

2016

# Aerospace & Defense Manufacturing in Tijuana and Mexico

*Advantages of Nearshoring in Mexico,  
Key Highlights and 2016 Industry Overview*

**WHITE PAPER**



# WHY ARE AEROSPACE MANUFACTURERS EXPANDING TO MEXICO?

**M**exico has rapidly become a top global destination for aerospace and defense manufacturing. The entire California and Baja California is known as the “Aerospace Megaregion,” with the global manufacturing hub of Tijuana boasting an over 50 year-old history in aerospace manufacturing activities.<sup>2</sup> Executives and trade organizations cite major cost savings and ease of doing business benefits in Mexico, including:

- **Low-Cost, Highly-Skilled Workforce**
- **Proximity to Major Markets (US, Canada)**
- **NAFTA, Free Trade Zone**
- **Maquila Duty-Free Temporary Imports**
- **Strong Intellectual Property (IP) Protections**
- **Established Infrastructure**

This white paper will assist executives in understanding the benefits of [manufacturing in Mexico](#) by analyzing Mexico as a potential site for aerospace and defense manufacturing activities. Important factors such as proximity to major markets, infrastructure, labor cost and supply, transportation and ease of doing business, will be covered. Additionally, this paper will also focus on the established aerospace industry of both Mexico and Tijuana, Baja California.

## MEXICO'S AEROSPACE INDUSTRY



**34,000** Workforce



**289** Aerospace & Defense Firms

## SECTION 1

### Mexico: Hub for Aerospace & Defense Manufacturing

Mexico grew from third in 2012 and is now ranked first for lowest business costs according to the annual KPMG Competitive Alternatives: Guide to International Business Location Costs 2016.<sup>1</sup> Valued at \$7 billion in 2014, Mexico's aerospace and defense exports highlight a significant market trend for country's rapidly growing industries.<sup>17</sup>

Mexico is home to more than 289 aerospace manufacturing facilities and a 34,000 strong, highly-skilled direct industry workforce. The state of Baja California, especially the border region, has become a growing global center for the industry and now attracts the largest share of companies in all of Mexico.

From temporary imports for assembly to full production operations and special processing, Baja California is known for interior aircraft design, precision machinery, electrical power systems, and special processes such as heat and surface treatments.<sup>2</sup>

#### SPOTLIGHT

**\$7 Billion**



**Mexico's Aerospace & Defense  
Industry Exports in 2014<sup>17</sup>**

Baja California also leads with expertise in the more complex design and aerospace engineering processes. Exporting more than \$1.5 billion annually.<sup>18</sup> Baja California's proximity to the United States and Canada make it a globally ideal location easily accessible by major North American markets.

In 2013 the Baja Californian government confirmed the regional aerospace industry had generated more than \$300 million in direct foreign investment (DFI) which could potentially outpace the high of \$599.5M in 2011. The manufacturing sector being the largest recipient of such direct foreign investment, adding to a total cumulative DFI to the state's capabilities of \$1.3 billion dollars.<sup>2,5</sup>

## Baja California's Competitive Advantages

- ✧ Baja California has the only Binational Aerospace Cluster in Mexico
- ✧ NAFTA Free Trade Zone with rapid access to U.S. and Canada, ideal for raw materials, components and machinery
- ✧ Access to the port of Long Beach, CA and the Port of Ensenada, Baja California
- ✧ Low-Cost, just-in-time production capabilities
- ✧ Specialized education programs for Aerospace Manufacturing

 **82** Companies  
**28,000**  Workforce

### NATIONAL FLIGHT PLAN:

#### Roadmap for Aerospace & Defense Industries in Mexico & Baja California

ProMexico and the Economy Ministry of Mexico recently developed a roadmap for the national aerospace and defense industries, as well as for Baja California, with three benchmark periods over the next 12 years.<sup>4</sup>

The state of Baja California has the following goals and milestones<sup>15</sup>:

- **By 2015** – B.C. is an international competitive pole through the coordination of a high value productive ecosystem.
- **By 2020** – B.C. is the main export hub of high-value, knowledge-based services (KPO) for Mexico's A+D industries.
- **By 2025** – B.C. is an activator. It coordinates actions to turn Mexico into a KPO leader for fuselage systems and power plants in Latin America.

These main goals highlight the areas of current strategic investments necessary to support current stakeholders and the future investments needed to attract new business to the region. In addition to direct support, funds will be allocated for investment in technical training and university-level fields of study most needed by the aerospace and defense industries, such as electronic and mechanical engineering.

#### Aerospace Cluster of Baja California

The Secretary of the Economy of Mexico officially recognized the Aerospace Cluster of Baja California at the end of 2012. This official recognition also awarded funding to the organization which supports over 30 aerospace suppliers in three segments: Aeronautic, Defense and Space. The Cluster is a non-profit collaboration of private, academic and government industry organizations.

More than 70% of the cluster's federal funding will go to improve the region's aerospace supplier value chain with proper certifications under ISO AS9100, 9110, 91120, AS5553, Nadcap, ITAR/EAR and international aerospace agencies (OACI) USA/Mexico (FAA, TCCA, DGAC), and the European (EASA).<sup>5</sup>

Both the United States Federal Aviation Administration (FAA) and Mexico's Direction General of Civil Aeronautics (DGAC) work closely together, especially in regards to quality and safety of aerospace exports and imports. Additionally, Mexico participates in various international treaties and export control regimes discussed in Section 2 of this paper.

### AEROSPACE MEGAREGION:

#### California & Baja California Border Region

Tijuana welcomed its first aerospace manufacturer when Switch Luz, an airplane interior lighting manufacturer, opened a facility in the city in 1956.<sup>5</sup> Now more than 50 years later, Baja California and its manufacturing powerhouse border city of Tijuana, continue to serve as one of the world's most desirable locations for the [aerospace manufacturing industry](#).

Mexico has registered a growth rate in the sector of approximately 20% since 2004 and is the 6<sup>th</sup> largest supplier of aerospace & defense products to the world's largest aerospace market; the United States.<sup>15</sup> With North America & Europe receiving 42% of all deliveries of aircraft with more than 100 seats, the California and Baja California region is a major hub for global commercial aircraft production.

Baja California ranks as a top destination in Mexico for aerospace manufacturing with over 82 companies and 28,000 direct industry employees.

#### A Long History in Baja California

<b>Rockwell Collins</b>	<b>48 years</b>
<b>Chromalloy</b>	<b>38 years</b>
<b>Honeywell</b>	<b>31 years</b>
<b>Gulfstream</b>	<b>28 years</b>
<b>EATON</b>	<b>10 years</b>

## Defense Manufacturing in Mexico and Baja California

### *Restricted Technologies, Munitions and International Compliance*

Mexico's [defense industry](#) involvement in the development of restricted high and dual-use technologies is the most lucrative part of the national aerospace and defense sectors. At the same time, this sector faces budget constraints, concentration of resources on specific programs and requires a more efficient supply chain to fully maximize the nation's defense industry.<sup>15</sup> With government sponsored endeavors such as the National Flight Plan and strategic regional investments in specific A+D sectors, the country has fortified its capabilities to meet these needs.

Through its entry into the main export control systems such as those of the Bilateral Aviation Safety Agreement (BASA), the Wassenaar Arrangement (WA), the Nuclear Suppliers Group, and soon the Group of Australia; Mexico has managed to strengthen the capture of investment projects which are continually more profitable and strategic, with greater potential for the promotion of industrial competitiveness through technical and financial compensation.<sup>15</sup>

#### EDUCATION SPOTLIGHT

115,000



Approximate engineering graduates annually in Mexico<sup>8</sup>

## Overview of Mexico & Baja's Defense Industry

Mexico's defense industry is by no means a new sector for the country. Major international and US defense contractors such as BAE Systems, Lockheed Martin and Delphi, established operations in Mexico during the late 80's and early 90's. Additionally, it's the support of government and private sector [aerospace manufacturers in Tijuana](#), who are showcasing their capabilities to the world, proving the region is ready to trail blaze for the country's largest share of the defense industry.

Mexico currently attracts 5% of the total number of licenses granted by the State Department of the United States for the production of dual use goods and technologies.<sup>15</sup> In Baja

California, defense companies have worked directly with local educational institutions for high level cooperative training for A+D industry personnel.

Alliances between government, the private sector and academia (sometimes referred to as the "Triple Helix") have fostered an education-rich environment where technical training in specific processes and products have become collaborative ventures. For example, **Honeywell's Mexicali Research & Technology Center (MRTC)** focuses on engineering and integrated technology and is comprised of a design center, a laboratory integration system, and a testing attachment and business support team.

The MRTC allows for full scale simulation of multiple aircraft systems, providing the ability to test their interoperability, control and technical maturity. Additionally, these facilities test a wide range of subsystems and electrical / mechanical products for next-generation aircraft in the air transportation market. Its testing annex supports a wide variety of electronic and/or mechanical activities and manufacturing processes as well as instrumentation test functions.

## Export Control Regimes and International Agreements

The **Bilateral Aviation Safety Agreement (BASA)** was ratified in 2009 by the United States and Mexico and represents a mutual recognition of airworthiness certification systems between the Directorate General of Civil Aviation (DGAC – Mexico) and the Federal Aviation Administration (FAA – United States).

The ratification of the BASA recognizes aeronautical systems and products made in Mexico and allows for the design and manufacture of components in the country by encouraging the development and strengthening of national procurement for the parts manufacturing industry. Products produced under this agreement allow for the DGAC to certify products destined for the United States.

Mexico was accepted as the 41<sup>st</sup> member of the international **Wassenaar Arrangement (WA)** in 2012. The WA was established to contribute to regional and international stability and security by promoting transparency and accountability in the transfer of conventional arms, goods and dual-use technologies.

Mexico's participation in both the BASA and the WA offers certainty to the international community in its capabilities and at the same time makes Mexico eligible as a reliable partner to develop business in the high technology market restricted to those who previously had no access.



## Unmanned Aerial Vehicle (UAV) Market

The US market for Unmanned Aerial Vehicles (UAVs) will grow at a CAGR of 12% to **\$18.7 billion in 2018**; generating approximately \$86.5 billion in revenue during 2013-2018. As Mexico continues to invest in high technology training and education, so will its share of this specific sector of the aerospace and defense industries.

## ITAR: International Traffic of Arms Regulations

The United States government established ITAR for the export and import of defense related products and services on the United States Munitions List (USML). Based on the provisions of the Arms Export Control Act (AECA), these regulations aim to safeguard US national security and further US foreign policy.

ITAR regulations are important to aerospace and defense companies who are exploring Mexico as a potential site for their activities. Its regulations mandate strict adherence from the nationality of the personnel on the production floor to how emails are handled when sensitive topics or technologies are discussed.

When looking to produce ITAR products in Mexico, executives should consider the following:

- **Employees & Personnel**, Nationality & Training
- **Facility Security**, Physical Site and Digital
- **Technical & Sensitive Data**, Management & Monitoring
- **Continuous Compliance**, Manufacturing & Export

Due to the sensitive nature of defense technologies, the complexities of international arms and munitions treaties regulating trade, and the complexities of complying with ITAR's detailed requirements, defense companies considering Mexico should consult an experienced specialist or services firm. For example, Smiths Interconnect whose customer's include various US defense departments, major prime contractors and tier I system providers, established a shelter corporation for their new operations in Mexico in 1996 under the administrative services firm, CPI.

## Nadcap Accreditation

Nadcap (National Aerospace & Defense Contractors Accreditation Program) is a vital international quality assurance program that oversees the processing and production of materials and products that destined for use in the U.S. aerospace and defense industries. Administered by PRI, the accreditation time for even a single process can take anywhere from 1-2 years.

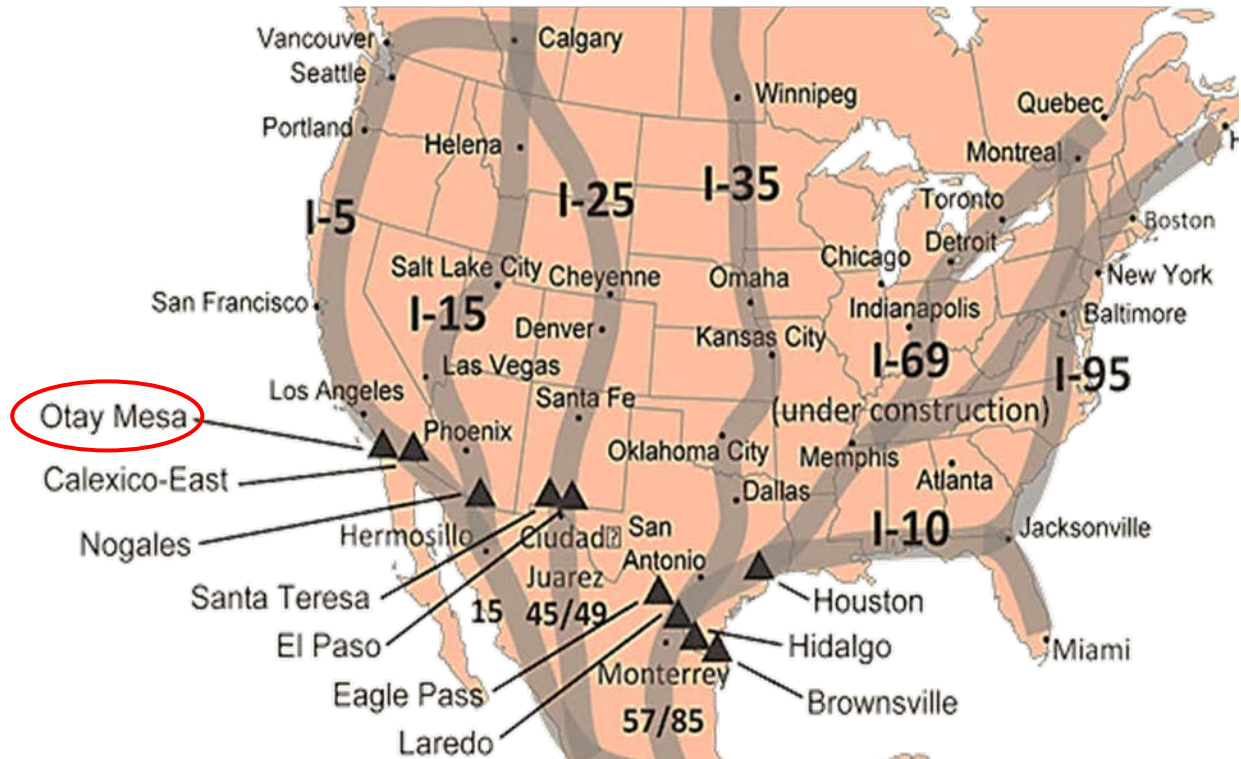
Nadcap accreditations exist for a variety of specialized processes from heat treating to non-destructive testing. Additionally, once a company is certified for one or more of these processes, they also go through an extensive annual audit process to verify continued compliance. BAP Aerospace de Mexico recently completed their Chemical Processing (CP) Nadcap certification which took 18 months and makes them the first company in the Baja California region carrying the CP accreditation. Aerospace and defense companies making plans for operations in Mexico should include Nadcap accreditation and the compliance timeframes into consideration.

## Major Defense Companies in Mexico

Mexico's A+D industries showcase major U.S. and international companies producing or assembling parts from the tail to the nose of the aircraft. Companies such as Eaton, Zodiac, Lockheed Martin, and Gulfstream are major players in the Tijuana/Baja California Region.

<b>BAE Systems</b> (Sonora)	Propeller & Rotor parts, Electrical Power & Cable, Fuel Systems, Hydraulic & Power Systems
<b>CUBIC Systems</b> (Tijuana)	Avionic, Communication, Computer and Electrical Power Systems
<b>Delphi Connection Systems</b> (Tijuana)	Computer System Software, Information Systems, Connection systems,
<b>Eaton Aerospace</b> (Tijuana)	Propeller & Rotor parts, Electrical Power & Cable, Fuel Systems, Hydraulic & Power Systems
<b>Honeywell</b> (Mexicali)	Propeller & Rotor parts, Flight Controls, Fuel & Fuel Systems, Hydraulic & Power Systems
<b>Lockheed Martin</b>	Electrical Power, Airborne Auxiliary Power Systems

## NAFTA Corridor & Major Commercial Routes



### SECTION 3

## NAFTA for the Aerospace & Defense Industries

### *Welcome to an Effortless, Free Trade Zone*

During the last 15 years, Mexico's foreign trade policy has focused on establishing strong commercial trade partnerships with other countries. Mexico has entered into 12 major free trade agreements giving preferential treatment to 49 markets on three continents.

Despite multiple strong agreements with the European Union and Latin America, it's the North American Free Trade Agreement (NAFTA) that remains the most attractive to North American companies selecting Mexico for their next facility. Signed by the United States, Canada and Mexico in 1994, NAFTA created one of the largest trade zones in the world with more than 160 million consumers within its borders.<sup>7</sup>

"Mexico has a free market economy in the trillion dollar class," according to a KPMG report, with trade to the US and Canada nearly tripling since its signing in 1994.<sup>7</sup> NAFTA has proven to be a successful 20-year global case study on how lucrative trade agreements can be, especially between neighboring countries.

### NAFTA Free Trade Zone

NAFTA's main purpose is to gradually reduce or eliminate trade barriers between its three member nations, with 99% of imports currently duty-free in Mexico, and the remaining 1% benefiting from preferential duty. In very few cases where NAFTA does not apply, the Mexican government established programs such as IMMEX and PROSEC to fill these gaps.

### From Buy American to "Buy NAFTA"

The United States government's Buy American Act includes acquisitions by the U.S. Department of Defense and restricts purchases from suppliers whose products do not contain a minimum of 50% national produced content. As this directly conflicts with NAFTA provisions banning protectionist legislation such as the Buy American Act, Mexico and the United States intend on signing a Memorandum of Understanding (MoU) that will exempt Mexico from this Act.<sup>15</sup>

### IMMEX Program for Temporary Import

This program is ideal for A+D manufacturers who are looking for low cost manufacturing and assembly solutions that also shorten the supply chain to major markets. Under the Manufacturing, [Maquiladora and Export Service Decree](#), the IMMEX Program allows for goods, raw materials and components to be imported into Mexico on a temporary basis, duty-free and VAT-free, as long as they are returned abroad within the established timeframes (most are 18mos).<sup>7</sup>

## Free Import: Special Aerospace Tariff Sections 9806.00.06 & .05

The creation of new tariff sections 9806.00.06 allows for free imports to assemble and manufacture aircraft or aircraft parts, when companies have the Certificate of Approval to Produce issued by the Ministry of Communications and Transportation.<sup>15</sup>

Additionally, the previous section 9806.00.05 corresponding to the “goods for repair or maintenance of aircraft or aircraft parts,” benefits MRO activity allowing imports under this item to also be free of tariffs and have administrative advantages for companies.

These sections have benefited most companies regardless of their activities, whether engaged in the design and development of parts, assembly or manufacture of harnesses and wires, airframe parts, components for landing systems, machining and metal turbine parts, precision equipment, audio and video systems, electronic components, etc., or repair work and maintenance and repair of aircraft interiors, mechanical and electrical parts, repair and maintenance of turbines, among others.<sup>15</sup>

## TPP: Benefits for [Manufacturers in Mexico](#)

The establishment of a free trade zone for 12 countries under the Trans Pacific Partnership in 2016 will open up NAFTA-style preferential tariffs or liberalization of tariffs. The member states include the USA, Canada, Mexico, Peru, Chile, Australia, New Zealand, Japan, Malaysia, Singapore, Vietnam and Brunei. Ratification is expected by 2018 and is expected to boost exports in strategic sectors such as vehicles & auto-parts, aerospace, medical devices, electric equipment, cosmetics, tequila, mescal, beer, avocado, beef, pork and orange juice.<sup>15</sup>

## IP Protections

Mexico is regarded as having strong IP protections and enforcement. Two main Mexican laws govern intellectual property. The Industrial Property Law, enforced by the Mexican Trademark Office (IMPI), and is mainly for inventions, trademarks, industrial designs, and appellations of origin. The second is the Copyright Law enforced by the Mexican Copyright Office (INDAUTOR), and is primarily for literary, musical, artistic, photographic and audiovisual works.<sup>4</sup>

Both of these laws were modeled after international standards set by the World Intellectual Property Organization (WIPO) and carry similar legal provisions for IP protection and enforcement as seen in the United States. The Mexican Patent and Trademark Office will cooperate with its counterparts in other countries to reduce the local examination process for patents that have already been registered in other countries.

## An Infrastructure of Support Services

After nearly 20 years since the signing of NAFTA, Mexico has fostered a pro-business environment ideal for manufacturing activities. From industry support service companies such as legal consulting firms and administrative services outsourcing to call centers, and trade & logistics specialists, a long-established network of support services available for aerospace and defense manufacturers.

Most support service companies carry decades-long expertise for doing business in Mexico, shortening the supply chain, and maximizing benefits from trade agreements such as NAFTA. For businesses looking to establish operations in Mexico, [Co-Production International \(CPI\)](#) is one of these whose purpose is to take on the logistical and legal tasks of establishing your new operations, managing day to day administrative activities, along with trade and logistics support.

Using the shelter model for legal and corporate establishment, services firms such as CPI are a large part of the support services infrastructure for the aerospace and defense industries in Mexico. CPI is registered with the US Department of Defense acting as a 3<sup>rd</sup> party for A+D manufacturers and suppliers seeking to establish new operations in the region.

### SECTION 4

## Mexico's Low Cost, Highly Skilled Workforce

### *Expect Employees to be University Educated and Technically Trained*

Mexico and Baja California's workforce is well-educated, plentiful and reliable. Graduating around 115,000 engineering and technical students nationally per year, Mexico produces roughly three times more graduates in the field than the United States.<sup>8</sup> Baja California's aerospace industry is responsible for over 28,000 direct industry jobs in the state.<sup>17</sup>

Higher Education Enrollment in Tijuana 2013 <sup>12</sup>	
Under Graduate	40,963
Technical Training Students	6,434
Graduate Students	3,215
Total (estimated):	50,612

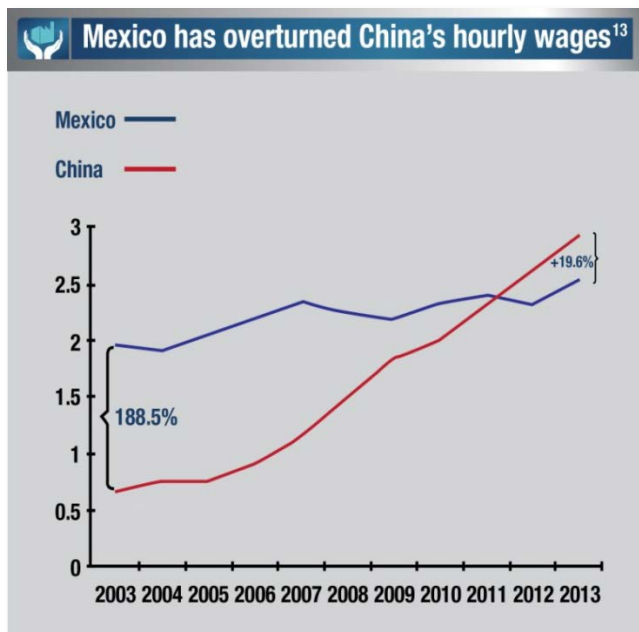


The Baja California's state university (UABC) is located in most major urban centers of the state and offers Bachelor of Science degrees in Aerospace, Electronics, Electrical, Mechanical, and Industrial engineering fields. Baja California's direct industry workforce represents 50% of the national Mexico aerospace workforce, and is the top contributor to aerospace industry jobs in the country.<sup>15</sup>

[Tijuana's workforce](#) is extremely reliable with executives citing benefits of the closer cultural ties with the mostly bilingual workforce versus difficulties observed in offshore locations like those in the Asia-Pacific. The manufacturing industry in Tijuana represents 47% of the permanent private jobs in the city.<sup>2</sup>

## Highly Skilled & Highly Trained

Baja California is home to 35 universities and 14 technical schools offering over one hundred professional degrees including Biotechnology, Physics, Oceanography, Digital Geothermal Technology, Astronomy, Aerospace, Electrical Engineering, and Sustainable Energy.<sup>10</sup> Most universities and technical schools are located in major urban centers such as Tijuana (35) and Ensenada (12) and many participate in direct education exchange programs with the leading universities in Southern California and San Diego.<sup>2, 10</sup>



## Globally Competitive Labor Rates

In the high growth markets, total labor costs account for approximately 30 percent of total location-sensitive costs in manufacturing and approximately 65 percent of total location-sensitive costs in service operations. Labor costs are lowest in India, China, and Mexico.<sup>13</sup>

In the last 10 years Mexico has significantly closed the gap in labor costs compared to its offshore competitor, China. [Labor cost in Mexico](#) went from being 200% more expensive than

China, to an impressive 19.6% difference today. Adding in transportation and logistics time and cost, companies are finding nearshore operations in Mexico dramatically less expensive, even with the growing gap in labor costs.

## New Aerospace Training Facility Opens

In April of 2013 the Baja California Aerospace industry opened a new Precision Machining Center (called the CADTE) in Tijuana to specifically train aerospace technical and precision machining skills.<sup>3</sup>

Baja California's leadership is, "in large part, thanks to the work of the 16,000 men and women in the industry that continue to build a future here based on **high value knowledge (KPO)**," said then-Governor Osuna Millán. Knowledge Process Outsourcing (KPO) has become a growing approach taken by companies that use services and consulting firms when exploring complex activities such as expanding operations nearshore.

In addition to attending full term university and technical schools for various aeronautical and aerospace industry specialties, classes are often put on to enhance student's practical knowledge and application of various levels of product design and certification, including Air Transport Association (ATA) nomenclature, aeronautical tools and machinery, along with US Federal Aviation Administration (FAA), product and procedure Federal Aviation Regulations (FAR) 21, 23, 25, 27, 29, 31, 33 and 35.

Many courses, both in public educational institutions and private-sector training facilities, award various levels of FAA educational certifications, including the Type Certificate (TC), Supplemental Type Certificate (STC), Technical Standard Order (TSO), and the Parts Manufacturer Approval (PMA).

### BAJA CALIFORNIA GOVERNOR OSUNA MILLÁN <sup>2</sup>

"Baja California has invested more in education than in any other state, represented in part by the 20,923 students in engineering and technology through their academic institutions."

## Close Cultural Ties to the United States

Strong cultural, economic and familial ties have existed between Tijuana and San Diego for decades, some would say as long back as when California was still a part of Mexico.



With over 59 million northbound crossings from Tijuana to San Diego a year, executives find that the region is not only largely bilingual, but also engrained with many American customs. Additionally, the US Dollar is a widely accepted and used form of currency, especially along Northern border regions and in city metropolises. It also the main currency for most commercial trade.

SECTION 5

# Mexico’s Commercial Trade & Logistics Infrastructure

## Rapid Ground & Air Transportation to Major North American Markets

Baja California is Mexico’s most western state located just south of California. The Tijuana/San Diego border region is one of the largest in the world for both tourism and commercial trade. With the enactment of NAFTA, Mexico has invested significantly in infrastructure improvements to maintain existing, as well as attract new commercial trade to the region.

### Highways & Transportation

Tijuana and the Otay Mesa Commercial border crossings are located just minutes south of San Diego, California, giving commercial transportation access to all major North American trade corridors and highways. (Also see map on page 5.) Baja California has a strong network of well-maintained highways with Highway 1 as the major artery connecting the entire state to the US via San Diego. Running east from Tijuana, Highway 2 provides direct connection to eastern commercial land ports of entry like those in Nogales and El Paso.

In addition to several thousand miles of highways and railways used to move raw materials and finished products throughout the region and to major North American markets, Baja California also has one deep water port located in Ensenada. A mere 63 miles south of Tijuana/San Diego, Ensenada’s deep water port is directly linked to over 60 major international commercial ports, including the global hubs of Los Angeles, Long Beach and Hong Kong.

### NEW, FASTER PROCESSING: Otay Mesa Commercial Crossing

Otay Mesa is located just 15 minutes east of Tijuana and 20 minutes south of San Diego, California. Designated as the only commercial crossing in all of Southern California, Otay Mesa sees more than 1.4 million commercial trucks crossings into the United States a year.

A new facility located at the Otay Mesa port of entry was recently completed in 2013 by the Mexican government and has customs officers from both the U.S. and Mexico. From laboratory rooms and cold storage, to state of the art inspection equipment, the purpose of joint operation is to speed processing of produce coming into the US. Its these types of investments in infrastructure and import/export process improvement by the Mexican government that continue to prove the country’s dedication to increasing efficiency in trade and commerce for its region.

In the summer of 2013, US Customs and Border Protection began two new pilot programs at the Otay Mesa commercial crossing for empty trucks heading both north and southbound. These pilot programs are meant to help ease traffic and wait times. Now, the northbound import facility will open at 5am (instead of 6am) and the southbound export facility will open at 7am (instead of 8am). Investments by the US in these types of pilot programs also show the importance of the commercial trade relationship with Mexico.

### Facilities & Real Estate

The Tijuana industrial real estate market offers more than 57.3 million square feet of pre-owned and new buildings throughout the city. From Class A to Class C facilities, companies will find shell, semi-finished and built-to-suit options, as well as inexpensive land for new facility construction. Tijuana has over 52 industrial parks making it one of the top four industrial markets in Mexico.

	'14 Q1	'15 Q1	'16 Q1	Trend
Total Available Industrial Space (Million SF)	4.97	4.48	2.89	↓
Vacancy Rate %	8.06%	7.00%	4.40%	↓
Asking Lease Rates Class A, \$/SF/month	\$0.45	\$0.45	\$0.46	↑
Under Construction (SF)	497,327	800,556	833,242	↑

### Utilities Infrastructure

Utility costs include electricity and natural gas costs and represent up to 8 percent of total location-sensitive costs. Mexico has very low utility costs when compared to other major growth markets.<sup>13</sup> For example, the capital of Baja California, Mexicali, lies just east of Tijuana, supplies most of its inhabitant’s electricity from hydroelectric power provided by the Colorado River.

Within the last 2 years Mexico also made the electrical infrastructure for new facility sites easier to obtain by streamlining procedures, offering training opportunities to private contractors, using a geographic information system (GIS) to map the electricity distribution network and increasing the stock of materials.<sup>9</sup>

A majority of the water supply for Tijuana is obtained from the Colorado River. The Baja Californian State Water Commission (CESPT) opened two new water treatment plants in Tijuana in 2010 for recycled water meant specifically for industrial use.<sup>10</sup> These two new facilities were certified by the North American Bank.

#### SPOTLIGHT

# \$11 Billion

## Tijuana's Annual Industrial Supply Demand<sup>2</sup>

### Supply Chain & New Exposure

The Aerospace industry not only identifies the financial benefit in overhead reductions of by expanding or moving operations to Mexico, but keys in on additional features of locations such as Tijuana. In addition to lowering costs, aerospace companies also enjoy the lucrative nature of being geographically located in the heart of Mexico's largest Aerospace Manufacturing Cluster, giving them access to new clients and new suppliers.

In Tijuana alone, industrial supply demand totals \$11B USD annually, with a majority in electronics, medical products, automotive, aerospace and other industries.<sup>2</sup> In aerospace components and services, for example, there are 13 companies in aeroengine components and aerostructure components, 25 companies in electric, electronics, and electrical cable and accessories; and 7 in armaments and related equipment. Additionally Tijuana is home to control systems, landing gear parts and components, technical textiles, wings, windows, fuel and fuel systems, ground support and airfield equipment and avionics components suppliers and manufacturers.<sup>2</sup>



Companies like **Eaton Aerospace**, **Gulfstream** and **Honeywell** have found that their proximity to other aerospace manufacturing and assembly operations opened themselves up to new suppliers and a new supply chain. For Honeywell, who first established operations in Mexico in 1947, the country "has played an important role in Honeywell's globalization initiative over the past decade, greatly expanding the company's manufacturing base and shared services operations. The country is making a big contribution to the company's success by increasing

domestic sales, exports and the production of aerospace, automation and control, and turbocharger products."<sup>16</sup>

## SECTION 6

### Nearshore vs. Offshore

#### World Bank: Mexico Top-Ranked Global Destination for Doing Business

Mexico is ranked 38 under the "ease of doing business" category, surpassing all the BRIC countries and also including Costa Rica (58), China (84), Brazil (116), and India (130), according to the World Bank's annual report "Doing Business 2016," which compares business regulations for domestic firms in 185 countries.<sup>9</sup> This represents a marked improvement of Mexico's rank of 48 in 2012.

Improving five positions since 2012, Mexico's pro-business government made notable improvements including eliminating minimum capital requirements for LLCs, and reducing the number of times a company pays taxes from 27 to 6 times a year.

The cost of manufacturing aerospace materials, aviation and electronic devices, special processing and precision components; concept testing, operating and labor costs in Mexico are all substantially lower than in other countries across all levels of specialization.

### Mexico Logistics Savings for Manufacturers

The cost to transport materials and products represents anywhere from 30–40% of your total logistics costs. Contributing directly to your bottom line and the product's final cost, logic dictates having your manufacturing activities as close to your market as possible. Tijuana is only 140 miles from Los Angeles making it 46 times closer to North American markets than the global commercial logistics hub in Shanghai.

## NEARSHORE COMPANY HIGHLIGHT

### BAP Aerospace de Mexico

BAP Aerospace de Mexico, a subsidiary of the US based [Barry Avenue Plating](#), specializing in metal finishing, processing, production and final assembly for the aerospace and defense industries. Their expansion in Mexico made immediate press with their new 30,000 ft<sup>2</sup> facility that opened this 2014.

BAP used Co-Production International (CPI), to handle corporate legal establishment and manage day-to-day administrative responsibilities for their expansion in Tijuana. The services CPI provided allowed the flexibility and "freed up my time which allowed BAP to concentrate solely on Nadcap certification and facility readiness," said Cruz Maldonado, President BAP Aerospace de Mexico.

BAP Aerospace de Mexico received two of the three Nadcap accreditations for Chemical Processing (CPI) and Aerospace Quality Standards (AQS) in early 2013, making it the first to do so in all of Baja California and the 5<sup>th</sup> in Mexico as a whole at the time. Most international aerospace firms require their suppliers and manufacturers carry Nadcap accreditation.

REGIONAL SPOTLIGHT

Mexicali, Baja California

**Mexicali** is the capital of Baja California and is located just east of the Tijuana/San Ysidro and Otay Mesa border crossings. A rapidly growing city both in population and industry, Mexicali is home to over 130 industrial firms, including the major aerospace giants of **Honeywell**, **Gulfstream** and **UTC Aerospace Systems**.

The city's main activities of manufacturing, trade, services and construction, receive highly-trained and highly-skilled personnel into the workforce from the 12 universities ranking amongst the best in the nation. Mexicali offers an established and experienced infrastructure for international trade and business and is becoming an increasingly popular destination for foreign companies.

Major Aerospace Companies in Tijuana

Of note, more than 90% of companies in Mexico with more than 250 employees are ISO certified.<sup>10</sup>

<b>BAP Aerospace de Mexico</b>	Metal finishing, processing, production and final assembly
<b>CUBIC Systems</b>	Avionic, Communication, Computer and Electrical Power Systems
<b>EATON Aerospace</b>	Propeller & Rotor parts, Electrical Power & Cable, Fuel Systems, Hydraulic & Power Systems
<b>Honeywell</b>	Propeller & Rotor parts, Flight Controls, Fuel & Fuel Systems, Hydraulic & Power Systems
<b>Lockheed Martin</b>	Optical components and electronic sub-assemblies
<b>RAM Technologies</b>	Foam and Fabric for Defense and Industrial
<b>UTC Aerospace Systems</b>	Aeroengine parts and components, assembly & manufacture

SECTION 7

Getting Started in Mexico

It Doesn't Get Any Easier!

Starting or expanding your business in any foreign country can be a daunting decision process for any sized business. Fortunately it couldn't be any easier than it is in Mexico. In addition to the long history of social and cultural ties between the Mexico and the United States, the two countries have also mastered a mutually beneficial and supportive environment for trade and commerce.

An Industry at Your Service

Considering close geographic proximity, over 20 years of NAFTA, and an established network of industry support services, executives exploring Mexico for their next facility can rely on services organizations whose sole purpose is to facilitate or handle it all for you. Not only are there many companies such as [Co-Production International](#), to facilitate your operations in Mexico, but also government organizations waiting to get you through the legal steps so you can get up and running as soon as possible.

Security & Safety in Mexico

One last consideration by executives is the safety and security of the country they are considering to do business in. Much of the news reports of unrest in Mexico, especially along the US/Mexico border, have been shown to be exaggerated.

Co-Production International has an expanded paper for executives interested in learning more about issues of security and safety in Mexico. For your free copy of *Security First in Tijuana, Mexico*, visit CPI's [website](#) or contact CPI at (877) 230-7989.

Mexico: A New State of Manufacturing

Executives and companies consider a handful of factors when exploring new facilities for aerospace and defense manufacturing activities. Most frequently considered are the cost-effectiveness of production (labor & materials), the proximity to major markets, trade and commerce infrastructure, and ease of doing business. Additionally, with the specialization and international quality standards for aerospace and defense products, a country's compliance and capabilities are equally important considerations.

Years ago businesses wouldn't hesitate to cite offshore countries such as China as the hands-down lowest cost option for manufacturing. After examining various factors crucial to a low cost, efficient and lean manufacturing supply

chain, Mexico has emerged as a global leader for the aerospace and defense industries.

## 2016 EVENTS HIGHLIGHTS

# Upcoming Regional Aerospace Events

## CPI Baja Manufacturing Tours

Tijuana, Baja California

### Want to see it first hand?

Get a chance to see manufacturing in Mexico up close! Tour includes visits to manufacturing OEMs, industrial park and sites, and meetings with government officials specializing in setting up operations in Mexico.

**Contact us today to set up a tour date that works for you!**

**Denisse Martinez**

[denissem@co-production.net](mailto:denissem@co-production.net)

[www.co-production.net](http://www.co-production.net)

## REFERENCES

1. **Competitive Alternatives: KPMG's Guide to International Business Location Costs 2016.** Retrieved 05-2016. [https://www.competitivealternatives.com/reports/compalt2016\\_report\\_vol1\\_en.pdf](https://www.competitivealternatives.com/reports/compalt2016_report_vol1_en.pdf)
1. **Business Conexión Magazine June 2013. Special Aerospace Edition: Welcome to the Aerospace Megaregion.** June 2013. <http://www.businessconexion.info/especiales/>
2. **New Precision Machining Aerospace Center in Baja California, Mexico's Aerospace Manufacturing Hub.** Tijuana Economic Development Council (EDC) Press Release. April 29, 2013. <http://www.prweb.com/releases/2013/4/prweb10679685.htm>
3. **Flight Plan: Mexico's Aerospace Industry Roadmap - Baja California. 2012-2020.** [http://www.tijuana-edc.com/sites/default/files/u1/baja\\_aerospace\\_roadmap.pdf](http://www.tijuana-edc.com/sites/default/files/u1/baja_aerospace_roadmap.pdf)
4. **Executive Report of the Aerospace Cluster of BC, from the Paris Airshow June 17-23, 2013.** Aerospace Cluster of Baja California. PDF Report issued July 2013.
5. **ProAéreo: Strategic Program for the Aerospace Industry 2012-2020.** FEMIA (Mexican Federation of the Aerospace Industry). [https://docs.google.com/viewer?url=http://femia.com.mx/themes/femia/ppt/proaereo\\_esp.pdf](https://docs.google.com/viewer?url=http://femia.com.mx/themes/femia/ppt/proaereo_esp.pdf)
6. **Investment in Mexico 2012.** KPMG. 2012. <https://www.kpmg.com/US/en/IssuesAndInsights/ArticlesPublications/Documents/investment-in-mexico.pdf>
7. **Mexico: The New China.** New York Times. January 26, 2013. [http://www.nytimes.com/2013/01/27/opinion/sunday/the-tijuana-connection-a-template-for-growth.html?\\_r=0](http://www.nytimes.com/2013/01/27/opinion/sunday/the-tijuana-connection-a-template-for-growth.html?_r=0)
8. **Doing Business 2016: Comparing Business Regulations for Domestic Firms in 185 Countries.** World Bank. 2016. <http://www.doingbusiness.org/~media/GIAWB/Doing%20Business/Documents/Annual-Reports/English/DB16-Full-Report.pdf>
9. **Tijuana Economic Development Council** (Tijuana EDC). [www.tijuana-edc.com](http://www.tijuana-edc.com)
10. **Industrial Trends & Statistics: Tijuana, Baja California. Q2. 2013.** CBRE. (San Diego Office)
11. **US Department of State Announces Mexico's Accession to Wassenaar Arrangement.** January 25, 2012. <http://www.state.gov/r/pa/prs/ps/2012/01/182499.htm>
12. **Competitive Alternatives: KPMG's Guide to International Business Location Costs 2012.** KPMG. 2012. <https://www.kpmg.com/Global/en/IssuesAndInsights/ArticlesPublications/Documents/competitive-alternatives-special-report.pdf>
13. **Labor Statistics – Multiple Sources.** Merrill Lynch Global Research, Banxico, INEGI, International Labor Organization, Tijuana EDC, China NBS Own estimates for China since 2009 and for Mexico in 2013.
14. **Flight Plan – Mexico's Aerospace Industry Roadmap 2013.** ProMexico and Ministry of the Economy of Mexico. 4<sup>th</sup> Edition, June 2013.
15. **Honeywell Worldwide website.** Retrieved 08-2013. <http://honeywell.com/worldwide/Pages/mexico-en.aspx>
16. **Aerospace Cluster of Baja California.** Retrieved 04-2016. [www.bajaaerospace.org](http://www.bajaaerospace.org)
17. **Aerospace & Defense White Paper.** March 2016. Retrieved 05-2016. <http://tijuanaedc.org/wordpress/wp-content/uploads/2016/03/Manual-Aeroespacial-WEB.pdf>

*References and sources provided for further information. This is not a legal document. Co-Production International, Inc. does not guarantee claims made by sources used in this paper. Every effort to be accurate has been made at the time of publication. Corrections to data or errors should be sent to CPI.*



## FURTHER READING

CPI invites you to read more about manufacturing in Mexico with its series of White Papers on the following industries. Requests to: Denisse Martinez, Marketing Director, Email: [denissem@co-production.net](mailto:denissem@co-production.net) Phone: (619) 429 4344 Ext. 231

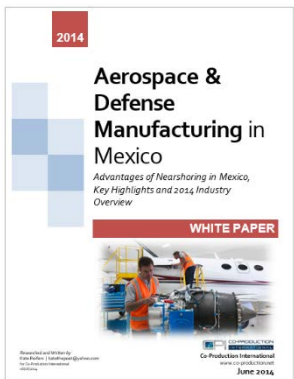
## NEW! Industry Fact Sheets 2016

- Medical Device
- Aerospace & Defense
- Electronics
- Automotive & Auto Parts



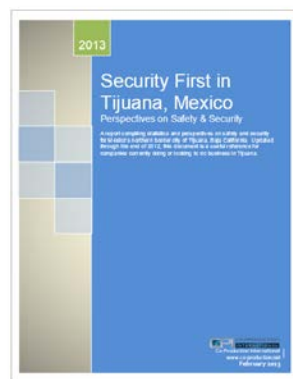
## Manufacturing in Mexico 2016

[LINK TO DOWNLOAD](#)



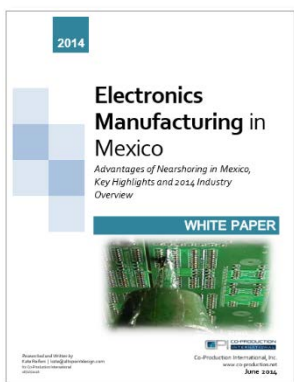
## Aerospace & Defense Manufacturing in Mexico 2016

[LINK TO DOWNLOAD](#)



## Security First in Tijuana, Mexico 2013

[LINK TO DOWNLOAD](#)



## Electronics Manufacturing in Mexico 2016

[LINK TO DOWNLOAD](#)



## Medical Device Manufacturing in Mexico 2016

[LINK TO DOWNLOAD](#)