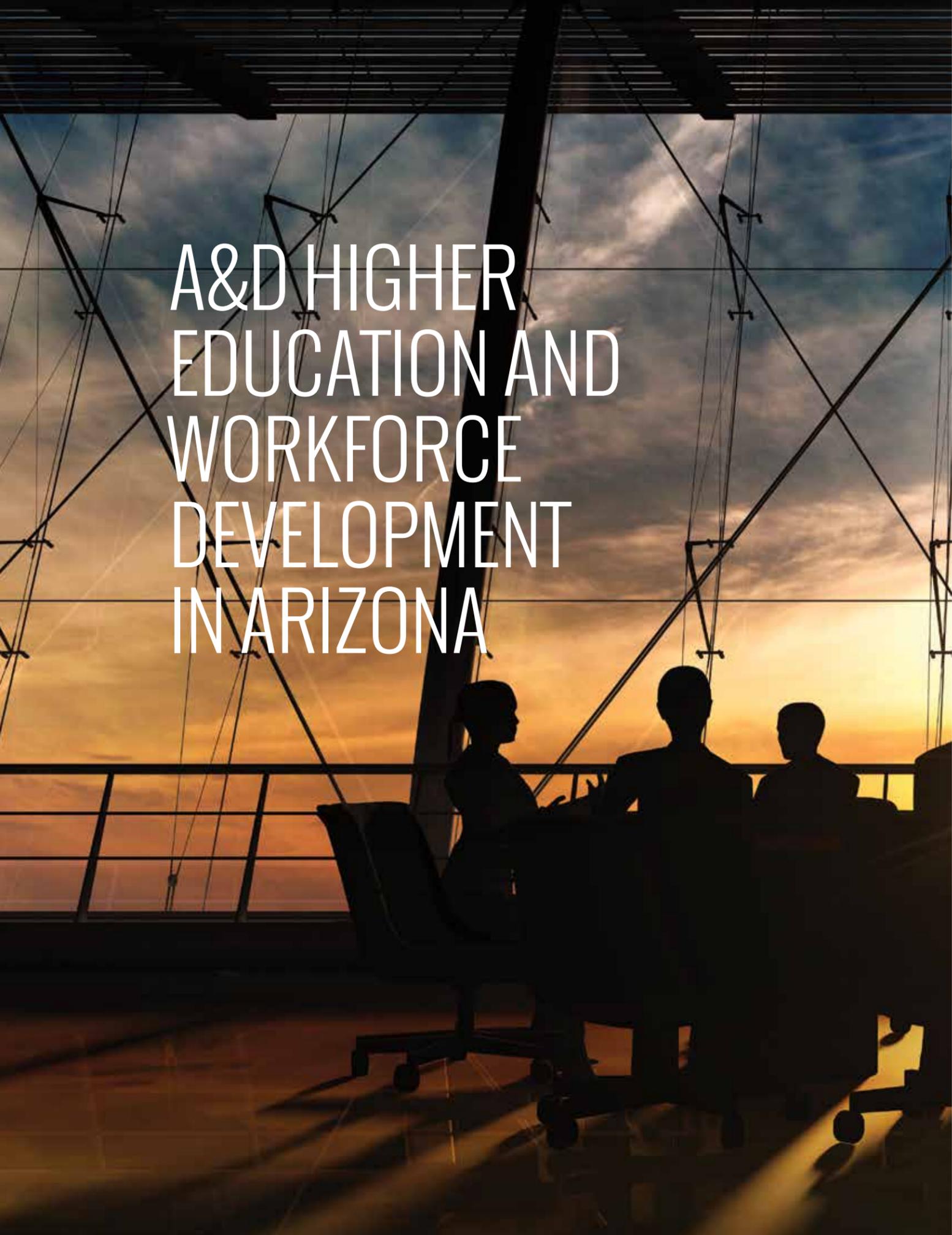
The people who power Arizona's A&D industry have been defining excellence in their fields for a long time. They remain the world's best, and the state's education and training strategies are preparing a new generation to continue a tradition of excellence.

Within the specific segments that comprise aviation and aerospace, guided missiles and space vehicles employ the most Arizonans by a large margin, while also paying the highest average wages. Arizona's workforce is employed in this industry at a rate more than 11 times that of the national average. Arizona manufactures more guided missiles and space vehicles than any other state, and ranks in the top ten in employment for aeronautical and navigation equipment, aircraft, aircraft engines and parts and guided missile parts. More than 30,000 Arizonans are directly employed by these industries.

TABLE 3: AVIATION AND AEROSPACE MANUFACTURING IN ARIZONA

INDUSTRY	ARIZONA JOBS 2014	UNITED STATES JOBS 2014	ARIZONA LOCATION QUOTIENT 2014	ARIZONA RANK
GUIDED MISSILES AND SPACE VEHICLES	10,886	54,183	11.00	1
SEARCH, DETECTION, AERONAUTICAL/ NAUTICAL NAVIGATION EQUIPMENT	6,712	123,255	3.13	4
AIRCRAFT ENGINE AND PARTS	4,914	77,121	3.60	5
GUIDED MISSILE PROPULSION UNITS AND PROPULSION PARTS	582	9,832	3.51	5

EMSI



# A&D HIGHER EDUCATION AND WORKFORCE DEVELOPMENT IN ARIZONA

Arizona's aerospace and defense research initiatives abound at the university level, demonstrating both the state's commitment to the industry's growth and a unique level of cooperation between Arizona's businesses, universities, community colleges and K-12 schools.

The 2014 Science and Engineering (S&E) Indicators report by the National Science Foundation recognizes the impact of Arizona's focus on S&E education. According to the report, Arizona boasts the highest percentage of associate degrees in science, engineering and technology per 1,000 people, nearly triple the next highest state's concentration. Arizona is first in S&E degree five-year and ten-year growth, and Arizona also ranks fourth in bachelor's degrees per 1,000 people. Arizona's exceptional universities and first-class network of community colleges educates a significant number of graduates that supply the world's foremost aerospace and defense companies.

## ARIZONA STATE UNIVERSITY

As of 2014, enrollment at the Ira Fulton Schools of Engineering has grown to nearly 17,000 students from all 50 states and 111 countries - including more than 700 aerospace engineering students. U.S. News and World Report 2015 ranked ASU 23rd in the country and both undergraduate and graduate programs were ranked 3rd in the nation. Eight of ASU's nine graduate engineering programs are in the top 50 of all such programs in the United States.

- Arizona State University conducts innovative research in all of the traditional core areas of aerospace engineering with applications to some of society's most pressing problems in energy, the environment, national defense, security and transportation. State-of-the-art laboratories and computational facilities support research and educational missions.
- ASU's Aviation Program offers comprehensive undergraduate and graduate degrees that combine academic studies with professional flight and aviation training.
- The College of Technology and Innovation's 600-acre campus is home to more than 3,000 students studying in undergraduate and graduate majors. The college is home to one of the most innovative engineering programs in the country.
- The Security Engineering for Future Computing program, is a laboratory dedicated to cyberspace security and defense. Current research interests include identity management and access control, formal models for computer security, network and distributed systems security, vulnerability and risk assessment and cybercrime analysis.

## UNIVERSITY OF ARIZONA

As one of the largest public institutions in the state, and with an undergraduate enrollment of 32,987 in 2014-2015, UA in Tucson offers a wide range of activities and academic opportunities to its students. U.S. News and World Report 2014 ranked UA 27th for Aerospace/Aeronautical/Astronautical Engineering. There are more than 2,200 students enrolled in UA's engineering school. Nine of UA's 11 engineering programs are in the top 50 among all such programs in the United States.

Known around the world for the College of Optical Sciences, the Department of Planetary Sciences and the College of Engineering, the UA provides baccalaureate and graduate degree programs for highly motivated students who are pursuing careers in aerospace and defense areas. The UA led NASA's \$420 million Phoenix Mars Mission and was an indispensable player in the recent NASA Mission to Mars that resulted in the landing of the robot Curiosity. UA has been awarded the 5th most NASA grants in the country when comparing both dollar amount and number of grants to other universities (both public and private). UA is also at the forefront of developing technologies used in applications from bio-sensing to unmanned aerial vehicles (UAVs).

Cutting-edge aerospace research is conducted at the UA, primarily in the Department of Aerospace and Mechanical Engineering. Nineteen research laboratories focus on topics such as fluid dynamics, aerodynamics, energy and fuel cell efficiency, mechanical characterization of materials and space engineering. The department oversees the Rocket Laboratory which develops propellants for space. Current research delves into hybrids, safe oxidizers and environmentally benign exhaust products. This lab, among others in the department, is often utilized by industry partners such as Raytheon Missile Systems.

- UA operates the Artificial Intelligence Laboratory which currently is focused on cutting-edge technology in four major theme areas: border security, biosecurity, cyber security and e-commerce security.
- UA's Center for Excellence in Border Security and Immigration (BORDERS) is a Department of Homeland Security-funded center researching new technologies for implementation along international borders.
- UA researchers are also using their knowledge of Artificial Intelligence to combat terrorism. The UA Dark Web Project is a scientific program designed to study and understand international terrorism phenomena via a computational, data-centric approach. In addition, MIS professors developed the Terrorism Knowledge Portal, a search engine specifically for terrorism research.

## NORTHERN ARIZONA UNIVERSITY

Located in Flagstaff, NAU has developed a curriculum that aligns perfectly with the state's aerospace and defense initiatives. This includes diverse astrophysics programs, mechanical engineering, aerospace and defense research, adaptive research and materials, advanced composites and optomechanics.

## EMBRY-RIDDLE AERONAUTICAL UNIVERSITY

Located in Prescott, Embry-Riddle is the only fully accredited, aviation-oriented university in the world. It has a total undergraduate enrollment of 1,678. U.S. News and World Report 2014 ranked Embry-Riddle 1st in the country for their Aerospace Engineering program and 3rd for their Aerospace/Aeronautical/Astronautical program.

## GRAND CANYON UNIVERSITY

Located in Phoenix, Grand Canyon University (GCU) had a total enrollment in 2014 – 2015 of 11,000 on campus and 55,000 online students. GCU offers a Bachelor of Science in Mechanical Engineering degree which helps prepare students for a variety of careers within the aerospace and defense industry

## MARICOPA COUNTY COMMUNITY COLLEGE SYSTEM

The Maricopa County Community College System (MCCCS) had a total enrollment in 2013-2014 of more than 226,000 students. Many of the community colleges offer specialized programs in automation, welding and advanced manufacturing, each based on local employer input. The system also offers specialized programs for employers, including aerospace and defense firms like Boeing.

## MESA COMMUNITY COLLEGE

The Advanced Manufacturing Institute at MCC offers courses in automation, electronics, drafting, machining, process design and welding. The AMI provides a holistic approach to meeting the needs of the manufacturing industry, incorporating industry-relevant curriculum, flexible learning models, portable labs for onsite training, and a deeply experienced faculty pool. Recent AMI partnerships have included Intel, Freescale Semiconductor, Medtronic and TRW Automotive. The AMI partners with the Chandler-Gilbert Community College and the Maricopa and SouthWest Skill Centers to provide Boeing pre-employment boot camps which offer National Career Readiness Certification in addition to industry-driven certifications such as NIMS, AWS and IPC. The AMI will also partner with Boeing at its manufacturing facility in Mesa to provide new aerospace manufacturing technology certificates and degrees.

## CHANDLER-GILBERT COMMUNITY COLLEGE

The aviation maintenance programs at CGCC are certificate/degree and university transfer programs that have been designed for students to meet the aviation industry's need for well-prepared technicians. Technical specialties include aircraft maintenance, electronics/avionics and aircraft construction.

## WESTERN MARICOPA EDUCATION CENTER

WMEC offers avionics and aviation maintenance programs to both high school juniors and seniors and adult learners. The programs prepare students to earn FAA airframe and powerplant certifications.

## THE NASA SPACE GRANT PROGRAM

This program offers a scholarship and fellowship that provides students opportunities to develop NASA's aeronautic and space projects and is available through four Arizona universities.

## COCHISE COLLEGE

Aviation, Avionics, Professional Pilot Technology and Unmanned Aerial Systems programs are offered through the Business and Technology Department at Cochise College in Douglas. Over more than 40 years of aviation training, Cochise has placed graduates with every major commercial airline, the Federal Aviation Administration, the U.S. Border Patrol and U.S. Customs.

## PIMA COMMUNITY COLLEGE

PCC's Aviation Technology Programs are commercial aviation-oriented and provide pathways to the aviation maintenance field. Specifically, Pima Community College provides a Structural Repair and Modification program, an Avionics Technician program and an FAA Airframe and Power Plant Certification Program. All programs award students with certificates/associate degrees, and several programs also provide federal licensure opportunities.



# ARIZONA IS HOME TO A&D INDUSTRY GIANTS

With its less burdensome approach to government, a lower cost of doing business, a competitive cost of living, top research programs, a skilled workforce and optimal year-round flying conditions, Arizona offers an environment that fosters industry success.

Aerospace and defense is a long-standing priority sector in Arizona's economic growth strategy, and A&D firms around the world continue to recognize the unique benefits and competitive advantages of Arizona as a place to grow and prosper. Some of Arizona's highest-profile firms include:

#### **ASCENT AVIATION SERVICES**

Ascent Aviation operates a 37-acre maintenance, repair, overhaul and storage facility for heavy aircraft in Tucson. Growth created a need for expansion, and in 2013 Ascent entered a new long-term lease at the Tucson International Airport and began construction of a new \$5 million aircraft service hangar that ultimately doubled Ascent's heavy maintenance capacity.

#### **AVIATION COMMUNICATION SURVEILLANCE SYSTEMS**

ACSS, a division of L-3 Aviation Products, manufactures safety avionics systems for commercial and military flight operators, as well as a set of automatic dependent surveillance-broadcast (ADS-B) solutions. In April 2014, ACSS announced a project that involved expanding research and development operations at its Phoenix facility and adding 64 new full-time positions by 2017.

#### **BAE SYSTEMS AEROSPACE AND DEFENSE**

BAE Systems, Inc. is the U.S. subsidiary of BAE Systems plc, a British defense, security and aerospace firm. BAE Systems, Inc. delivers a full range of products and services for air, land and naval forces, as well as advanced electronics, security, information technology solutions and customer support services. BAE Systems manufactures body armor at its Phoenix facility. Significant 2014 federal contracts for work performed in Arizona: \$11 million for 13,000 Gen II helmet sensors, \$5 million for aircraft seats and \$864,000 for Spear Gen IV Hard Armor inserts.

#### **BOEING**

Boeing delivers a family of technologically advanced and efficient airplanes to customers around the world. Boeing provides and supports large-scale systems that combine sophisticated communications networks with air-, land-, sea- and space-based platforms for military, government and commercial customers around the world. Boeing builds the U.S. Army's AH-64D Apache Block III helicopter in Mesa. Significant 2013/2014 federal contracts for work performed in Arizona: \$24 million for 150 composite main rotor blades and three destructive testing composite main rotor blades, \$9 million for rotor blade dampers and \$8 million for rotary rudder heads.

### **BOMBARDIER AEROSPACE**

Bombardier Aerospace designs, manufactures and supports innovative aviation products for the business, commercial, specialized and amphibious aircraft markets. Bombardier operates an aircraft service center in Tucson.

### **DURALAR TECHNOLOGIES**

Duralar, a global nanotechnology company announced in March 2014 that it was establishing its U.S. headquarters in Tucson. The 30 jobs at the facility are a mix of material science, chemical and electrical engineering positions, technicians and management positions.

### **GE AVIC CIVIL AVIONICS SYSTEMS COMPANY**

Aviage Systems is a global civil avionics systems provider. This joint venture of General Electric and the Aviation Industry Corporation of China plans to establish its first U.S.-based operations, including a commercial avionics design, testing and development facility in Peoria.

### **GENERAL DYNAMICS C4 SYSTEMS**

General Dynamics C4 Systems designs and manufactures communication products, integrating them into secure networks that deliver vital information for military, homeland security and public safety professionals. General Dynamics C4 Systems innovates in the fields of secure communications networks, radios and satellite technology from Scottsdale.

### **HONEYWELL AEROSPACE**

Honeywell Aerospace is the world's largest manufacturer of aircraft engines and avionics, as well as a producer of auxiliary power units (APUs) and other aviation products. Honeywell Aerospace is headquartered in Phoenix and crafts jet engines and gas turbines in Tempe. Honeywell Aerospace also operates a repair and overhaul facility in Tucson. Significant 2014 federal contracts for work performed in Arizona: \$95 million for secondary power logistics support of USAF (other service and FMS aircraft, to include C-130, Ground Carts, B-2 and F-15), \$22 million for fixed-wing aircraft and \$17 million for jet fuel starters.

### **J.B.'S PRECISION INDUSTRIES**

J.B.'s Precision Industries manufactures parts for the commercial and aerospace manufacturing industry. By 2014, J.B.'s had outgrown its existing facility, but using a loan facilitated by the Arizona Commerce Authority's Arizona Innovation Accelerator Fund (AIAF), J.B.'s financed construction of a new 15,000 square-foot headquarters/operations building in Phoenix.

### **L-3 COMMUNICATIONS**

L-3 Communications has produced thousands of products for a wide range of military and commercial customers. The company specializes in the design and manufacture of highly complex optical solutions. L-3 Communications builds electro-optical components for weapon sights and goggle systems from its Tempe facility. Significant 2014 federal contracts for work performed in Arizona: \$8 million for F-16 aircraft maintenance, \$8 million for omnibus VII systems, \$8 million for image intensifier tubes.

### **MD HELICOPTERS**

Once a subsidiary of McDonnell Douglas, MD Helicopters is now an independent company. Fleet users include the Korean Armed Forces, US Special Operations, Japanese Self Defense Forces, Jordanian Armed Forces, Turkish National Police, Houston Police, Columbus Police, CALSTAR, Argentina Armed Forces, the Italian government, the Finnish Armed Forces and many others. MD manufactures the MD 500E, MD 530F, MD 520N, MD 600N and the MD Explorer models at its facility in Mesa. Significant 2014 federal contracts for work performed in Arizona: \$5 million for two 600 N helicopters, \$1 million for adding long lead spares to MD 600 N helicopters, \$1 million for training.

### **NAMMO TALLEY**

Nammo Talley, a business unit of the Norwegian firm Nammo, specializes in the design, development and manufacture of ammunition and energetic material solutions for defense and commercial applications. The company provides a broad range of products and capabilities from military shoulder-launched weapons and ammunition to commercial propellants and time delay explosives. Nammo Talley has headquarters and production facilities in Mesa. Significant 2014 federal contracts for work performed in Arizona: \$9 million for BDM tactical weapons and field handling trainers, \$1 million for cartridge and propellant actuated devices and \$1 million for research and development on urban breaching rounds.

### **NORTHROP GRUMMAN TECHNICAL SERVICES**

Northrop Grumman Aerospace Systems is a premier developer, integrator, producer and supporter of manned and unmanned aircraft, spacecraft, high-energy laser systems and microelectronics. Northrop Grumman's Unmanned Systems Integration Center in Sierra Vista, is the Army's Hunter UAV depot support facility. Significant 2014 federal contracts for work performed in Arizona: \$45 million for incremental funding for deployment, operations and logistical support of the Hunter unmanned aircraft, \$12 million for incremental funding for deployment, operations and logistical support of the Hunter unmanned aircraft and \$10 million for incremental funding for deployment, operations and logistical support of the Hunter unmanned aircraft.

### **ORBITAL ATK**

A manufacturer of small and medium class space and rocket systems, Orbital satellites include geosynchronous-Earth Orbit (GEO) satellites for communications and broadcasting; low-Earth Orbit (LEO) spacecraft, which perform remote sensing and scientific research; spacecraft used for national security missions; and planetary probes to explore deep space. Launch vehicles include rockets that transport satellites into orbit; missile defense interceptor booster vehicles; and target rockets used to test missile defense systems. Orbital also supports human space flight by supplying cargo resupply services for the International Space Station. In addition, Orbital provides full engineering, production and technical services for NASA, DOD, commercial and academic space programs. Orbital ATK designs and manufactures launch vehicles in Chandler and satellites in Gilbert. Significant 2014 federal contracts for work performed in Arizona: \$56 million for incremental funding for Intermediate Range Ballistic Missile (IRBM) guided missile targets, \$37 million for supersonic sea-skimming target systems and \$26 million for ducted rockets for target vehicles.

### **RAYTHEON MISSILE SYSTEMS**

One of four divisions of Raytheon, Missile Systems is a global producer of offensive and defensive missile systems and related weapons used by U.S. and allied nations for land-, air- and sea-launched combat missiles. Raytheon manufactures guided missiles in Tucson. Significant 2014 federal contracts for work performed in Arizona: \$334 million for TOW 2A and 2B missiles for foreign military sales customers, including Oman and Saudi Arabia, \$276 million for SM-6 missiles and \$263 million for SM-3 Block 1B missiles.

### **ROBERTSON FUEL SYSTEMS**

Robertson Fuel Systems, LLC designs and manufactures fuel containment and ballistic tolerance systems, including ballistically self-sealing primary and auxiliary fuel systems for rotary and fixed winged aircraft and ground combat vehicles. Robertson self-funds the development of its products and has never accepted any government/customer development funding. Robertson Fuel Systems has headquarters and manufacturing facilities in Tempe. Significant 2014 federal contracts for work performed in Arizona: \$14 million for airframe structural components, \$13 million for airframe structural components and \$9 million for miscellaneous aircraft accessories and components.

### **SARGENT AEROSPACE & DEFENSE**

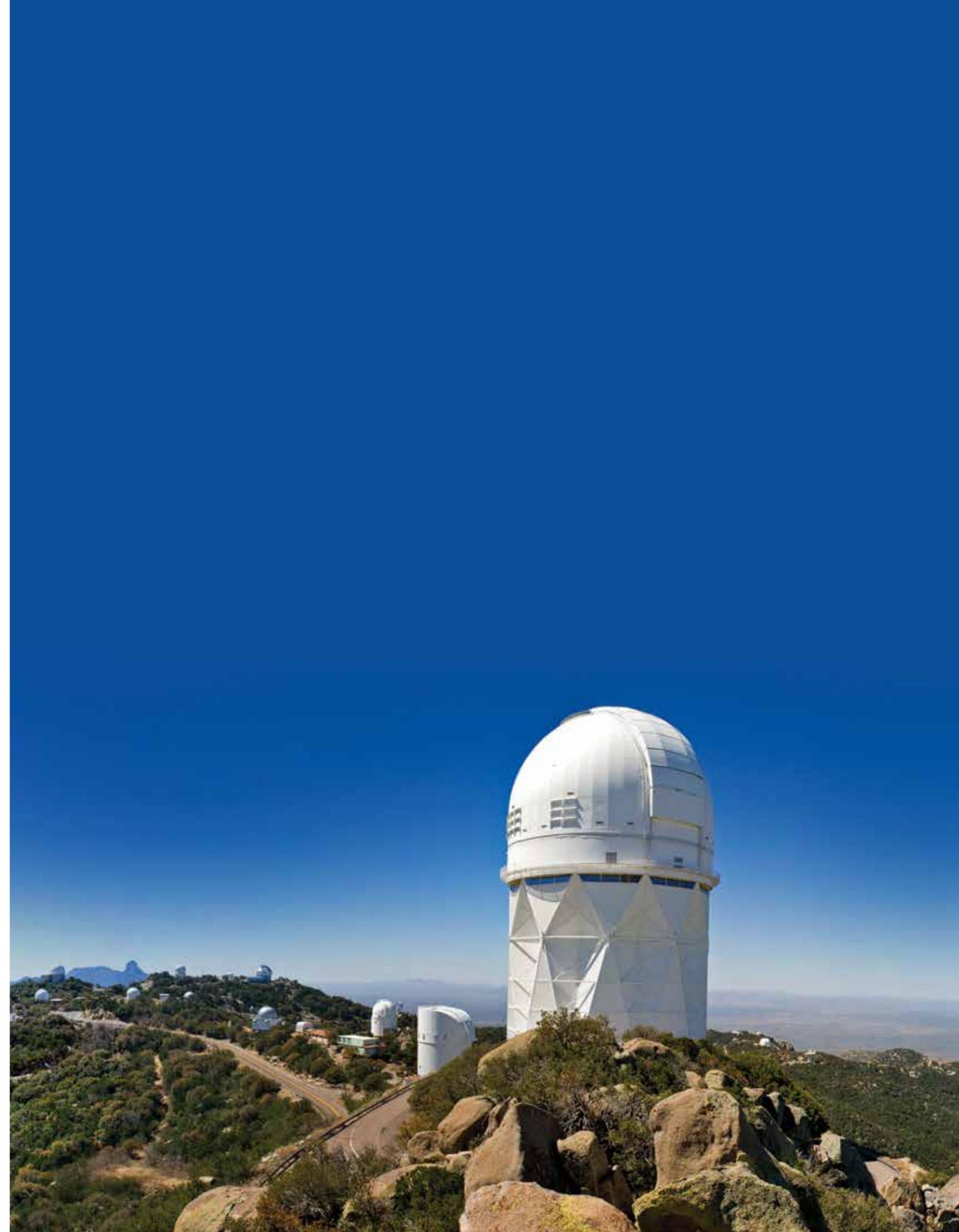
Sargent is a global supplier of precision-engineered components and aftermarket services and performs critical functions on a variety of commercial and military aircraft, submarines and land-based vehicles in operation worldwide. Sargent's customer base includes both OEM and MRO markets. Sargent's headquarters are in Tucson, where it manufactures alignment joints, bearings, fasteners, hydraulics, rings and seals. Significant 2014 federal contracts for work performed in Arizona: \$486,000 for ballscrew assemblies, \$454,000 for direct linear valves and \$343,000 for reciprocating pumps.

### **SECURAPLANE**

Securaplane is a global manufacturer of aircraft avionics and electrical systems and components. In April 2013, Securaplane broke ground on a new 55,000-square-foot facility in Oro Valley and announced plans to add 55 new engineering, production and administration positions.

### **UTC AEROSPACE SYSTEMS**

In 2012, UTC Aerospace Systems was formed by combining two industry leaders, Hamilton Sundstrand and Goodrich. Both brands have been maintained. UTC Aerospace Systems provides innovative aerospace technologies and integrated systems that advance the performance, safety and efficiency of commercial aviation, global defense and space exploration. UTC Aerospace manufactures aircraft interiors (including veneers, lighting and life rafts) and engine components (including nozzles, turbine blades, drive shafts and couplings) at its facility in Phoenix.





ARIZONA  
COMMERCE  
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