

Site Selection Investigates New Location Drivers for Aviation

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Introduction

The U.S. aerospace and defense industry (A&D) is a major player in our nation’s economy. It accounts for almost 15 percent of our country’s manufacturing workforce or about 2.6 million people prior to the pandemic. Its highly skilled workers are well compensated, with an average

salary over 40 percent higher than the national average. The industry is also a major exporter, accounting for about 10 percent of all U.S. exports. Five states account for well over half of these exports: Washington, California, Connecticut, Texas and Florida.

Our corporate site selection firm has been very active in the aerospace sector over the years, serving major manufacturers like Boeing, Pratt & Whitney and Safran Landing Systems, global supply chain specialist, Aviall Services as well as providing data to the Aerospace Industries Association (AIA) in Washington, DC. As the industry now begins its rebound from the pandemic, here are some factors that will surely color site selection decisions over the next few years.

Cost Containment

Of all the industries impacted by the pandemic, none was hit harder than the air travel industry. In 2020, North American airline capacity was off 43 percent, airline industry revenue down some \$88 billion and traffic plummeting by almost 600 million passengers from the previous year. With no help on the revenue side of the ledger, cost containment will be the mantra of the entire airline and aerospace sector as companies begin their climb from the pandemic. This laser focus on comparative costs will continue for some time now, whether for new production, supply chain and administrative facilities or consolidations of existing operations.

The aerospace industry is truly an international one, with a number of concentrated production and operational hubs in cities around the globe. Some of these hubs are long-standing ones like Seattle, Southern California and Montreal, while others are relatively new like Mobile, Alabama, where Airbus operates a major assembly plant turning out A320 family and A220 product lines.

A new 2021 BizCosts® report of our firm identifies 15 leading hubs of the global aerospace industry and charts comparative operating costs (labor, real estate and utilities) in those markets. (See Figure 1). Annual operating costs in the report range from a high of \$58.2 million in Seattle to a low of \$23.7 in Sao Paulo, Brazil, an operating cost differential of 59.3 percent. (See Figure 2). In addition to Seattle, Sao Paulo and Mobile, other aerospace hubs identified and charted in our BizCosts® analysis include: Los Angeles; Dallas; Wichita; Charleston, SC; East Hartford, CT; Palm Beach County, FL; Fairfax County, VA; Phoenix; Toulouse, France; Hamburg, Germany; Madrid, Spain and Montreal, Quebec.

Figure 1

Global Aerospace Hub	Company Presence
Seattle, WA	Boeing, SpaceX, Blue Origin
Los Angeles, CA	Northrop Grumman, Lockheed
Dallas, TX	BP Aero, Sikorsky
Wichita, KS	Spirit AeroSystems, Learjet, Cessna
Mobile, AL	Airbus, Safran, UTC Aerospace
Charleston, SC	Boeing, Parker, Eaton
East Hartford, CT	Pratt & Whitney, GKN, Kaman
Palm Beach County, FL	Collins Aerospace, Pratt & Whitney, Sikorsky
Fairfax County, VA	Rolls-Royce, Northrop Grumman
Phoenix, AZ	Honeywell, General Dynamics, BAE Systems
Toulouse, FR	Safran, Airbus, Dassault Aviation
Hamburg, DE	Airbus, Cimpa, Diehl
Madrid, ES	Airbus, Boeing, Alcoa
São Paulo, BR	Embraer, Helibras, Sobraer
Montreal, CA	Bombardier, CAE, Bell Helicopter

Figure 2

COMPARATIVE ANNUAL OPERATING COST SIMULATION (1)

	Seattle	Mobile	Sao Paulo
	WA	AL	BR
Nonexempt Labor Costs			
Weighted Average Hourly Earnings	\$40.88	\$32.63	\$11.48
Annual Base Payroll Costs	\$38,917,760	\$31,063,760	\$10,928,960
Fringe Benefits	\$14,010,394	\$11,182,954	\$9,071,037
Total Annual Labor Costs	\$52,928,154	\$42,246,714	\$19,999,997
Energy Costs			
Electric Power Costs	\$727,740	\$484,380	\$975,000
Natural Gas Costs	\$653,606	\$249,908	\$1,311,056
Industrial Lease Costs	\$3,930,500	\$1,785,000	\$1,375,500
Total Annual Geographically-Variable Operating Costs	\$58,240,000	\$44,766,002	\$23,661,553

Note:

(1) Based on a 350,000 sq. ft. (32,516 sq. m) aerospace manufacturing plant employing 500 workers. All costs in \$U.S. dollars.

Source: 2021 Boyd BizCosts® Aerospace Benchmark Snapshot

Pent Up Demand, Asia-Pacific in the Lead

Here in 2021, the aerospace industry is recalibrating pre-pandemic demand projections for new aircraft, parts and maintenance services. Time-lines for recovery are still unclear but with COVID-19 vaccines now being administered and others in the pipeline, a return to pre-pandemic expectations for the industry are well underway.

Latest estimates by Boeing indicate that there are well over 900 airplanes today that are over 25 years old. By the mid 2020's, more than 500 airplanes a year will reach 25 years of age fueling a robust retirement wave. Over 40 percent of the new airplanes will be needed to cover replacement alone, notwithstanding new demand, however dampened by the pandemic.

Linking demand to geographic site selection, the Asia-Pacific region will be the leader in demand for new aircraft over the next decade. This will also include services such as maintenance and engineering, which covers activities to maintain or restore the airworthiness of an aircraft and its systems, along with flight operations, which covers services associated with the flight deck, cabin services and crew training and management. Industry analysts point to the Asia-Pacific region accounting for 40 percent of passenger jet deliveries over the next two decades, more than twice the amount projected for both North America and Europe.

China will be the key player in the Asia-Pacific market driven by its growing middle class that will eventually lead to China overtaking the U.S. as the largest domestic airplane passenger market in the world. Also, India, Indonesia, Malaysia, Vietnam, Thailand and Singapore have all been generating huge demand for tourism travel from passengers around the globe, prompting the airlines to create new routes for this growing market segment which is poised to rebound.

Due to all of these drivers, the Asia-Pacific region will be on the radar screen for a multitude of investments by aircraft manufacturers and related maintenance, engineering and flight operations providers. I can share that our firm's site selection research for Boeing in recent years focused largely on the Asia-Pacific region and supply chain opportunities there.

Trophy Aerospace Projects: The Southeast A Big Winner

Space Command Headquarters to Alabama



Huntsville – home of the Redstone Arsenal and the NASA Marshall Space Flight Center – was recently selected as the recommended location for the new U.S. Space Command Headquarters. This is a major win for Alabama and a further shift of the center of gravity of the aerospace industry from pockets in Southern California, the Puget Sound and Connecticut to the Southeast. A common denominator of states in the Southeast attracting new aerospace investment is their right-to-work status, attractive operating costs, incentives and workforce training programs.

The Space Command was established in the Air Force in 2019, and the search for a permanent headquarters began in 2020. Communities across the country competed. They were ranked according to established criteria related to the command’s mission, room to grow and add infrastructure, community support and costs to the Department of Defense.

Twenty-four states officially went after the command headquarters, and finalists included Albuquerque, New Mexico; Bellevue, Kansas; Cape Canaveral, Florida; Colorado Springs, Colorado; and San Antonio, Texas. The headquarters is temporarily based in Colorado Springs now, and that city was reportedly Huntsville’s major competition.

The Southeast region that can point to other high profile investments and expansions like Airbus in Mobile, Alabama; Pratt & Whitney in Asheville, North Carolina; Boeing in North Charleston, South Carolina; Sikorsky and Collins in Palm Beach County, Florida; Safran Landing Systems in Walton, Kentucky; to name just a few. This industry shift follows that of the U.S. auto industry’s migration from the Upper Midwest to the Southeast over the past two decades.

An interesting sidelight to the Huntsville win is how the Florida Panhandle region – a pocket of aerospace activity in its own right and actively promoting itself as such – will be able to compete without the benefit of Florida’s flagship Qualified Target Industry (QTI) incentive program for the next wave of aerospace suppliers in fields like telecommunications, cybersecurity, software,

avionics and others expected to gravitate to the greater Huntsville region in order to serve the new Space Command Headquarters.

Florida's QTI program was recently abolished by the Florida Legislature and was the hot topic of conversation at a Florida Economic Development Council forum in January where our firm testified to legislators on how important QTI is to the state, especially to Panhandle communities like Crestview, Pensacola, Fort Walton, Marianna and Panama City, that will be competing against cities in the Deep South for many of the supplier jobs that we expect to be gravitating to do business with the new Space Command headquarters in Huntsville.

Keep in mind, space is now a \$9 billion private industry, with companies like Amazon, Microsoft and Virgin getting into space. Also, look for space travel to be the next status symbol for high-net-worth individuals, with celebrity CEO's like Elon Musk, Jeff Bezos and Richard Branson setting the stage. Beyond space travel, virtually all sectors of our nation's economy like finance, healthcare, communications, defense and entertainment are dependent on the security of satellites in space.

Without QTI in its business attraction arsenal, Florida has lost to incentive-rich states such as North Carolina, Texas, Tennessee and Georgia when trying to attract companies both in and out of the aerospace sector, including a number of high-value corporations such as Honeywell, Centene, Charles Schwab, Aircraft Solutions USA, HP, among others.

Pratt & Whitney Goes to North Carolina

In addition to the Space Command Headquarters, another big win for the Southeast in 2020 was the new plant announced by East Hartford, Connecticut-based aircraft engine manufacturer Pratt & Whitney in Asheville, North Carolina. Pratt & Whitney will build a one-million square-foot, advanced manufacturing center on a 100-acre site the Biltmore Farms organization offered to Pratt & Whitney for \$1, part of \$15 million in state economic incentives that attracted the company to North Carolina. In commenting on the North Carolina decision, Greg Hayes, the CEO of Pratt & Whitney's parent company, Raytheon, said the project will result in a savings of \$175 million for the engine-maker.



The Pratt & Whitney project warrants special note given its huge economic impact for Western North Carolina. The company plans to employ as many as 800 workers and generate an annual payroll of some \$55 million, with the positions averaging \$68,000 a year, well over twice the local prevailing average. From a corporate site selection standpoint, this transformational Pratt & Whitney plant is expected to attract numerous other high-paying suppliers to the Western North Carolina region in the months and years ahead.

This major aerospace win for North Carolina can largely be attributed to the difficult but prudent decision made by Democratic Governor Roy Cooper shortly after taking office in 2017 to revamp North Carolina's incentive program to address the fact that the state had a long string of second place finishes in a number of high profile industrial projects, especially in the auto industry, that went to other Southeast states with more robust incentive offerings.

Boeing Consolidates 787 Production in South Carolina

Another big win for the Southeast came in October 2020, when Boeing announced that it will consolidate production of 787 jets at its nonunion, lower-cost facility in North Charleston, South Carolina, starting in mid-2021, later changed to mid-March 2021. The decision comes at the expense of Boeing's Seattle area assembly plant as the company moves to preserve liquidity and reposition certain lines of business due to the pandemic and challenging air travel conditions. More than 1,000 workers assemble 787s in Boeing's Seattle area plant, resulting in another hit to the Puget Sound aerospace region, which has already lost more than 20,000 aerospace industry jobs amid the pandemic.



Aerospace Mobility and Right-to-Work

South Carolina first attracted Boeing's major assembly operations in 2009 but that win for the nonunion state was nearly blocked by the National Labor Relations Board (NLRB) under the Obama and Biden administration and the largely pro-union appointees at the NLRB. The NLRB wanted Boeing to manufacture its planes only in Washington State, a state without Right-to-Work legislation and where its workers must belong to the International Association of Machinists and Aerospace Workers to work at Boeing. At the time, this was seen by many in the corporate site selection field, as a direct attack on South Carolina, the other 20-odd Right-to-Work states and corporate mobility itself.

The NLRB eventually dropped its lawsuit against Boeing after strong objections led by then South Carolina Governor Nikki Haley and when Boeing reached a deal with the International Association of Machinists union to build a different type of airliner, the 737 Max, in unionized Washington State.

Fast forward to just 48 hours after President Joe Biden's inauguration when he fired both the General Counsel and Deputy General Counsel of the NLRB and set the wheels in motion for a more union-friendly tenor at the NLRB than was the case under the Trump administration and its NLRB appointees. Also, both Biden and Vice President Harris support The PRO Act, legislation passed by Speaker Nancy Pelosi and congressional Democrats in 2020, that seeks to restrict independent contracting and freelancing. It is modeled after the controversial California Assembly Bill 5, legislation where many industries fought for, and won, exemptions.

Moreover, and from a corporate site selection standpoint, the PRO Act would also overturn state Right-to-Work laws – historically a pivotal location factor, especially in manufacturing sectors like aerospace. Right-to-Work, which is the law of the land now in most states, is not restricted to just red states. In fact, some of the most recent states to enact Right to Work laws were passed in the "Blue Wall" states that President Trump won in 2016: Indiana, Michigan and Wisconsin.

Boyd and Boyd clients – both in and out of the aerospace field – will be following closely the rulings of new NLRB and congressional debate on The PRO Act. Both, no doubt, will impact labor-management relations and corporate mobility greatly over the next four years.

What's Next: Supersonic

The Concorde, the world's first supersonic airliner, made its last commercial passenger flight, traveling at twice the speed of sound from New York City's John F. Kennedy International Airport to London's Heathrow Airport 18 years ago. While Concorde was a magnificent feat of engineering, it never turned a profit and was restricted at many airports due to its sonic boom.



AN AEROSPACE COMPANY HEADQUARTERED IN DENVER AND INTERESTINGLY ENOUGH, NAMED BOOM, RECENTLY CLOSED ON \$50 MILLION IN FUNDING IN A NEW ROUND LED BY WRVI CAPITAL.

An aerospace company headquartered in Denver and interestingly enough, named Boom, recently closed on \$50 million in funding in a new round led by WRVI Capital. With this new infusion of cash, Boom is working on producing the first supersonic jet named Overture to take off since the Concorde. Boom has already raised hundreds of millions of dollars and the company reports orders from both Japan Airlines and Virgin Group, with the former having invested \$10 million in the venture.

Boom's goal is to bring supersonic flight to the mainstream. Initially, the company anticipates making Overture's fares equal to that of business class before lowering them to economy-class levels. Boom plans to begin construction of a manufacturing plant for its Overture plane in 2022. Later this year, the company plans to start testing XB-1, the one-third-scale prototype of its full-scale passenger jet.

About Boom's Overture Supersonic Plane:

- Overture will be able to cruise at an altitude of up to 60,000 feet, at Mach 2.2
- The plane will be 199 ft. long (this compares to a 737-800 which is 130 ft. long and a 777-300 which is 242 ft. long)
- Overture's range will be just under 4,900 miles

- The plane will accommodate 65-88 passengers, all-business class
- Overture will be green-friendly and 100 percent carbon neutral
- The anticipated price will be \$200 million per plane
- Timing has the Boom Overture prototype built in 2022, rollout in 2025 and passenger flights by 2029
- Projected supersonic travel times: New York to London, 3hr-15minutes, Tokyo to Seattle, 4hr-30 minutes
- Fares: estimated roundtrip business class between New York and London, \$5,000

What's Next: Electric

The significant advancement in batteries, electric motors and other systems now found in electric cars – as well as hundreds of millions of dollars already in aviation applications – have brought electric technology much closer to commercial take-off after years of research. By 2035, investment bank UBS estimates that the aviation industry will be 25 percent hybrid or fully electric. The move to electric will address fuel costs which are one of the largest, most variable airline expenses, representing between 12 and 20 percent of total expenses.

In June 2020, a milestone in the quest to develop electric commercial aircraft took place when the world's largest commercial electric airplane took to the skies, flying for 30 minutes over Moses Lake, Washington.

The plane, a modified Cessna Caravan that seats nine people, was the product of two Seattle-area aviation companies, startup MagniX that supplied the electric motor, and AeroTEC that modified the Cessna with two tons of lithium-ion batteries and cooling equipment. Despite the relatively limited flight time and range (100 miles), the Moses Lake flight proved a plane of this size could be powered solely by an electric motor.

Battery technology is the key to electric commercial aviation as it is in the auto industry. Energy density still is not quite there, but it's getting closer. Large commercial aircraft likely aren't going electric anytime soon, but aviation giant Airbus is considering going hybrid for a next-generation passenger jet.

From a corporate site selection perspective, the move to electric propulsion will eventually expand our list of 15 global aerospace hubs to additional cities given the shift in engineering, design, manufacturing and components associated with electric aircraft.

From 30,000 feet (sorry about that!), a common denominator among existing global aerospace production hubs is their concentration of high precision metalworking operations and the workers trained in operating multi-axis CNC machining, along with other capabilities in milling, turning, fabrication, grinding, heat treating, surface treatment and anodize plating – many functions linked to jet and other internal combustion engines and their fueling, lubrication and maintenance.

While many of these skillsets will still be relevant, the eventual shift to electric will prioritize other design and production skills in the fields of electrochemistry, electronics, mechanical engineering, robotics, artificial intelligence, 3-D printing and software. These new location drivers will open up site selection investigations to a new set of hub cities that show well for these factors.

About the Author: John H. (“Jack”) Boyd

A thought leader and well-known pioneer of the modern era of corporate site selection, Jack has done much to advance the profession setting best practice standards of independence, objectivity, integrity and confidentiality.

An economist by training, Jack’s corporate site selection focus traces back to his academic research in Puerto Rico studying the Island’s commonwealth political status, unique tax structure and why U.S. corporations were locating there. As a Bevier Fellow in economics at the Rutgers Graduate School, Jack expanded his research in the field of corporate relocation and Latin American economic development.

Following work as a site selection analyst with Dun & Bradstreet’s Management Consulting Division based New York City, Jack established the Boyd firm in Princeton, NJ’s historic Twenty Nassau Building overlooking the Princeton University campus in 1975. Boyd serves a broad spectrum of Fortune 500 and up-and-coming companies. Some Boyd clients include: UPS, Shell, Chevron, Philips, Progressive Insurance, Visa International, PepsiCo-Canada, to name a few.

Today, as head of one the nation’s oldest consultancies specializing in corporate mobility, Jack remains dedicated to positioning Boyd clients ahead of prevailing economic and business climate trends.