



photo: Antonio Mercedo



photo: American Production Sharing

For High Altitude Profits, Aerospace Companies Land in Tijuana

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Tijuana: Mexico's Nearshore 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.

Part of the Baja California aerospace industry cluster, Tijuana stands out by not only having the largest number of operating aerospace firms in Northern Mexico (31)¹, but also as the Mexican city with the largest aerospace industry employment within 400 miles of the US-Mexico border: more than 7,300 employees, in fact, as of mid-2011².

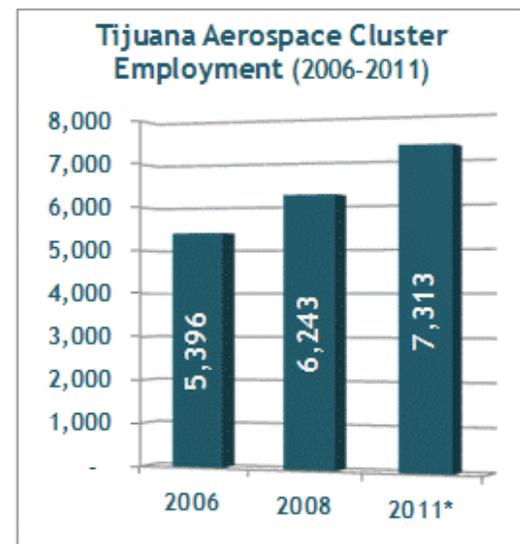
And that's a number that's been gaining altitude, with independent data showing that Tijuana's aerospace industry has continued to grow - despite global economic worries. Between 2006 and 2011, the city's aerospace firms had average annual employment growth of 6%. In some part, this is due to Mexico's lower-cost labor, strong IP protections due to NAFTA, and benefits from Mexico's other free trade agreements. But, only minutes from Downtown San Diego (as seen in the cover photo) and as the 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 - in 2012 - Tijuana is not only still the number-one city in Mexico for maquiladora (IMMEX) manufacturing companies³, but also a modern city on the frontier of aerospace manufacturing.

The Aerospace Talent of Tijuana-San Diego

With growing industry numbers comes the need for aerospace talent - and Tijuana's universities are throttling up to meet that need. Currently, three universities in the city offer aerospace-related educational programs - including CETYS Universidad (with both an undergraduate Mechanical Engineering with a minor in Aerospace Design, and a Masters program in Aerospace Engineering); the Universidad Autónoma de Baja California (with a new undergraduate program in Aerospace Engineering); and the Universidad Tecnológico de Tijuana (with a training program in Professional Engineering in Harness Manufacturing Processes).

In addition, there are more than 35,000 students enrolled in Tijuana's universities (many in engineering studies), not to mention the talent within the entire Tijuana-San Diego region.



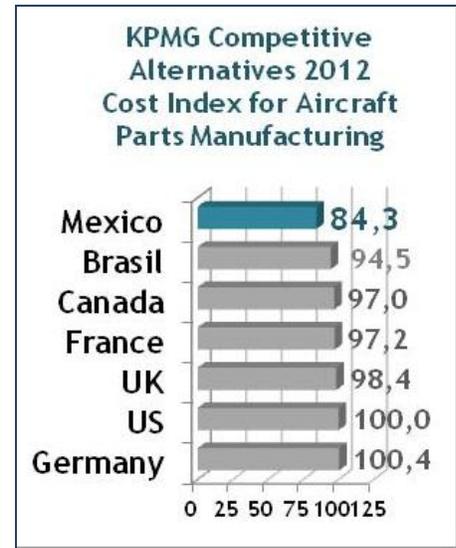
"...[T]he educational focus by local universities in the engineering field has greatly helped the success of our Company..."

- 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 often 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 permit 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 #3 as the lowest-cost** (and highest after-tax profit) country among ten analyzed by KPMG in their *2012 Competitive Alternatives* study. 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 **15.7% cost advantage compared to the U.S.**, as well as significant cost advantages compared to other global locations. KPMG's analysis also found that a location in Mexico could result in nearly four-times the after-tax profit as compared to the U.S.⁵



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

- A large base of 31 existing aerospace companies within Tijuana, and even more in adjacent areas 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 measured in hours - not weeks;
- A trained, quality-conscious and highly bilingual workforce - in a low union, business-friendly environment;
- Strong intellectual property-rights protections guaranteed via NAFTA; and
- Lower-cost (as seen in the sample at right⁶), just-in-time production capabilities.

"Tijuana is a city that is recognized by its manufacturing quality, by its professionals, is a place where any investor can trust in, and it is geographically very well located."

- Juan Antonio Esquivel Lafarga
HR Manager for Mexico
Parker

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

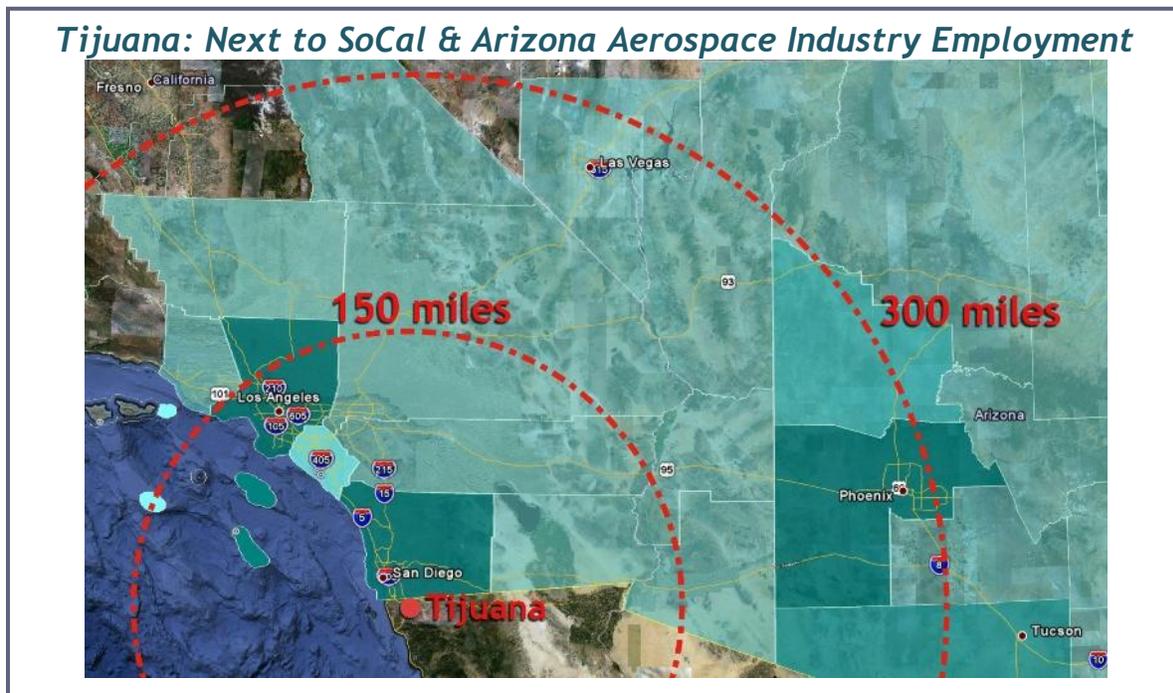
Access to Customers & Suppliers

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.

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 products can be trucked to anywhere in the U.S. within one- to five-days (with time-sensitive products flown from SAN, LAX, and other cargo airports to customers in only hours).



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 below, many suppliers (as well as aerospace OEMs and major firms) are within 150 miles in Southern California and less than 300 miles away in Arizona. These networks grow larger each year with Baja California's own, public-private **Baja Aerospace Supplier Forum**, this year's edition will be held in Mexicali, November 2012 to support the aerospace industry cluster.



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:



Taking Off: The Tijuana Aerospace Cluster

All the facts presented in the previous pages indicate one thing: *Tijuana's aerospace industry is not only on approach, but has arrived spectacularly.*

Clearly, as one of the largest aerospace hubs in Mexico - both in terms of the number of firms and overall cluster employment - Tijuana is poised to become 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.

In addition, on January 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.

As Mexico's aerospace industry grows in the coming decade, Tijuana and the Cali-Baja Mega Region are sure to benefit - and reach new heights.

"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
Manager

Latin America 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.

¹ Tijuana aerospace firms verified by phone April-May, 2011 by Crossborder Group; number of firms compared to city-level aerospace industry data provided in ProMexico's May 2010 "Aeroespacial_Mapa_industria";

² Industry employment confirmed directly with HR or General management of 29 firms in Tijuana, via phone surveys conducted by Crossborder Group (April-May, 2011);

³ INEGI firm data for Industria manufacturera, maquiladora y de servicios de exportación (IMMEX) industry, accessed June 2011 (<http://bit.ly/l61fXG>)

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 - 2012 Edition", p. 12-13
http://www.competitivealternatives.com/reports/2012_compalt_report_vol1_en.pdf

⁶ Cost estimate based on average 2009 US and Tijuana manufacturing industry wages; source: the Tijuana EDC.