

Aerospace & Defense Industry Overview

Soaring Aerospace Industry

Tucson's clear blue skies and dry climate have been attracting aerospace and defense related attention since the early 1900s. Today, the aerospace & defense industry is one of the community's stronger economic drivers; one in five workers is employed by an aerospace & defense company.

Tucson's aerospace industry represents civil aviation, defense and space-related research, development and manufacturing. Tucson is 8.4 times more concentrated in the aerospace products and parts manufacturing than the average of all metropolitan statistical areas across the country.

**Tucson is recognized as one of the
Top 5 Metro Areas Nationwide
for its concentration of companies and
employees in Aerospace and Defense**

Source: KMK Consulting, Moody's Economy.com

World-Class Aerospace Companies

The region generates between \$5 and \$6 billion in revenues annually from more than 200 aerospace companies. Currently there are between 20,000 and 30,000 people employed in the aerospace industry.

Major Aerospace Companies in the Region

Raytheon Missile Systems - www.raytheon.com

Raytheon is a technology and innovation leader specializing in defense, homeland security and other government markets throughout the world. Raytheon Missile Systems is the world leader in design, development and production of missile systems, deploying missile systems for U.S. and allied forces, including air-to-air, strike, naval weapon systems, land combat missiles, guided projectiles, exoatmospheric kill vehicles, and directed energy weapons. Raytheon is the region's largest private employer.

Employment: ~10,500

Northrop Grumman - www.northropgrumman.com

A premier provider of manned and unmanned aircraft, space systems, missile systems and advanced technologies critical to the nation's security, Northrop Grumman's key products include Global Hawk, Fire Scout and UCAS-D unmanned aircraft systems. The Northrop Grumman facility in Sierra Vista, just south of Tucson, is an Unmanned Vehicle Center of Excellence.

Employment: ~390

Bombardier Aerospace - www.bombardier.com

Bombardier is a global transportation company, present in more than 60 countries on five continents. In Tucson, Bombardier operations include two maintenance facilities - a Regional Aircraft Service Center as well as a Business Aviation Services Center.

Employment: ~750

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Honeywell Aerospace - www.honeywell.com

Honeywell Aerospace is a pioneer in aviation safety with industry leading safety products like the Enhanced Ground Proximity Warning System (EGPWS) and Runway Awareness and Advisory System (RAAS). Honeywell offers state-of-the-art, proven products and systems for large and regional air transport, business and general aviation aircraft, military aircraft, surface vehicles, defense systems, and space applications.

Employment: ~630

General Dynamics - www.generaldynamics.com

General Dynamics Information Technology is a top-tier IT integrator that provides information technology, systems engineering and professional services to customers in the defense, intelligence, homeland security, federal civil and commercial sectors. The company has the customer knowledge, domain expertise and proven performance to manage large-scale, mission-critical IT programs.

Employment: ~1,050

Sargent Aerospace & Defense - www.sargentaerospace.com

Sargent Aerospace & Defense is part of Dover Industrial Products' Mobile Equipment, Transportation Group, and is a premier global supplier of custom engineered, precision products to the aerospace and defense Industries. Sargent holds a leadership position in this highly competitive environment as a result of its commitment to investment in people, technology, facilities, new products, processes and equipment. Among its top customers are Boeing, United Technologies companies, Northrop Grumman, General Electric, Safran, Airbus, Rolls-Royce, Honeywell, Lockheed Martin, Defense Supply Centers and many major airlines worldwide.

Employment: ~250

Industry-Educated Workforce

Education is priority one in Pima County. Complemented by a K-12 public education system of 18 districts with over 131,000 students (2008-2009 enrollment figures, source: Arizona Department of Education), as well as a wide range of private and charter school choices, this well-developed education infrastructure maintains an open ear to the needs of the business community. And it shows. Tucson is home to a number of nationally recognized institutions for higher education.

The aerospace sector is a high-value, high-wage industry that attracts top-notch talent to the region. In 2007-2008, there were 1,668 bachelor's degrees, 693 master's and 82 doctorates awarded in aerospace-related fields by Arizona's private and public universities.

The University of Arizona

The University of Arizona (UA), with a mission devoted to excellence in teaching, research, and public service:

- A Top 15 U.S. Public Research University (Source: National Science Foundation)
- Offers 347 degree programs in 15 colleges on three campuses

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- Enrolls more than 38,000 full-time students
- Creates a \$2.3 billion impact on the local Tucson economy
- A leader in research with over \$490 million annually in funding, with programs in optics, planetary science and water that are recognized as the best in the world
- Home of Eller College of Management, (ranked #15 among public business schools by U.S. News & World Report, 2008) with many established local business partnerships

The College of Engineering at The University of Arizona offers many outstanding engineering programs, granting 450 bachelor's degrees, 118 master's, and 45 doctoral degrees in 2009-2010.

The Department of Aerospace and Mechanical Engineering (AME) offers ABET accredited undergraduate, master's, and doctoral programs in aerospace engineering and mechanical engineering.

AME research activities are concentrated in fluid mechanics and aerodynamics, multi-body dynamics and control, heat transfer, solid mechanics and composite materials, space technology, biomedical engineering and reliability. Some of the emerging areas of concentration include micro-electrical-mechanical systems (MEMS), nanotechnology and opto-mechanics.

UA ranks in the top 10 of NASA grant recipients and is No. 1 in space science research. UA's Lunar and Planetary Laboratory is instrumental in several ongoing NASA space missions, including the Mercury Messenger, Cassini Saturn and Phoenix Mars missions.

Arizona Center for Innovation, located at the UA Science and Technology Park, is a high tech incubator that focuses on important developing areas including aerospace, advance composites, information technology and the life sciences.

Pima Community College

Pima Community College, the eighth largest community college in the nation:

- Enrolls more than 73,000 students annually (2007-2008 enrollment)
- Provides contracts for customized on-site job training
- Dedicated Aviation Technology Center and new Avionics Expansion provides FAA-approved Airframe and Powerplant Certification, Aviation Structural Repair and Avionics Technician Training. PCC's aviation technology degrees and certifications can be paired with training programs customized to employer's requirements, and are nationally recognized for producing highly-skilled, industry-ready workers. PCC's Aviation Structural Repair program is the only one of its kind in the nation.

Embry-Riddle Aeronautical University

Embry-Riddle Aeronautical University offers several degrees at its Davis-Monthan AFB Campus (over 1,000 students in 2009).

Trade & Vocational Training

Over 25 schools throughout the Tucson region.

Military Installations

The military is a key employer in Southern Arizona and a critical component of the aerospace and defense industry. Many of the aerospace industry's finest companies benefit from the vast experience of military retirees that choose to continue their professional careers in the region.

Davis-Monthan Air Force Base

Davis-Monthan Air Force Base, founded in 1925, is the fourth-largest employer in Pima County and the third-largest installation in Air Combat Command. The 355th Wing is the host unit at the base and provides medical, logistical, and operational support to all associate units. The associate units are represented by almost all major air commands, the Air Force Reserve and the Air National Guard. The wing's missions are to train A-10 and OA-10 pilots and to provide close support and forward air control to ground forces worldwide.

Fort Huachuca

Fort Huachuca, annexed by Sierra Vista in 1971, is located in southeast Arizona, about 15 miles north of the Mexico border. Fort Huachuca is under the command of the United States Army Installation Management Command and its major tenants are the Army Network Enterprise Technology Command (NETCOM)/9th Army Signal Command and the United States Army Intelligence Center. The fort is now the largest employer in Cochise County and in southeast Arizona.

Space Exploration and Innovation

OSIRIS REx Mission

NASA has selected the University of Arizona to lead a sample-return mission to an asteroid. The OSIRIS-REx mission is budgeted for approximately \$800 million, excluding the launch vehicle. Scheduled for launch in 2016, the mission will return the first samples ever taken from a special type of asteroid holding clues to the origin of the solar system and likely organic molecules that may have seeded life on Earth.

The OSIRIS-REx spacecraft will orbit and explore asteroid 1999 RQ36 for more than a year before closing in and collecting a sample of pristine organic material that may have seeded Earth with the building blocks that led to life.

Phoenix Mars Mission

Tucson came into the space exploration and research spotlight in 2008 when the Phoenix Mars Mission was launched. The Mission, operated for NASA by the Lunar and Planetary Laboratory at The University of Arizona in partnership with the Jet Propulsion Laboratory, Lockheed Martin, and the Canadian Space Agency, spent more than five months excavating, sampling and analyzing Martian soil. The lander also sent back more than 25,000 photos and enough data to keep mission analysis teams busy for years.

The first Mars mission ever led by a public university, Phoenix used some of the world's most sophisticated and advanced space exploration technology to study the history of water and habitability potential in the ice-rich soil of Mars. Among the mission's many prominent achievements, it verified the presence of water-based ice in the Martian subsurface.

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Phoenix was designed to be an innovative, low-cost part of NASA's Mars Exploration Program, which aims to incrementally lay the scientific groundwork for human exploration of the Red Planet.

Space Innovation

Tucson is seen as a flagship in civil space innovation. The exceptional talent and resources in Southern Arizona have the capability and opportunity to truly go where no man has gone before.

Tucson-based Paragon Space Development Corporation is the premier provider of environmental controls for extreme and hazardous environments. Paragon designs, builds, tests and operates premier life support systems and leading thermal control products for astronauts, contaminated water divers, and other extreme environment adventurers, as well as for unmanned space and terrestrial applications. Four of our major programs include: Design, analyze, and manufacture the tubing for the environmental control and life support system (ECLSS) on the Orion spacecraft; Paragon Commercial Crew Transport-Air Revitalization System (CCT-ARS), a turnkey life support system built to meet or exceed NASA human flight safety standards; Program thermal lead for the Constellation Space Suit System; and the Paragon Dive System, (developed for the U.S. Navy, it protects divers working in contaminated waters and is derived from our space suit expertise).

State and Local Commitment

There are many state and local organizations dedicated to aerospace advancement such as the Arizona Aerospace and Defense Commission. The Commission was established to develop an aerospace and defense strategic plan that builds synergy between government, industry and education. The Commission works to enhance, foster and drive the aerospace and defense industry in Arizona.

Another group committed to advancements in the industry is the Arizona Technology Council (AZTC). The AZTC is a non-profit trade association that connects, represents and supports members through initiatives, advocacy, networking, effective communications, business support and access to educational forums. The association will benefit the interests of a variety of technology, manufacturing and service firms, such as those in the aerospace, bioscience, defense, electronics, information technology, nanotechnology, optics, semiconductors and telecommunications sectors.