Think of Tucson and you may just think of a place where the sun shines more than 350 days a year and the skies are clear and blue. That sunshine and the low humidity not only are attractive to tourists and residents. They also are two of the many reasons why Tucson is a key player in the Aerospace & Defense industry.

This white paper explores what Tucson, Arizona has to offer to companies in A&D. Whether they manufacture black boxes and aviation batteries or help to maintain, revitalize or store thousands of aircraft at what we Tucsonans fondly call The Boneyard, commercial and government-contracted companies find a ready workforce and a supportive business environment.

Anyone with plans to start, relocate or expand their Aerospace & Defense business would benefit from knowing what Tucson can offer wherever they are in the supply chain.

Contact Michael Coretz, your Tucson commercial real estate partner, for more information.
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Aerospace & Defense: Facts & Figures

Just what makes up the A&D industry?

The Aerospace & Defense industry, according to PWC (PricewaterhouseCoopers), is made up of companies “that generate the majority of revenue from A&D activities or, for diversified companies, those reportable segments that derive a majority of their revenue from A&D activities.”

PWC’s 2013 report on A&D cites that the top 100 A&D companies in the United States reported $719 billion in revenue and $66 billion in operating profit.

Tucson and Arizona have even more impressive facts.

Tucson Highlights

- Tucson’s highly concentrated aerospace product and parts manufacturing sector has an 8.35 location quotient. This ratio is calculated to indicate industry activity among different regions of the United States. Tucson’s location quotient means the area is over eight times more concentrated in this industry than the average of all metropolitan statistical areas across the country.
- Tucson has often been in the spotlight for space exploration and research. In 2008, The University of Arizona’s Lunar and Planetary Laboratory became internationally known as it partnered with NASA’s Jet Propulsion Laboratory and Lockheed Martin, among others, to launch the Phoenix Mars Mission to “excavate, sample and analyze” the soil on Mars. The Mars Lander sent back more than 25,000 photos to Tucson and fulfilled the long-term need for ongoing analysis and study.
- In 2011, Tucson gained national attention when NASA chose the university’s LPL to lead the OSIRIS-Rex mission, which in 2016 will be the first mission to sample an asteroid and return to Earth. This $800 million mission is being run from The University of Arizona campus.
Arizona Highlights

- Even with reductions in the national defense budget, the A&D industry in Arizona is growing and employment is projected to increase by 10% annually through 2018.4

- Arizona is a “relatively science- and engineering-intensive state and workers in these fields account for 5.4% of total Arizona employment, compared to the 5.2% share of those workers in U.S. employment.”5


- Arizona’s Aerospace & Defense total exports rose by more than 18% from 2011 to 2012, reaching $2.87 billion. According to a 2013 study by the International Trade Administration, WorldTradeStatistics.com, the increase was primarily due to an almost $400 million increase in aircraft, engines and parts exports.6

- TechAmerica’s 2013 Cyberstates Report ranks Arizona fourth nationwide for jobs in the space and defense systems manufacturing industry, employing more than 8,700 people.7
Introduction: Tucson, Arizona. An Enviable Location?

Yes! Tucson is in enviable location for any company involved in the Aerospace & Defense industry.

The city’s central southwestern U.S. location provides a number of advantages to companies in the area. Imports and exports are easily handled due to Tucson’s many transportation options. Not only does it sit within easy access of interstates, but this industry, along with many others, also benefits from the Port of Tucson, an inland warehousing, manufacturing and rail distribution hub. This intermodal rail facility, registered as a Foreign Trade Zone, simplifies domestic and international shipping for manufacturers involved in all parts of the supply chain.

*Southern Arizona has historically been and continues to be an industry force in support of national security, aerospace and defense. With nearly 1,200 companies active in the A&D supply chain statewide, Arizona boasts a strong infrastructure that includes leading military installations and private sector development of new missions and future requirements in areas ranging from unmanned systems to cyber threats to modernization of current assets across the defense spectrum.*

—Alex Rodriguez, Vice President, Southern Arizona, Arizona Technology Council

Industry research shows that for companies to be successful in any sort of aircraft manufacturing industry, it’s imperative they can provide prompt delivery to market and have a willingness to outsource when appropriate.
It’s a Dry Heat!

Residents and visitors alike may joke or boast that in Tucson, “it’s a dry heat,” but the climate does indeed play a part in making this industry one of Tucson’s most prominent. The clear blue skies and large expanses of surrounding desert make the area prime real estate for testing and training.

The dryness of the Sonoran Desert also provides an ideal storage environment for aviation in what residents fondly refer to as The Boneyard.

Davis-Monthan Air Force Base

Tucson’s local Air Force base has been in operation since 1925 and, among many other things, provides initial and ongoing training for all U.S. Air Force A-10, OA-10 and EC-130 pilots and crews, including many military personnel from other countries. In 2013 there were an estimated 25,000 total sorties at Davis-Monthan.

Adjoining Davis-Monthan, the local Air Force base in the southern part of the city, is AMARG (Aerospace Maintenance and Regeneration Group), the largest and most visited “Boneyard” where typically over 4,000 aircraft and other types of military equipment are stored. The aircraft provide parts, but many also can be returned to operational status somewhat quickly, so they are considered a tax-saving entity. The aircraft are kept in stable condition with anti-corrosion and preservation processes and all military branches (Air Force, Navy, Marines, Coast Guard and Army), along with other U.S. national agencies, benefit from this center, as do thousands of visitors a year who are able to tour the AMARG space.

Pinal Airpark

The Pinal Airpark and Marana Aerospace Solutions located on the northern outskirts of Tucson offer more than 600 acres of secured ramp and storage area for all sizes and types of commercial and military aircraft. Formerly Evergreen Maintenance Center, Marana Aerospace Solutions is internationally recognized as “one of the world’s most reliable aviation service facilities.”

“There is no better place to train pilots than right here in Tucson. When I send my young fighter pilots into combat there is no training and there is nothing that can be replicated than what we have here around Davis-Monthan.”

…Col. James Meger, 355th Fighter Commander
State & Local Support

As a major component in the region's economy, Tucson's Aerospace & Defense industry is ranked as one of the top five areas in the United States for industry activity. A good number of activities are represented by the work of local companies. It's not difficult to find people working in any of the following segments:

- defense-related development and manufacturing
- space-related development and manufacturing
- research and development
- assembly, distribution and warehousing
- rehabilitation and storage of fleets.

Many organizations in Tucson, and the state overall, understand just how important it is to support and grow the area's role in Aerospace & Defense.

Arizona Technology Council (AZTC) is a statewide non-profit trade association connecting, representing and supporting members in a variety of technology-related industries. In addition to aviation and defense companies, other members involved in bioscience, electronics, information technology, optics, semiconductors and telecommunications make up the association's membership and all make great collaborators for the A&D sector. AZTC hosts the state annual Aviation, Aerospace & Defense Requirements Conference that attracts companies ranging from prime contractors to tier four suppliers to the U.S. Department of Defense (DoD) community and state policy makers.

Arizona Commerce Authority, which replaced the Arizona Department of Commerce, is one of the state's primary private economic development organizations and supports the overall mission to recruit, grow and create business in the state. One of its targeted industries is Aerospace & Defense and it does a great job of proactively supporting and incentivizing companies in this sector.

Tucson Regional Economic Opportunity (TREO), as the primary economic and business development agency for the Tucson region, supports the city's quest to be on a short list for corporate site selectors considering moving or expanding their companies.

Pima County, the second largest county in the state, is the government jurisdiction where Tucson is located. Its involvement and support for the local Aerospace & Defense industry includes the Pima County Aerospace and Defense Corridor Initiative. This high-speed bypass plans to connect strategic areas of town, including the two major interstates, Tucson International Airport and the University Tech Parks, making it easier to grow and retain new high-tech aerospace and defense jobs in the vicinity of the airport.
Incentives

In addition to ongoing business and workforce support for the industry, Arizona’s incentives for A&D companies are also impressive.

- More than $200 million is available through refundable tax credits, reimbursable grants and property tax reductions. Those incentives include R&D Tax Credits, Quality Jobs Tax Credits and a Qualified Tax Incentive Program. The last one provides up to 10% refundable tax credit for investment in manufacturing facilities.

- Tucson is located in a Foreign Trade Zone and businesses located in a zone or sub-zone are eligible for up to 72.9% reduction in state, real and personal property taxes.

Specialized Commercial Real Estate Needs

Businesses involved in aviation, aerospace or defense manufacturing and service have specialized real estate needs. Tucson can fulfill these needs. The expertise of a local commercial real estate expert is crucial when seeking specialized commercial real estate, especially for manufacturers. This person will understand the needs that are specific to companies who might focus on manufacturing and distribution:

- adequate warehouse space for materials and end product
- building configurations and infrastructure that optimize production and service
- locations with easy access to multiple transportation modes.

Research shows that a key success factor in the global aircraft manufacturing industry includes the ability to expand or curtail operations rapidly as the market demands. The ability to establish a flexible production facility that can meet “troughs and peaks” in demand is key to maintaining profitability. Local commercial real estate experts can readily provide value in all of the above areas because of their familiarity with both the industry and the community.
Flying High: Some Local Success Stories

Tucson already is home to some of the largest names in the industry. Many companies are headquartered here, as well as B2B firms with supply-chain connections throughout Arizona and around the world.

The 1,200-plus companies involved in aerospace and defense are located throughout the city, where there are opportunities to easily connect and partner with other businesses. This map of aerospace and defense companies provides just a glimpse of how prevalent the industry is throughout the Tucson metropolitan area. Nearly every community is touched by people who work in these jobs.

**Raytheon** is Tucson’s largest private employer. Best known as the world’s leader in the building of missile systems, it employs over 9,000 Tucson-area workers. Engineers and staff work toward providing both defensive and offensive weapons for air, land, sea and space, as well as sensors for the battlefield. Raytheon’s need for material, service and support provides millions of dollars to other Arizona and Tucson companies that can meet those needs. In 2007 it was $280 million for the state and $60 million to Tucson-area businesses. In October 2014, Raytheon announced it had won a $149.3 million contract to help build an Israeli rocket-defense system, so it’s good to assume that local and national A&D companies will also benefit from that news.
A few other names that might sound familiar to players in the A&D sector, all of whom have a Tucson presence, include Honeywell Aerospace, Bombardier Aerospace, Areté Associates, Lockheed Martin and Sargent Aerospace & Defense. There also are many small- and mid-sized companies that support these companies in a variety of ways and Tucson has some companies in the Aerospace & Defense sector that maintain a high profile locally.

Glancing at some details of a few of them will better support the idea that internationally renowned companies have committed to and have been successful in Tucson, Arizona. According to “The Arizona Daily Star 200” of top Tucson-area employers, many of these companies have seen an uptick in employee hiring in the past year or two. This bodes well for Tucson and the industry overall.

Airtronics has been in the business of designing and manufacturing aircraft components for nearly 40 years and is currently in the process of setting up a manufacturing facility, a maquiladora, in northern Mexico. It plans to continue healthy growth in Tucson at the same time.

Areté Associates describes itself as a company dedicated to “revolutionizing the mission effectiveness of their National Security customers” and maintains an optical engineering division in Tucson.

Biosphere 2, an Earth systems science research facility, was, in the early 1990s, the home of several Biospherians who lived inside the sealed glass enclosure for two years as part of a mission to aid in understanding ecology. Located just north of Tucson, it is currently used as a University of Arizona environmental education and research facility that can be visited by scientists and the public alike.

Bombardier Aerospace, headquartered in Canada, is an international company operating a Tucson maintenance facility for business and commercial aircraft. With over 900 employees, over 100 of whom were hired in the last three years, the company has benefitted from federal stimulus money channeled through the Arizona Commerce Authority. According to the Vice President of the Service Center, “Tucson is Bombardier’s only wholly owned facility serving both commercial and business aircraft customers that includes a state-of-the-art paint facility, positioning the center as Bombardier’s center of excellence for paint and refurbishment.”

Paragon Space Development Corporation was co-founded by Jane Poynter and Taber MacCallum. The company designs, builds, tests and develops environmental controls for extreme and hazardous environments, including life support systems for astronauts, water divers and other extreme environments. As former “Biospherians,” the founders were part of the Biosphere 2 project, a two-year mission where eight scientists lived and worked inside a three-acre materially closed ecological system.

Planetary Science Institute (PSI). Another Tucson gem is the Planetary Science Institute (PSI). PSI, while not an aviation company or a manufacturer, is dedicated to solar system exploration. This private, nonprofit corporation is headquartered in Tucson and has scientists based in 20 states and in over 10 countries. PSI’s work has included numerous NASA and international missions, the study of Mars and other planets and a variety of additional scientific missions.
Sargent Aerospace & Defense has its headquarters, as well as one of its five North American facilities, in Tucson. Known as a leading supplier of precision-engineered components and aftermarket services, the company is owned by Dover Engineered Systems (DES) and employs over 250 local workers.

Securaplane brings innovation to the commercial aerospace industry in the form of a variety of batteries and electronics. Lithium batteries, power electronics, wireless control systems, high-definition cameras and fully integrated aircraft security systems form the basis of its products. In September 2014, the company announced it was increasing the size of its sales team to support ongoing growth. Earlier in the year it celebrated its 10-year anniversary as a supplier to Airbus. Securaplane is headquartered in Tucson from which it oversees sub-assembly and repair/overhaul operations in Vietnam, the United Kingdom and Singapore. In its relatively new location in north Tucson, the company employees almost 200 workers.

Universal Avionics Systems Corporation, a leading manufacturer of avionics systems, is headquartered near the Tucson International Airport. It has approximately 20,000 UNS systems onboard more than 9,500 aircraft representing over 150 types of aircraft in over 115 countries. Locally, the company is well-known as a developer and manufacturer of the cockpit voice recorders and flight data recorders we all refer to as Black Boxes. Its complete line is much larger and includes products like flight management systems, instrument displays, radio control units, electronic flight bags and terrain awareness and warning systems. Its products can be found in business jets, turboprop aircraft, transport aircraft, helicopters, commercial airliners and military operators.
Additional Local Support

Tucson and Arizona have other benefits to offer in addition to those specific to the aerospace and defense industry. Companies that might plan to move, expand or establish a start-up here can benefit greatly from the variety of support available locally.

Availability of Federal and State Government Funding Programs and Tax Credits

- SBIR (Small Business Innovation Research) grants have been awarded to many Tucson-based companies.
- ACA (Arizona Commerce Authority) provides numerous funding and incentive opportunities to encourage establishment and growth of companies in the state of Arizona.

Availability of Business Capital and Local Entrepreneurship

- Tucson is called an “Emerging Entrepreneurial Hub” by **Entrepreneur Magazine**, August 2013.
- **Chief Executive Magazine** calls Arizona “#6 Best State for Business,” May 2013.

City of Tucson Incentive Programs

- Tucson offers over 21 different business incentives and assistance programs to companies who are considering moving or expanding to the city. Categories include financial incentives, loan programs, business assistance programs, development services programs and incentive districts.
- Hundreds of millions of dollars have been invested in the city as a result of these incentives, creating hundreds of new jobs. The City Manager’s Office of Economic Initiatives combines Economic Development, Annexation, Small Business Assistance and Special Events coordination into one team to continue to improve Tucson’s economic environment.

Strong Research & Educational Presence

- The University of Arizona’s Department of Aerospace and Mechanical Engineering is in a perfect position to help educate and support the A&D industry.
- The university’s Tech Park, The Arizona Center for Innovation (AzCI) and Tech Launch Arizona (TLA) combine resources to help faculty and private companies to commercialize product.
- Arizona’s three state universities (University of Arizona, Arizona State University and Northern Arizona University) conferred more than 3,200 undergraduate degrees and 1,600 graduate degrees in A&D-related fields in 2012.
Pima Community College’s Aviation Technology Program is a great example of workforce development, offering four major program fields of study — structural repair, airframe and power plant, avionics and ground school for professional flight training. PCC offers both certificate and associate degree training in each area of study. The programs are highly regarded in the aerospace industry and the aviation curriculum has been called “one of the best kept secrets among many in the Tucson region.”

"Pima Community College graduates not only form a steady source of employees for local aviation businesses, they also are a boon to the Tucson regional economy. They give those aviation companies reason to expand here in Tucson because there is a ready workforce available to them. Also, our trained workforce serves to help attract other aviation companies to locate here."

—Tom Hinman, Aviation Technology Program Manager, Pima Community College (cited in Inside Tucson Business article April 2012)

Conclusion

This white paper has identified a number of reasons why Tucson, Arizona, has been, and continues to be, a hub for aerospace and defense industry leaders and suppliers.

It also provides evidence of a supportive business community with many local leaders, stakeholders and professionals who are eager to help new or established companies be successful and feel supported if they choose to make Tucson, Arizona, their new home.

In addition, it’s clear that with the University of Arizona and Pima Community College providing well-trained workers ranging from engineers and scientists to aviation technicians, there is a bright future for both companies and individuals in Tucson.
Resources & Publications

City of Tucson. www.tucsonaz.gov
Davis-Monthan Air Force Base. www.dm.af.mil
Pima Community College. www.pima.edu
Pima County Government. webcms.pima.gov/government/economic_development
Port of Tucson. www.portoftucson.net
Tucson Regional Economic Opportunities (TREO). www.treoaz.org

A sampling of local A&D companies
Areté Associates (Sensors, Sources, and Systems Division). www.arete.com
Ascent Aviation Services Corporation. www.ascentmro.com
B/E Aerospace, Inc. www.beaerospace.com
Bombardier Aerospace. www.bombardier.com
Honeywell Aerospace. www.honeywell.com
Lockheed Martin Corporation and Aeronautics Company. www.lockheedmartin.com
Paragon Space Development Corporation. www.paragonsdc.com
Raytheon. www.raytheon.com
Sargent Aerospace & Defense. www.sargentaerospace.com
Securaplane. www.securaplane.com
Universal Avionics. www.uasc.com

Research Reports

University of Arizona Resources
• Arizona Center for Innovation (AzCI) Tech Incubator. www.azinnovation.com
• Biosphere 2. b2science.org
• Department of Aerospace and Mechanical Engineering. www.ame.arizona.edu
• Department of Lunar & Planetary Sciences. www.lpl.arizona.edu
• Tech Launch Arizona (TLA). techlaunch.arizona.edu
• University Tech Parks. techparks.arizona.edu/connections/industry
Sources