

A route to high profits, Aerospace and Defense Industry Thrives in Tijuana



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Tijuana: Mexico's Aerospace Hub

The aerospace industry has long been one of the economic drivers of the Southwest United States, and more recently a key growth industry in Europe, Brazil, and Asia. What's not as often discussed, however, is the emergence of a fast-growing aerospace and defense sector in Mexico - and the increasing role that Tijuana has as a leading nearshore aerospace hub.

The State of Baja California stands out as one of Mexico's top aerospace destinations, where the city of Tijuana holds the largest number of operating aerospace firms in the country (31)¹, and also for developed a 40-years ecosystem specialized in aerospace and defense manufacturing.

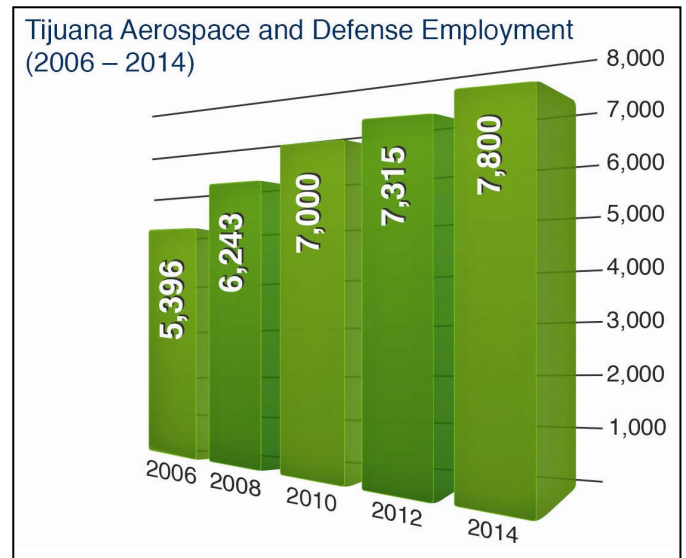
Numbers are gaining altitude, between 2006 and 2013, city's aerospace firms had average annual employment growth of 6% by virtue of its talented pool of young engineers, advanced manufacturing platform, and unparalleled geographic location. Only minutes from Downtown San Diego second-largest city on the West Coast of North America (with nearly 1.6 million residents), Tijuana's also an easy nearshore location to navigate, too.

This document provides a quick, fact-based introduction to help potential investors understand why - now- Tijuana is not only still the number-one city in Mexico for "maquiladora" (IMMEX) manufacturing companies² with 565 (INEGI, 2014), but also a modern city on the frontier of aerospace and defense manufacturing.

The Aerospace Talent of Tijuana-San Diego

With growing industry numbers comes the need for specialized talent - and Tijuana's universities are throttling up to develop a growing number of aerospace professionals. Currently, four universities in the city offer aerospace educational programs tailored to industry's requirements: CETYS university- WASC certified for accredited (with both a Bachelor's degree in Mechanical Engineering with a minor in Aerospace Design, and a Masters program in Aerospace Engineering); UABC State University of Baja California, launched six years ago The Center for Aerospace and Engineering Technology; and Universidad Tecnológica de Tijuana (with specialized programs in Mechatronic Engineering and Aerospace Harness Manufacturing)³. More than 12,216 students enrolled in undergraduate engineering, technological careers and graduate studies in 2014.

In the technical field, CAST opened in 2013 its Aerospace Precision Machining Center (CADTE) to train technicians on how to manufacture precision parts meeting industry's strict quality standards.



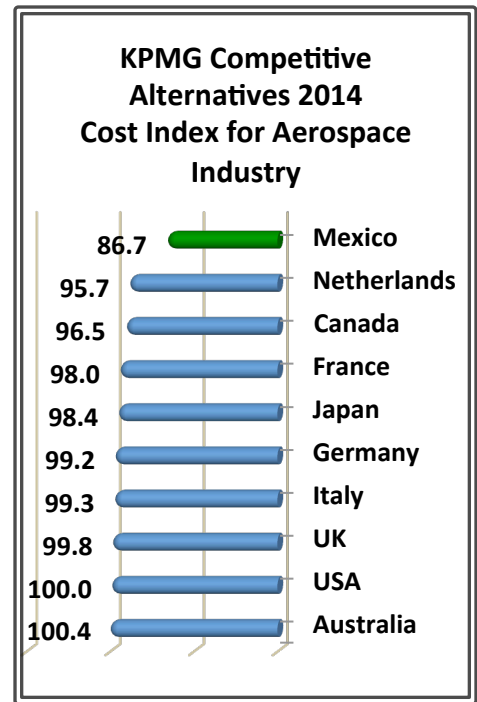
"...The educational focus by local universities in the engineering field has greatly helped the success of our Company..."

- Raul Perez
VP & General Manager
Zodiac Aerospace
Tijuana, Mexico

Why Mexico, and Why Tijuana? The Experts Agree...

Competing in a global environment isn't just a goal, it's a requirement for today's aerospace companies who face increasing competition (and increasing costs) around the world. This force of globalization is, in fact, why the U.S. FAA finalized a **Bilateral Aviation Safety Agreement (BASA)** with Mexico in 2007 - to grant nearshore manufacturing of aerospace components while complying with strict quality and safety standards.⁴

As more options exist for offshore and nearshore manufacturing, it's also useful to note that **Mexico was ranked #1 as the lowest-cost, and 3rd highest after-tax profit country** among ten countries analyzed by KPMG in their *2014 Competitive Alternatives* study⁵. This study evaluated the "impact of 26 significant business cost components that are most likely to vary by location", finding (as seen at right) that Mexico was determined to provide aerospace manufacturers with a **18.7% cost advantage compared to the U.S.**, as well as significant cost advantages compared to other global locations. KPMG's Tax report found that Mexico result in nearly half the Total Tax Costs (Corporate income taxes, other taxes (property, capital, sales) and atatory labor costs) compared to the U.S.⁶.



The facts: while many regions market themselves as possible locations for globally-expanding companies, no other international city offers the unique combination of:

- 40 years of experience in Aerospace and Defense manufacturing.
- A large base of 31 existing aerospace companies within Tijuana, and even more in the State of Baja California;
- A "next-door", nearshore location with quick logistical access to the West Coast of the U.S. and major international seaports and airports with radius in hours - not weeks: Jus-in-time.
- Savings, "Mexico is less expensive than China" according to the New Boston Consulting Group 2014 Cost-Competitiveness Index⁷
- An experienced, quality-conscious and highly bilingual workforce - in a low union, business-friendly environment;

Using sample data derived from industry representatives and the Tijuana EDC, significant savings can be gained for both smaller and larger aerospace and defense manufacturing operations in Tijuana⁶:

Description	U.S. Cost	Tijuana, Mex. Cost
Employees		
Number of Employees	140	140
Direct	101	101
Indirect	25	25
Administrative	14	14
Hours/Work Week	40	48
Hours per year	2080	2496
Labor cost per hour		
Direct Labor Cost/Hr	\$ 14.05	\$ 3.20
Indirect Labor Cost/Hr	\$ 23.52	\$ 13.38
Admin Labor Cost/Hr	\$ 26.51	\$ 24.54
Factory cost		
Labor	\$ 14.05	\$ 3.20
Overhead	\$ 8.56	\$ 5.03
General & Administrative	\$ 4.19	\$ 4.01
Factory cost / Hour	\$ 26.80	\$ 12.23
Total factory operating cost	\$ 5,629,632	\$ 3,083,639
Potential annualized savings		\$ 2,545,993

"Cubic considers Tijuana as not only a strategic place to manufacture, but also a sage and innovative environment of our executives and operations."

- Reiny Giesecke
Director of Business Development
Cubic Defense Applications

Access to Customers & Suppliers

Just-in-time production isn't just an airy concept for Tijuana's aerospace companies - it's a real **cost-saving logistical benefit** that allows many of the city's manufacturers to not only reduce or avoid inventories, but also to ship finished product into the U.S. market in as little as a few hours.

Export: Tijuana is physically located only 15-minutes from downtown San Diego, California, companies operating in Tijuana are easy to access for better management communications and control, as well as *have* easy access to transportation infrastructure so aerospace finished products can be trucked and delivered to anywhere in the U.S. within one- to five-days or shipped away in hours from San Diego', Long Beach' and Ensenada' seaports. Time-sensitive products can fly from SAN, LAX, TIJ and other cargo airports to customers in only hours.



Import: Great access isn't just about geographic proximity - it's also what aerospace manufacturers get with their suppliers. Tijuana's existing aerospace companies already take advantage of a well-developed network of suppliers - importing nearly US\$1.5 billion in products each year. And, as seen in the map above, suppliers of aerospace OEMs and major firms are located within 150 miles in Southern California and less than 300 miles away in Arizona.

Tijuana's Aerospace Firms

In addition to aerospace companies that are operating under AS9100 or NADCAP certifications, over 90% of all manufacturing firms in Tijuana with 250+ employees are certified under ISO 13485, ISO 9000 or other quality standards. Below are just a few of the world-class aerospace companies in Tijuana:

Defense Manufacturing Achievements

With about 45% of the Aerospace installed firms in the city manufacturing for Defense, industry found in Tijuana an experienced manufacturing platform avoiding pitfalls in terms of technological transfer, intellectual property, and quality assurance.

U.S. Defense firms in Mexico are allowed to manufacture products requiring ITAR Registration; to guarantee accomplishment, companies must develop a documented system, in order to demonstrate tracking and control of ITAR items/data. Certainly, some import/export restrictions may apply (ie. end use limitations and product classification); however, it is feasible to have a Defense Manufacturing operation in Mexico abide by U.S. Department of Defense regulations.



Workers at C&D Zodiac in Tijuana assemble window panels for aircrafts July 20. / Photo by Peggy Peattie * U-T

In January 2012, Mexico became the 41st country to enter the Wassenaar Arrangement on export controls for conventional arms and dual use goods and technologies, giving defense and aerospace manufacturing companies established in Tijuana a more efficient regulatory framework for exports controls and documentation.

Taking Off: The Tijuana Aerospace Cluster

The World Bank ranks Mexico as the world's 13th largest economy in nominal terms and No. 11 in purchasing power. "Hecho en Mexico"—Made in Mexico—is a quality guarantee, including in aerospace⁸.

Clearly, the largest aerospace cluster in Mexico in terms of the number of firms, Tijuana is a major addition to North America's aerospace and defense manufacturing centers. Its location next to one of the largest aerospace industry concentrations in Southern California and Arizona certainly helps - as does increased profit margins, high levels of manufacturing security, and world-class quality.

The Cali Baja Bi-National Mega-Region comprised by the State of Baja California, San Diego County and Imperial Valley County, is home to over 400 aerospace and defense companies, representing 33,000 high value jobs within the sector. A binational infrastructure, bicultural engineering talent, and innovation capabilities on both sides of the border, anchor this growing industry.

As Mexico's aerospace industry grows in the coming decade, companies thriving in Tijuana and the Cali-Baja Mega Region keep the route to high profits.

"Tijuana and Baja California are well-positioned to become a center of excellence for component manufacturing in the aerospace industry given the number of companies established in the region, its geographical location, and the initiatives academia, government and private industry are promoting..."

- Alberto García Hentzen
Director Fuel & Motion Control Division
Supply Chain Management
EATON Aerospace Group

For more information about this Analysis, or about the City of Tijuana, please contact the Tijuana Economic Development Corporation at 1-855-55-TJEDC.

References:

¹ Tijuana aerospace firms verified by Baja California Aerospace Cluster. May 2014 based on ProMexico Aerospace Roadmap 2013

² INEGI firm data for Industria manufacturera, maquiladora y de servicios de exportación (IMMEX) industry, accessed June 2014
[<http://www.inegi.org.mx/sistemas/bie>]

³ Baja 's Engineering Talent Fosters Growth of the Aerospace Industry in Mexico, accessed June 2014
[<http://www.prweb.com/releases/2013/3/prweb10553167.htm>]

⁴ For more information about Mexico's Bilateral Aviation Safety Agreement, please see the FAA's website at
[http://www.faa.gov/aircraft/air_cert/international/bilateral_agreements/baa_basa_listing/]

⁵ "Competitive Alternatives: KPMG's Guide to International Business Location - 2014 Edition"
[http://www.competitivealternatives.com/reports/2014_compalt_execsum_en.pdf]

⁶ "Special Report: Focus on Taxes. Competitive Alternatives: KPMG's Guide to International Business Location - 2014 Edition"
[http://www.mmkconsulting.com/compalts/reports/2014_compalt_report_tax_en.pdf]

⁷ BCG Cost-Competitiveness Index Press Release. April 25, 2014
[<http://www.bcg.com/media/PressReleaseDetails.aspx?id=tcm:12-159505>]

⁸ Mexico's Welcome Mat Attracts Aerospace Manufacturers, Michael Mecham, April 2013
[<http://aviationweek.com/awin/mexico-s-welcome-mat-attracts-aerospace-manufacturers>]