

2013

Aerospace & Defense Manufacturing in Mexico

*Advantages of Nearshoring in Mexico,
Key Highlights and 2013 Industry Overview*

WHITE PAPER



WHY ARE AEROSPACE MANUFACTURERS EXPANDING TO MEXICO?

Mexico 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.² 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 examines current news and industry reports important to the aerospace and defense manufacturing industries. Meant to assist executives in understanding the benefits of expanding operations to Mexico, this paper analyzes Mexico as a potential site.

Also examined are important factors such as proximity to major markets, infrastructure, labor cost, supply chain, transportation and ease of doing business in Tijuana and Mexico. Due to the unique nature of the aerospace and defense industries, the paper also presents Mexico’s capabilities in specialized processes, international certifications and industry accepted quality assurance procedures.



SECTION 1

Mexico: Hub for Aerospace & Defense Manufacturing

Mexico is ranked third out of five high growth markets to watch, which include Brazil, China, India and Russia, according to the annual KPMG 2012 Guide to International Business Location Costs.¹ Valued at \$5.04 billion in 2012, Mexico’s aerospace and defense exports highlight a significant market trend for country’s rapidly growing industries.⁶

Mexico is home to more than 260 aerospace manufacturing facilities and a 31,000 strong, highly-skilled direct industry workforce. The state of Baja California, especially the border region, are becoming growing global centers for the industry and now attracting 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.²

SPOTLIGHT

\$5.04 Billion
Mexico’s Aerospace & Defense
Industry Exports in 2012¹⁵

Baja California also leads with expertise in the more complex design and aerospace engineering processes. Exporting more than \$1.391 billion annually, the state holds a 28% of national aerospace and defense industry exports.¹⁵ 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.^{2,5}

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.⁴

The state of Baja California has the following goals and milestones¹⁵:

- 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).⁵

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 1956.⁵ 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 and defense industries.

Mexico has registered a growth rate in the sector of approximately 20% since 2004 and is the 6th largest supplier of aerospace & defense products to the world's largest aerospace market; the United States.¹⁵ 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 60 companies and 16,000 direct industry employees. In 2013 alone, the western state is expected to add another 2,500 direct industry jobs and 1.5 million square feet of production floor to its capabilities.⁵

64
Aerospace & Defense
Companies

16,000
Workforce
for design, assembly,
manufacture and
MRO

Competitive Advantages of Baja California:

- ✗ 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
- ✗ Low-cost, just-in-time production capabilities
- ✗ Specialized education programs for Aerospace Manufacturing

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.¹⁵ 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.¹⁵

SPOTLIGHT

115,000

Approximate engineering graduates annually in Mexico⁸

An 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 clusters like that 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.¹⁵ 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 41st member of the international Wassenaar Arrangement (WA) in 2012 and is already in part two of the four main systems of export control, with the final two currently underway.¹⁵ 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.

DEFENSE PRODUCTS SPOTLIGHT¹⁵

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.

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

Major Aerospace Companies in Tijuana

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

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

2013 HIGHLIGHTS

Upcoming Regional Aerospace Events

4th Annual Baja International Aerospace Supplier Forum

AUGUST 29, 2013 – TIJUANA, B.C.

www.bajaaerospace.com

(855) 225-2243



1. **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>
2. Business Conexión Magazine June 2013. Special Aerospace Edition: Welcome to the Aerospace Megaregion. June 2013.
<http://www.businessconexion.info/especiales/>
3. 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>
4. **Flight Plan: Mexico's Aerospace Industry Roadmap -** Baja California. 2012-2020. http://www.tijuana-edc.com/sites/default/files/u1/baja_aerospace_roadmap.pdf
5. 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.
6. 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
7. Investment in Mexico 2012. KPMG. 2012.
<https://www.kpmg.com/US/en/IssuesAndInsights/ArticlesPublications/Documents/investment-in-mexico.pdf>
8. 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
9. Doing Business 2013: Comparing Business Regulations for Domestic Firms in 185 Countries. World Bank. 2013.
<http://www.doingbusiness.org/~media/GIAWB/Doing%20Business/Documents/Annual-Reports/English/DB13-full-report.pdf>
10. Tijuana Economic Development Council (Tijuana EDC).
www.tijuana-edc.com
11. Industrial Trends & Statistics: Tijuana, Baja California. Q2. 2013. CBRE. (San Diego Office)
12. **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>
13. **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>
14. 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.
15. Flight Plan – **Mexico's Aerospace Industry Roadmap** 2013. ProMexico and Ministry of the Economy of Mexico. 4th Edition, June 2013.
16. Honeywell Worldwide website. Retrieved 08-2013.
<http://honeywell.com/worldwide/Pages/mexico-en.aspx>

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.