Boeing San Antonio:
Role in the San Antonio and Texas Economies

Prepared by:

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This study was conducted by the Center for Community and Business Research, a division of the Institute for Economic Development, housed at the University of Texas at San Antonio. The study was conducted at the request of Boeing San Antonio (formerly Boeing Aerospace Support Center San Antonio) as an update to an earlier 2005 study to document their role in the San Antonio and Texas economies.

The report is presented in three parts. The first provides descriptive information on Boeing San Antonio reach into Texas, the San Antonio metropolitan area, and redevelopment of the former Kelly Air Force Base. The second part documents the direct, indirect, and induced economic impacts of Boeing San Antonio's operation in the state of Texas. The third part is a summary of critical observations in the report. An executive summary is also available as a separate document and is available at http://www.ccbr.iedtexas.org.

I. Boeing San Antonio's Reach

Boeing San Antonio was established as Boeing Aerospace Support Center in 1998 as a maintenance and modification center for large aircraft. The facility, formerly part of the San Antonio Air Logistics Center, is an anchor tenant for the re-developed Kelly Air Force Base.

Boeing San Antonio has 1.6 million square feet of enclosed area, including 940,000 square feet of hangar space. The hub of Boeing San Antonio's operation is Building 375, the largest free-standing, high-bay aircraft hangar in the world. It can accommodate up to 15 wide-body aircraft at a time. Boeing San Antonio also has available more than 3.5 million square feet of aircraft ramps, run-up areas, and parking pads. Capabilities include facilities for paint and depaint, non-destructive inspection, and corrosion control, as well as backshops and office space. Military and selected commercial maintenance and modification programs include:

C-17 Globemaster III Sustainment Partnering: A primary Air Force Depot for the C-17. Boeing San Antonio employs approximately 500 people to provide modifications and block upgrades.

KC-135 Programmed Depot Maintenance: Depot level repairs and inspections, including major structural repairs. Employs approximately 600 workers.

KC-135 Global Air Traffic Management: The Site employs approximately 140 workers to upgrade older KC-135 aircraft with modern cockpits, landing systems, and communications systems.

C-130 Avionics Modernization Program: Modernizes, standardizes and reduces the total ownership costs for the United States Air Force C-130 fleet**.**

787 Dreamliner & 747-8 Freighter (Commercial): Refurbishment and change incorporation activities on the 787 Dreamliner and the 747-8 Freighter are completed in San Antonio facilities.

Several of Boeing San Antonio programs have a global reach, with service of aircraft that support operations and fly around the world. However, its presence in Texas, in the San Antonio

metropolitan area, and in the re-developed Kelly Air Force Base has specific implications for the economic well-being of these localities. In 2009, Boeing San Antonio employed 1,665 San Antonio area workers. Notably, it contributed substantially to the stabilization of employment in the transition of Kelly Air Force Base to civilian Port San Antonio. The following three sections document Boeing San Antonio's reach into Texas, the San Antonio metropolitan area, and the redeveloping Port San Antonio site.

Reach into Texas

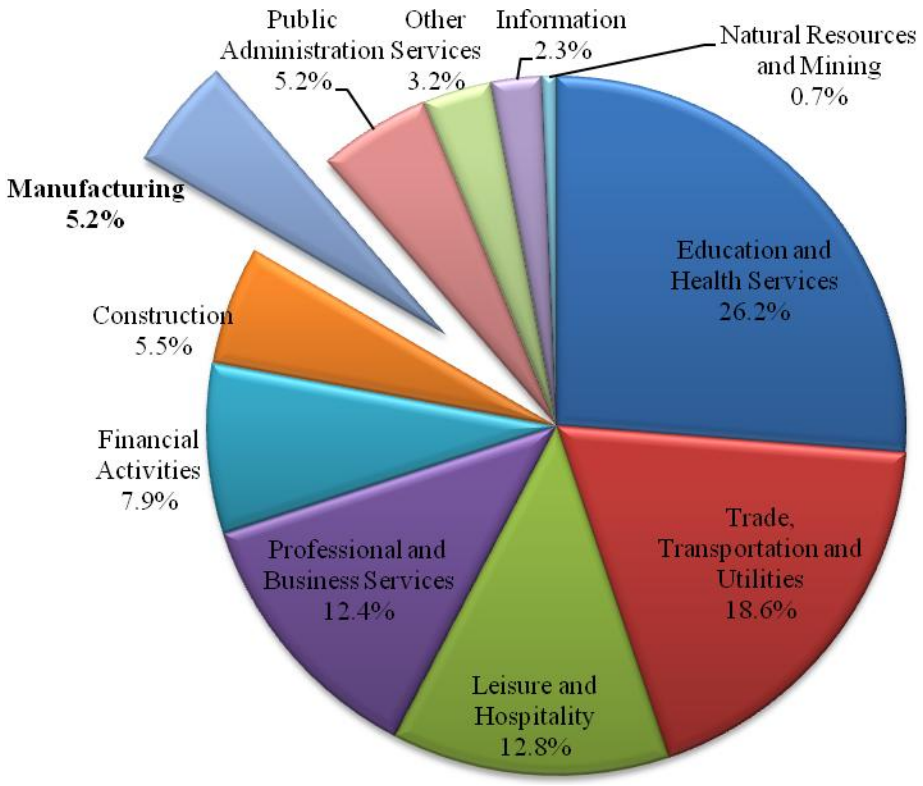
In addition to the 1,665 workers in San Antonio, Boeing currently employs an additional 3,424 workers in several facilities throughout Texas including business units in the communities of Richardson, Dallas, Houston and El Paso. These Boeing facilities perform a wide variety of both military, commercial aircraft and aerospace work.

In 2009, Boeing San Antonio contracted materials, supplies, equipment, and service from as many as 100 independent suppliers in Texas.

Reach into the San Antonio MSA

The Texas Workforce Commission reports total nonfarm employment in the San Antonio metropolitan statistical area (MSA) at 837,700 workers in October 2010. Figure 1 illustrates the distribution of nonfarm employment across nonfarm industries in the San Antonio MSA. The biggest employer is the education and health services industry (26.2 percent), with 218,620 employed for the second quarter of 2010. In comparison, the manufacturing industry accounts for 43,431 workers, or 5.2 percent of the nonfarm labor force. The manufacturing industry is roughly equal in employment to Public Administration in the San Antonio metropolitan area, and slightly below the construction industry in the same area.

Figure 1: Non-farm Employment in San Antonio MSA, 2nd Quarter 2010

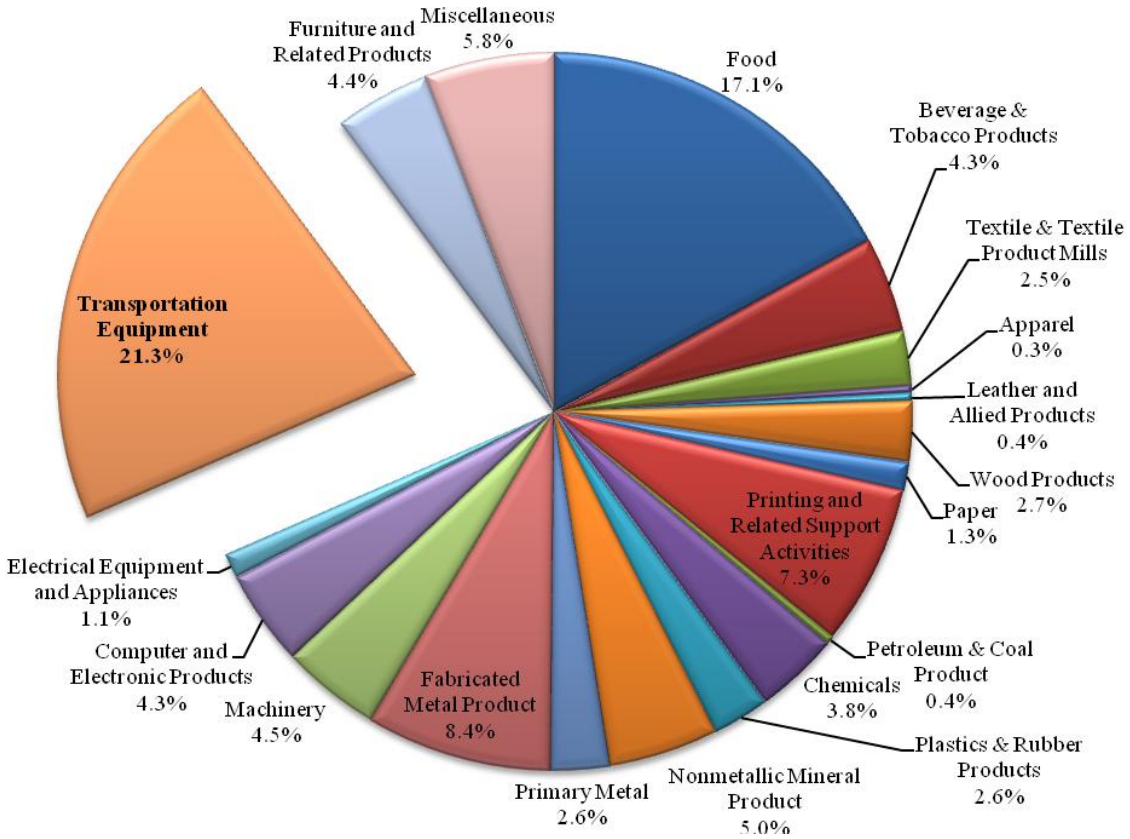


Source: Texas Workforce Commission

However, not all jobs are alike. Despite the relatively small share of the manufacturing industry, manufacturing jobs are vital to any region's economic structure. Manufactured products are more likely to be exported, bringing in new dollars to fuel the economy. Manufacturing activities generally add more value to the product than other types of activities, therefore supporting higher paying jobs than in more labor intensive industries such as retail trade, business services, and leisure.

The manufacturing base also generates other business activities for the economic area. For example, manufacturing firms hire the professional services of outside firms, build large facilities, purchase parts and supplies from local and regional suppliers, purchase health services for their employees, and upgrade the skill level of the local workforce. Consequently, manufacturing has a disproportionate positive impact on the economy than most other industries. We return to this point later in the report.

Figure 2: Manufacturing Employment in San Antonio MSA, 2nd Quarter 2010

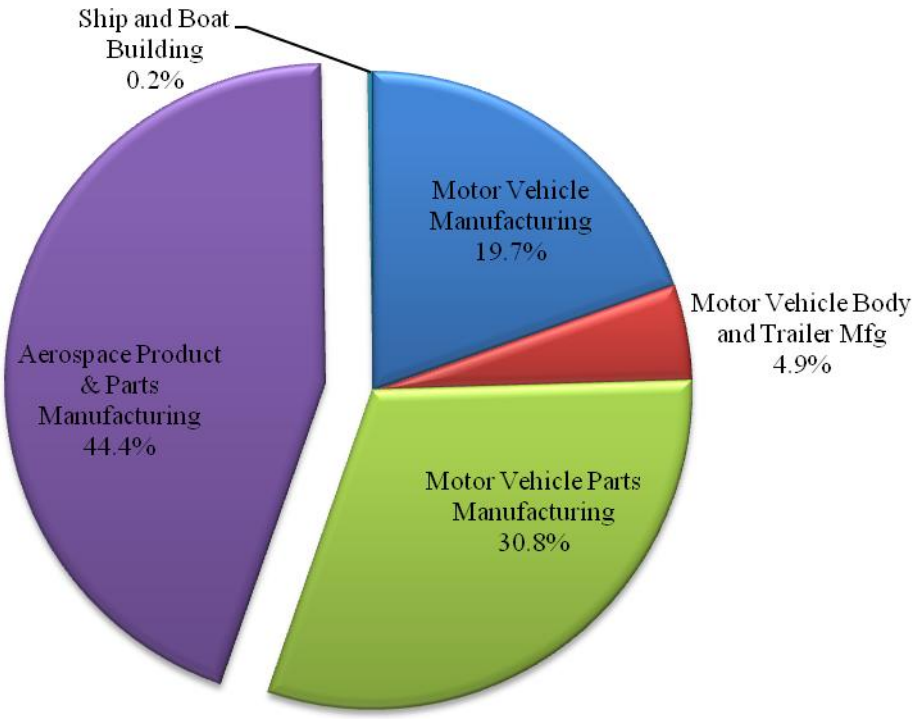


Source: Texas Workforce Commission

San Antonio boasts a diversified manufacturing sector, with two somewhat dominant industries: transportation equipment manufacturing and food manufacturing (see Figure 2). Boeing San Antonio operates in the largest segment of the manufacturing industry in the San Antonio MSA, transportation equipment manufacturing, which employs 9,266 and accounts for 21.3 percent of the manufacturing industry. [1]

[1] The Texas Workforce Commission reports 43,431 manufacturing jobs in the San Antonio MSA during the 2nd quarter of 2010. However, subsector data is specified for only 44,425 of these jobs. Consequently, share of manufacturing jobs is calculated as a percentage of 44,425.

Figure 3: Transportation Equipment Manufacturing Employment in San Antonio MSA, 2nd Quarter 2010



Of the jobs in the transportation equipment manufacturing subsector, 4,086 are for aerospace product and parts manufacturing.[2] Because Boeing San Antonio performs such a wide variety of manufacturing-like activities we analyze their economic activities in relation to the aggregate of an industry cluster comprising three manufacturing subsectors: aircraft manufacturing (NAICS 336411), aircraft engine and engine parts manufacturing (NAICS 336412), and other aircraft parts and equipment (NAICS 336413), which comprise the aerospace products and parts manufacturing subsector. As illustrated in Figure 3, transportation equipment manufacturing employment in the San Antonio metropolitan area has a larger proportion of aerospace product and parts manufacturing than any other subsector, representing just under half of the transportation equipment parts manufacturing jobs.

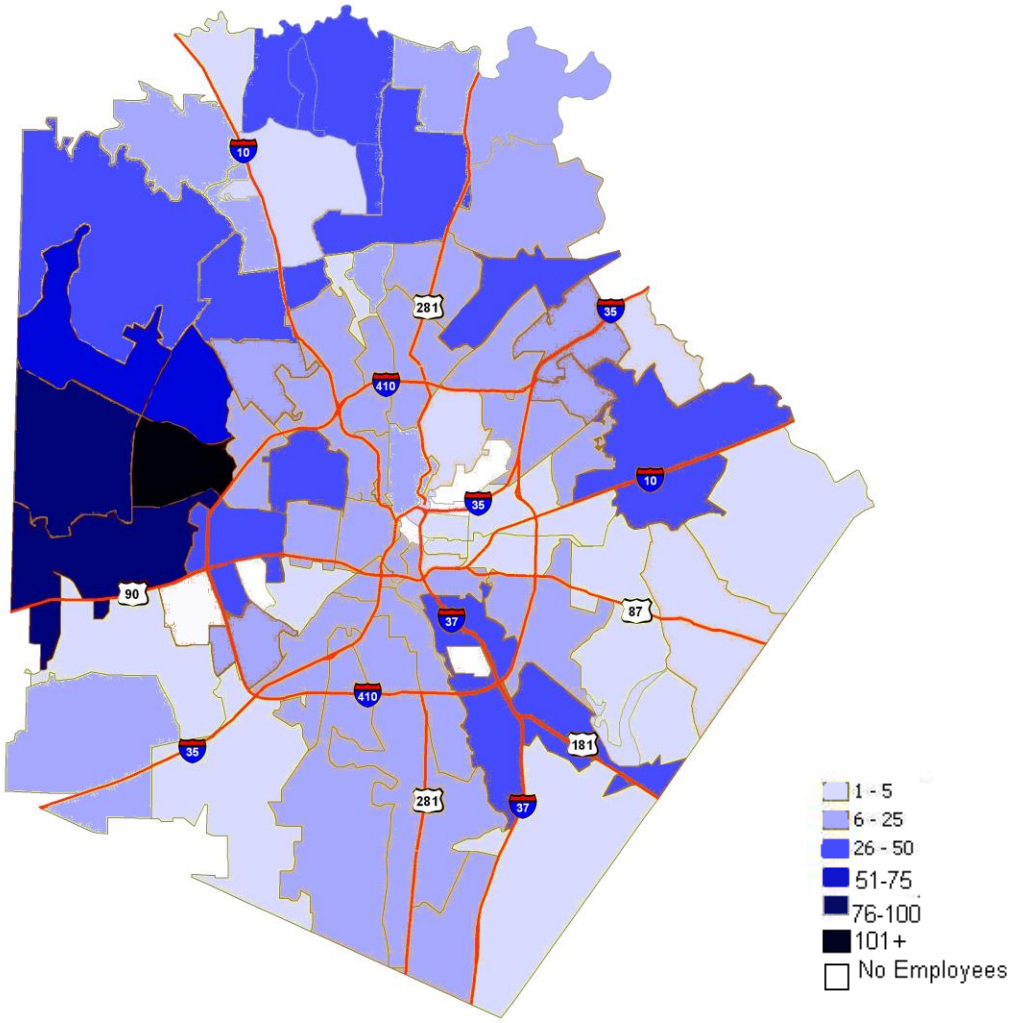
County Business Patterns (2008) reports 20 establishments in the aerospace products and parts manufacturing subsector in the San Antonio MSA and 142 in Texas. Boeing San Antonio's primary San Antonio colleagues include ST Aerospace, Standard Aero and Raytheon in aircraft maintenance and repair; and General Electric, Lockheed, and Pratt & Whitney in aircraft engine maintenance and repair. Other notable manufacturers in this subsector are Cessna, M7

[2] The Texas Workforce Commission reports 9,266 transportation equipment manufacturing jobs in the San Antonio MSA during the 2nd quarter of 2010. However, subsector data is specified for only 9,193 of these jobs. Consequently, share of transportation equipment manufacturing jobs is calculated as a percentage of 9,193.

Aerospace, Gore Design Completions and Chromalloy, all of whom engage in aircraft design and manufacturing in the San Antonio MSA.

With 1,665 employees, Boeing San Antonio accounted for 37 percent of the area aerospace product and parts manufacturing jobs. Boeing San Antonio employees are drawn from every side of Bexar County and from various surrounding areas encompassing a total of 136 ZIP Codes. There is some level of concentration, however: there are only 10 ZIP Codes employing more than 30 Boeing San Antonio employees. These ZIP Codes are highlighted in blue in the map below.[3]

Figure 4: Employment of Boeing San Antonio Employees by ZIP Code in Bexar County



[3] Employee ZIP Code information is based on information provided by Boeing San Antonio; ten employees are listed as residing in ZIP Codes outside of Texas, with an additional 60 employees listed for cities outside of San Antonio ZIP Codes. ZIP Code 78109 is designated in Boeing San Antonio documentation as split between Converse and San Antonio, so are included in the San Antonio count for the purposes of this discussion.

The single largest concentration of Boeing San Antonio employees reside in ZIP Code 78251, which is located in west San Antonio just outside the 410 loop. Along with the adjacent ZIP Codes of 78245 and 78253, these three ZIP Codes account for 287 or 18.8 percent of Boeing San Antonio employee residence.

Home Postal Code	Boeing San Antonio Employee Count
78251	105
78245	99
78253	83
78250	73
78254	69
78109	44
78023	40
78227	39
78247	37
78223	33

Reach into Port San Antonio

Boeing San Antonio is an important component of Port San Antonio. Currently, Boeing San Antonio's 1,665 employees accounts for 38.4 percent of all aerospace jobs (4,312) in the Port and 25.4 percent of all private sector jobs (6,566) making it a principal anchor tenant of Port San Antonio[4].

Port San Antonio (formerly Kelly Air Force Base) was one of sixteen military installations that experienced reduction in 1996. U.S. military operations were completely curtailed, resulting in loss of an estimated 10,912 civilian jobs. Figure 5 summarizes civilian job loss and creation in the ten years since the 1995 round of Base Realignment and Closure (BRAC).

Figure 5: Civilian Job Loss and Recovery for 1995 BRAC thru September, 2004 [5]

	Estimated Civilian Jobs Lost	Estimated Civilian Jobs Created	Recovery Percentage
Kelly Air Force Base, TX	**10,912**	**5,296**	**49%**
McClellan Air Force Base, CA	8,828	3,469	39%
Letterkenny Army Depot, PA	2,512	916	36%

[4] Port San Antonio *2010 Report Advancing the Port's Mission* Saber Institute

[5] Holman, Barry W. 2005. Military Base Closures: Observations on Prior and Current BRAC Rounds. Washington, DC: United States Government Accountability Office, GAO-05-614.

Indianapolis Naval Air Warfare Center, IN	2,196	1,776	81%
Bayonne Military Ocean Terminal, NJ	2,015	995	49%
Fitzsimmon Army Medical Center, CO	1,612	1,116	69%
Louisville Naval Ordnance Station, KY	1,435	822	57%
Stratford Army Engineering Plant, CT	1,400	0	0%
Fort Ritchie, MD	1,373	42	3%
Memphis Defense Distribution Depot, TN	1,289	1,045	81%
Reese Air Force Base, TX	1,238	468	38%
Ogden Defense Distribution Depot, UT	1,105	2,468	223%
Savanna Army Depot, IL	436	103	24%
Sierra Army Depot, CA	374	7	2%
Seneca Army Depot, NY	273	1,205	441%
Fort, Pickett, VA	245	272	111%

Of the sixteen military bases in the 1995 BRAC, Kelly Air Force Base was hardest hit in terms of civilian job loss. However, the reconstituted Port San Antonio has been able to attract and retain military contracts to continue some of the work that was originally conducted under the auspices of the federal government. Continuation of maintenance and modification for large aircraft by Boeing San Antonio is an example of the reclamation of civilian jobs. As of 2004, of those military installations that faced reduction and closure in 1995, the former Kelly Air Force Base had the highest number of civilian jobs created (5,296). Kelly's recovery success is due largely to Port San Antonio's ability to attract productive tenants who can hire large numbers of San Antonio area laborers.

II. Boeing San Antonio's Economic Impact

Boeing San Antonio's role in the San Antonio region and the Texas economy may also be quantified in dollar terms. This data is important to the community, Department of Defense customers, and area elected officials as well as for Boeing itself, to aid in decision-making regarding the optimal future of Boeing San Antonio considering all its stakeholders' interests.

In addition to standard economic benefits of private business spending, businesses generate economic impact in the form of re-circulated spending derived from a large employment and expenditure pattern. Traditional methods to assess economic impacts of industry were used in this report, beginning with collection of all the direct expenditures and employment data for a representative year of Boeing San Antonio operations. Data from the most recent financial reporting period of fiscal year 2009 were compiled from financial data provided by Boeing San Antonio personnel. With these as a basis, the overall ripple-effect on indirect and induced spending are derived.

Direct impacts include the following categories:

1) Operations: Expenditure data by class for statewide expenditures mapped from Boeing San Antonio financial statements to applicable industry sectors for a representative year of operations (2009). Operations spending primarily includes supplies, tools, repair and support equipment, aircraft parts, business and professional services, vehicles, leases, fuel, and utilities.

2) Personnel and benefits: wages, salaries and benefits of direct labor and support staff employed directly by Boeing San Antonio at year-end 2009.

3) Capital expenditures: Capital expenditures, which totaled $6.4 million in 2009, were mapped into applicable industry sectors for fiscal year 2009. Boeing San Antonio makes capital improvements through a combination of corporate allocations and grants or contracts with public and private entities.

4) Charitable contributions: Along with its employees, Boeing San Antonio contributed $442,155 to local charities in 2009. The Boeing Employee Community Fund donated $109, 280, the Employee Designated Giving through Employee Community Fund contributed $15,229, sponsorships accounted for $89,310, another $203,336 was given by Charitable Donations, and University Relations provided $25,000. Beneficiaries are 88 organizations, including: Any Baby Can, Make-A-Wish, local ISD's K-12 educational partners, Fisher House, Goodwill Industries, Witte Museum, San Antonio Lighthouse for the Blind and Bexarland Trust.

Figure 6: Boeing San Antonio's Direct Expenditures, 2009

Operations	$52,068,409
Personnel and Benefits	$140,715,046
Capital Expenditures	$6,400,000
Tuition Reimbursement	$1,286,839
Charitable Contributions	$442,155
Total	**$200,914,457**

In addition to the $200.9 million total direct expenditure, there were an additional $4.3 million in labor and other operating expenses related to Boeing San Antonio's commercial activities. Since Boeing San Antonio commercial activity is temporary, these costs are currently excluded from establishing the 2009 baseline, however are reinserted along with the forecasted commercial expenses through 2014 to more accurately approximate Boeing San Antonio's future impacts.

As is typical in economic impact studies of this type, these expenditures are used to measure indirect and induced effects of the presence of Boeing's San Antonio operations within the context of the state economy.

What are Economic Impacts, and How are They Calculated?

An economic input-output software called IMPLAN (MIG, Inc.) is used to estimate the economic impacts of spending that occur through backward linkages in the Texas economy. Such linkages capture the steps taken backwards in Boeing San Antonio's business processes to add value and produce its final products: repaired, overhauled and updated aircraft along with logistics and support services. This takes a specialized set of business processes:

- contract marketing and management to meet Department of Defense and worldwide fleet user requirements;
- extensive specialized direct labor of a highly skilled workforce for MRO services;
- support labor and administration per Department of Defense customer requirements;
- parts for all fleets serviced and their changing generations of technological advancement;
- Texas (and over 400 non-Texas) subcontractors and suppliers for a variety of goods and services;
- including subcontractor management and coordination with strategic partners also located at Port San Antonio (World Wide Technologies, North American Aviation Services, Triumph);
- leasehold interest, development and maintenance of unique facilities, featuring the world's largest aircraft hangar, plus a 3.5 million square foot ramp area and joint-use runway shared with adjacent Lackland Air Force Base;
- technological assets from Boeing fleet production experience;
- innovation, design and application of new avionics solutions;
- installation of new aircraft mission and task packages;
- environmental, worker safety, and security compliance;
- civil and defense authorities support for Boeing;
- anchor base redevelopment efforts; and
- being a good corporate citizen for Boeing San Antonio's hometown of San Antonio through charitable and civic engagement activities.

All these business processes are assembled at Port San Antonio to enable this value-added activity of major aircraft program MRO to occur in San Antonio, Texas, through Boeing San Antonio instead of occurring in another region or with another company. All these steps in the value-added process must be efficient for Boeing San Antonio to sustain competitive viability in performance of its current contracts and in future bidding cycles for extension and expansion of these major aircraft system workloads commencing in 2009.

The forward steps taken by all these actors are estimated to describe how the direct impact benefits of Boeing San Antonio related expenditures and employment are re-circulated throughout the economy, in further business and consumer expenditure patterns for this industry. These are manifested in additional business and personal spending and investments, such as:

- hiring by Boeing San Antonio subcontractors and suppliers;
- plant, equipment, and inventory expansions;
- payments to second and lower tier suppliers and subcontractors;

- business, financial, and professional services;
- consumer housing and other major purchases, such as cars, appliances, and furnishings;
- consumer food and beverage, apparel, travel, and entertainment;
- family health, education, and quality of life improvements; and
- greater tax and public service benefits for state and local governments.

To calculate the monetary effects of the Boeing San Antonio industry pattern for these linkages, the IMPLAN model uses benchmark tables provided by the Bureau of Economic Analysis (National Income and Product Accounts) as well as other statistical data. Minnesota Implan Group (MIG, Inc., IMPLAN's developer) provides the most current economic and demographic data available for use with IMPLAN so that it is customized for the economic region being studied. IMPLAN is, in a sense, a general accounting system of the economic transactions taking place between industries, businesses, and consumers in an economy. The result is an estimate of the impacts of direct spending on total output (sales), personal income, taxes, and employment. By expanding the analysis beyond the direct impacts, IMPLAN provides a more complete picture of the total economic effects of business activity.

> **Direct** effects are the changes in local business activity (increased sales) as a direct consequence of business activity (spending).
>
> **Secondary** effects are the changes in activity (retail, wholesale, and producer levels) for suppliers to the directly-affected businesses plus the impacts on spending for food, clothing, shelter, and other consumer goods and services as a consequence of the change in workers and payroll of the direct business and that of their suppliers.

More detail on IMPLAN and its estimation procedures is included in a methodological appendix at the end of this report.

Findings: Economic Impacts of Boeing San Antonio in 2009

At the end of 2009, Boeing San Antonio employed 1,665 employees on-site at Port San Antonio. Hourly technical workers at Boeing San Antonio earned an average annual wage of $45,076 in 2009, and all workers earned an average of $63,373. In contrast, the prevailing average wage for aircraft service technicians in the San Antonio MSA is $43,935, and the average wage for all industries is $39,613. The difference points to the large proportion of skilled workers in the Boeing San Antonio workforce and the willingness of Boeing San Antonio to pay a competitive wage.

In 2009, through its federal contracts Boeing San Antonio paid $140.7 million in wages, salaries and benefits, spent $52.1 million on operations, paid roughly $1.3 million on tuition reimbursement, invested $6.4 million on capital expenditures and over $442,000 on charitable contributions for a direct expenditures total of $200.9 million. As illustrated in Figure 7, this direct spending translates into an additional $206.0 million of secondary economic activity in the state of Texas. This reflects employee compensation discounted by 15 percent to account for

average tax burden, with the remainder representing disposable income. The total economic impact of Boeing San Antonio spending on the Texas economy was $406.9 million in 2009.

One component of total economic impact is employee compensation, which reflects increased employment and pay levels in the state due to Boeing San Antonio spending. Direct and secondary employee compensation result in spending totals of $252.4 million. Another component is increase in business taxes derived from the presence of Boeing San Antonio operations. Business taxes as a result of direct and secondary spending total another $10.9 million.

Figure 7: IMPLAN Estimates of Boeing San Antonio 2009 Texas Impacts

Economic Impacts:	Direct	Secondary	Total
Output ($ Mil)	**$ 200.9**	**$ 206.0**	**$ 406.9**
Employee Compensation ($ Mil)	$ 140.7	$ 111.7	$ 252.4
Business Taxes Component ($ Mil)	$ 6.3	$ 4.6	$ 10.9
Boeing San Antonio employees	1,665		
Employment	**1,665**	**1,546**	**3,211**

Finally, with Boeing San Antonio directly employing 1,665 workers and supporting an additional 1,546 employees of its Texas suppliers, related economic activity calculations show a total employment impact of 3,211 in the state of Texas.

Analysis of Findings

- *Contributing toward manufacturing job growth, and dominating its industry cluster*

The San Antonio metro economy is underrepresented in the manufacturing sector, at 5.2 percent of total employment compared with 8 percent manufacturing jobs in Texas and 9 percent in the nation. Manufacturing provides higher value-added activity and generally involves high-skilled and higher-paid jobs. The predominance of its products is sold to non-local customers, which brings substantial new resources into the local and state economies.

This is certainly the case with Boeing San Antonio, which contributes to the diversification and strengthening of the regional economy. San Antonio's manufacturing industry is varied in its activity, and has historically lacked large, dominant employers in any one subsector. In aggregate, only the manufacturing sectors of transportation equipment and food processing can be considered dominant, jointly representing 38 percent of the metropolitan area's total manufacturing employment. Within the transportation equipment subsector, Boeing San Antonio clearly dominates its industry cluster at this time. As indicated in Figure 8, Boeing San Antonio represents 37.3 percent of the cluster employment share locally.

Figure 8: Industry Cluster Employment Share, 2nd Quarter 2010

	Total industry cluster employment	Boeing San Antonio employment	Percent of employment
Texas	51,997	1,665	3.2%
San Antonio MSA	4,086	1,665	40.7%

- *Providing higher than average earnings*

Besides representing a dominant actor within this industry cluster, the earnings differentials of Boeing San Antonio jobs in comparison with other manufacturing sector jobs, and in comparison with total employment in San Antonio are substantial. As indicated in Figure 9, hourly technical workers at Boeing San Antonio earned an average annual wage of approximately $45,076 in 2009, and all workers earned an average of $63,373. In contrast, the prevailing average wage for all employment in the San Antonio MSA is approximately $39,600.

For many decades the San Antonio economy has been productive in growing its tourism and visitor industry as one sector of competitive advantage, and has also relied heavily on government and military installations for jobs. In the case of tourism, with 11 percent of the workforce, many jobs have been created but offer generally average-to-lower wages. Additionally, from a previous highpoint of 29 percent in the 1970s, government employment has shrunk to now represent 20 percent of the local non-farm workforce. So as the region strives to recalibrate its economy with a better mix of higher-skilled and higher-paying jobs, maximizing the contributions of jobs such as those offered by Boeing San Antonio is critical.

Figure 9: San Antonio MSA Salary Comparison, 2009

	Average Annual Wage	Number of Workers
All Industries	$ 39,613	820,529
Manufacturing	$ 43,678	42,646
Transportation Equipment Manufacturing	$ 51,476	8,659
Aerospace Product & Parts Manufacturing	$ 56,407	4,002
- Aircraft Manufacturing	$ 60,328	2,385
- Aircraft Engine and Engine Parts Manufacturing	$ 53,875	1,193
- Other Aircraft Parts & Equipment Manufacturing	$ 41,513	423
Aircraft Mechanics & Service Technicians (includes salaried workers)	$ 43,935	2,310
Boeing San Antonio, Entire Workforce	$ 63,373	1,665
Boeing San Antonio, Hourly Production Staff	$ 45,076	1,106

Sources: Texas Workforce Commission 2009 data (private, non-farm) for San Antonio Metropolitan Statistical Area figures and Boeing San Antonio

- *Higher value-added activity*

The total magnitude of these business activities, along with the new money brought into the community by "export" sales to its customer base outside of Texas, creates a multiplier effect that magnifies the value of direct spending. Multipliers are factors indicating the degrees of spending and re-spending (indirect and induced effects) in particular industries and economies being studied. When employees and suppliers receive compensation from Boeing San Antonio, they spend portions of these resources with local and in-state businesses and their employees. Further rounds of such spending continue until leakages through spending outside the jurisdiction ultimately balance with the new resources brought into the economy in the first place. As summarized in Figure 10, the economic activities of Boeing San Antonio are estimated to multiply throughout the Texas economy at a rate of 1.8 times for personal income, 1.9 times for employment, and 2.0 times for total spending.

Figure 10: Boeing San Antonio Texas Multipliers

Economic Impacts:	Direct	**Multiplier**	Total
Personal Income ($ Mil)	$ 140.7	**1.8**	$ 252.4
Employment (Direct and Secondary)	1,665	**1.9**	3,211
All Output ($ Mil)	$ 200.9	**2.0**	$ 406.9

As a high value-added activity, requiring a generally higher-skilled and higher-paid workforce, with extensive upstream supplier and subcontractor relationships, these multipliers are higher than would typically be found in most other area industry clusters.

Workers:

With a legacy carried-over from the former history of Kelly Air Force Base Air Logistics Center, San Antonio workers have developed strong competencies in aviation MRO skills and trades. Many credit generations of Port San Antonio's civil service employment and skills development opportunities as the primary factor in establishing a strong Hispanic middle class and opportunities for upward mobility in San Antonio. Boeing San Antonio recognized this factor as a strong asset in terms of workforce availability in deciding to establish themselves here in 1998. Since then this legacy has continued with a new generation of MRO specialized workers now employed at Port San Antonio.

Businesses:

Where business goals and social goals intersect to place an emphasis on development of Texas small and minority-owned businesses, Boeing San Antonio has made it a priority to do its part as well. Given Texas and San Antonio demographic trends where Latinos and other minority groups are increasingly dominating the workforce ranks, it is important that they participate successfully in business ownership. Outreach efforts to identify small disadvantaged supplier companies, and mentoring efforts to involve them in helping Boeing San Antonio provide ultimate customer value, are part of their corporate policies.

Future Potential for Sustained Economic Impacts of Boeing San Antonio

The nature of the defense business is for set terms to provide specific workloads. Impacts of economic output and job creation for this industry segment are typically measured in increments of five-year contracts and their potential extension periods. Department of Defense contracting is becoming increasingly competitive, so no guarantees for sustaining these impacts can be made beyond the competitive positioning efforts of Boeing San Antonio and its partners. An emphasis on continuous production improvements through lean manufacturing processes, and further overhead cost reductions, are the current focus of their management entering an upcoming round of major workload re-competitions, most notably for the commercial activity from 2009 thru 2014 time frame.

Diversification of Boeing's business is critical to the future of San Antonio. On March 7, 2011, Boeing San Antonio welcomed the 787 program to begin change incorporation and refurbishment on six Dreamliners. Three will complete change incorporation and three airplanes will be refurbished after flight test is complete. However, the plan is flexible and could accommodate additional 787 production needs as flight test is completed and airplanes are prepared for delivery. The work will be performed from March 2011 through 2013.

To prepare for the incoming commercial work, the San Antonio site has reserved a compliant-ready hangar. Some of the work done in San Antonio will include installing electronic and mechanical equipment, completing software upgrades, testing functional systems, and removing and reworking wiring or equipment that needs to be updated to current configuration requirements.

Bringing Boeing Commercial Airplanes business to Boeing San Antonio is evidence that the company operates as one team. The Boeing 747 program has selected the site to conduct some refurbishment work for the new 747-8 Freighter. By using the San Antonio site, the program can support the refurbishment work statement required to support the 747-8 Freighter delivery schedule. The site has the capacity and the capability to do this work. Refurbishment work will continue to be performed at Everett, while a portion (up to five 747-8 Freighters) of the work that exceeds Everett's field stall capacity is accomplished at San Antonio.

Even if a business stays at steady-state, its future outputs are subject to the value of inflation. To derive an estimate of increases in value per year, we utilized IMPLAN to forecast the producer price index (PPI) program at the U.S. Bureau of Labor Statistics. The PPI measures the average change over time in the selling prices received by domestic producers for their output. The PPI program maintains change in price data for a variety of industries, including aircraft engine and engine parts manufacturing. According to IMPLAN, the average annual change in selling prices for aircraft and engine parts manufacturing was 1.6 percent.

In addition to the company's $200.9 million in direct defense contract work, Boeing San Antonio is set to support an increasing number of commercial airliners including the 787 Dreamliner and 747-8 Freighter. This increase in activity will yield greater program impacts then the initial $406.9 million total impact estimated for 2009.

Figure 11: Forecast of Boeing San Antonio San Antonio Economic Impacts in Texas ($ Mil.)

	Direct Output	Direct Output with CA*	Total Output	Total Output with CA*
2009	$200.9	$205.2	$406.9	$415.5
2010	$204.1	$211.9	$413.4	$427.3
2011	$207.4	$270.2	$420.0	$532.9
2012	$210.7	$251.4	$426.8	$500.0
2013	$214.1	$237.7	$433.6	$475.0
2014	$217.5	$231.3	$440.5	$464.6
2015	$221.0	$221.0	$447.6	$447.6
2016	$224.5	$224.5	$454.7	$454.7
2017	$228.1	$228.1	$462.0	$462.0
2018	$231.8	$231.8	$469.4	$469.4

***NOTE: 2009-2014 outputs include adjustments made of the $200.9 million in Boeing San Antonio baseline expenditures and $406.9 million total output in 2009, plus the commercial activities (CA) and impacts of the 787 and 747-8.**

Figure 11, incorporates the expected expenditures for the commercial activities of 2009-2014, then forecasts the initial Boeing San Antonio output and total impact by increasing 1.6 percent annually through 2018. This projection is based on several assumptions that will change the 2013 total impact as Boeing San Antonio outputs deviate from industry averages. One assumption is that the forecast used the price indexes from IMPLAN which in turn uses information from the U.S. Bureau of Labor Statistics' producer price index (PPI). Second, we assume that 2009 is a representative base year for estimation. Third, we assume that upon completing the forecasted commercial activity, Boeing San Antonio will return to levels of business comparable with 2009 over the coming decade. Changes in prevailing economic prices and Boeing San Antonio business activity will impact the 2018 estimate.

Nonetheless, with typical inflation, Boeing San Antonio economic impacts will grow from current total output of $406.9 million in 2009 to $469.4 million in 2018. With the commercial activity of the 787 Dreamliner and the 747-8 Freighter included, output and expenditures will peak in 2011, with a total output of $532.9 million.

When combined with Boeing San Antonio's existing operations, the six years of activities associated with commercial enterprises, 2009 through 2014, represents an estimated $2.8 billion in total economic impact for the Texas economy.

III. Summary Conclusions

Boeing San Antonio is a unique and significant contributor to the United States' defense preparedness, by providing critical aircraft systems maintenance, repair, overhaul and support services to optimize fleet utilization for the KC-135, C-17, 787, and 747 programs under contract at this time.

Boeing San Antonio is a dominant factor within the local manufacturing arena and provided nearly half of the aerospace products and parts subsector jobs in 2009 for the metropolitan area. Considering that the San Antonio economy has only 5.2 percent manufacturing jobs, sustaining the Boeing San Antonio contribution toward such higher-skilled and higher-wage jobs is important for a healthy and diverse economy.

Manufacturing jobs typically have a higher positive economic impact, are better paid, add greater value, and bring more new dollars into the local and state economies. The Boeing San Antonio workforce earns an annual average of $63,373 versus the metro area average of nearly $40,000 for all workers and roughly $44,000 for comparable aircraft industry workers.

Boeing San Antonio is the principal anchor tenant at Port San Antonio, the redeveloped Kelly Air Force Base, contributing 21.7 percent of all private-sector jobs. Port San Antonio has been the most successfully redeveloped large military facility from the 1995 BRAC round, due in large part to Boeing's decision to locate Boeing San Antonio operations there in 1998.

Boeing San Antonio's direct economic impacts in 2009 for its federal contracting totaled $200.9 million in expenditures, including $140.7 million in salaries and wages, $52.1 million in other operation categories, $1.3 million in tuition expenditures, $6.4 million in capital expenditures, and $442,000 in charitable contributions. Multiplier effects of Boeing San Antonio rippling through the Texas economy provided an additional $206.0 million in secondary effects through all levels of supplier activity and re-spending of added worker and business income. This resulted in a total output increase for the Texas economy of $406.9 million for 2009 due to the presence of Boeing San Antonio. When the commercial activities are added the total impact exceeds $415.5 million.

Boeing San Antonio's 2009 direct employment of 1,665 workers leveraged creation of another 1,546 indirect and induced jobs, for a total employment impact in 2009 of 3,211 Texas jobs.

Though the vast majority of Boeing San Antonio employees are attached to the KC-135 PDM, KC-135 GATM, and C-17 workloads, the commercial activities of the 787 and 747-8 will play an increasingly important role in Boeing San Antonio operations, at least for the next five years.

A forecast of the Boeing San Antonio future impacts on the Texas economy from 2009 to 2014, based on this study's assessment of 2009 as a baseline year plus the planned commercial expenditures over the same time period, indicates that over $2.8 billion in total state economic output is dependent on their continued viable operations and competitive contractual success.

Methodological Note: Economic Impact Analysis

The purpose of this study was to provide an estimate of the short run economic impacts on the regional economies of the San Antonio Metropolitan Statistical Area (MSA) and for the state of Texas as a whole. For our analysis, we used the eight-county MSA as defined in December 2003 (Atascosa, Bandera, Bexar, Comal, Guadalupe, Kendall, Medina and Wilson Counties).

The first part of our analysis required us to estimate the direct expenditures within the regions. These direct impacts were measured for the 2009 fiscal year. The data for estimating the economic impacts of Boeing San Antonio were derived from financial statements, budget data and other information provided by Boeing San Antonio personnel. A multiplier effect was then measured for each one of these direct economic impacts through the IMPLAN Input/Output model. IMPLAN is a widely used input/output modeling software first developed by the United States Forest Service in 1979, and now marketed by Minnesota IMPLAN Group (MiG, Inc).

The latest regional and state economic data (2002) were used for this report. The model utilizes benchmark tables provided by the Bureau of Economic Analysis as well as other statistical data to model transactions occurring within a region, state or the nation. IMPLAN is, in a sense, a general accounting system of the economic transactions taking place between industries, businesses, and consumers in an economy and estimates the impacts on total output (sales), personal income, indirect business taxes, and employment. By expanding their analysis beyond the direct impacts, IMPLAN provides a more complete picture of the economic effects of transactions. The latest available economic data from IMPLAN (2002) were used to estimate the indirect and induced impacts of Boeing San Antonio.

Operational Expenditures

Operational expenditures were provided by Boeing San Antonio. These included gross payroll, payments made to suppliers, charity contributions, and capital expenditures. All categories were allocated to single or aggregated IMPLAN sectors except for salaries and related costs. Salary and wage related costs were analyzed separately.

Related IMPLAN sectors include manufacturing parts and supplies: iron and steel mills, steel product manufacturing, aircraft engine and engine manufacturing, other aircraft parts and auxiliary equipment, aircraft manufacturing, among other manufacturing (IMPLAN sectors 170, 171, 198, 238, 243, 249, 256, 284, 285, 286), utilities (sector 431, State and local government utilities), wholesale trade businesses (sector 319), transport by truck (sector 335), and real estate services (sector 360), other professional and scientific services (sector 380), gasoline stations (sector 326), automotive repair and maintenance (sector 414).

Capital Expenditures

Capital expenditure data were provided by Boeing San Antonio. These expenditures were allocated to IMPLAN sector 38 (commercial and institutional buildings). The IMPLAN model estimates local and non-local expenditures based on the underlying industry makeup of each region and the propensity to buy across industries (local purchase coefficients). The model local purchase coefficients were applied to each sector in the analysis. The direct expenditures for

capital were then modeled in IMPLAN to estimate the additional impacts to the regional economy.

Salaries and Wages

In order to estimate the economic impacts of Boeing San Antonio payroll, the direct salary and wage expenditures were discounted by 15 percent to account for average tax burden, with the remainder representing disposable income. The remaining amount was then applied to the median household range for the selected MSA and the state. IMPLAN models households as institutions based upon benchmarks of consumer expenditures provided by the Bureau of Labor Statistics. Indirect and induced expenditures were derived from the model results.

Methodological Note: Contextual Data

Contextual data in this report comes from unemployment insurance reports by Texas businesses to the Texas Workforce Commission. The timeliness and detail of this data make it attractive for many reports. However, the data have several limitations that result in likely undercounting of economic activity within subsectors. In 2007, Richard Butler and Mary Stefl compiled their most recent iteration of Aerospace Industry in San Antonio. They list three reasons why Texas Workforce Commission data likely results in undercounting. First, contract laborers are likely counted in the industry of their employer firm rather than the firm in which they are providing contract labor. Second, some companies may be incorrectly coded according to industry. And finally, some aerospace companies operating in Texas with only a portion of their operations in San Antonio may report all of their activity to another city instead of including San Antonio's estimates separately. However, since industry coding and detailed operations information at the establishment level is not provided by the state, researchers are unable to assess the scope and impacts of this problem.

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