

ECONOMIC CONTRIBUTION STUDY

A. B. Won Pat International Airport, Guam

Prepared for

Won Pat International Airport Authority, Guam
Tamuning, Guam



July 2007

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SUMMARY

Airports are important because they provide an essential role in the movement of passengers and cargo, facilitate commerce and national defense, and link communities with one another—on a local, regional, national, and global basis. As globalization continues, the competitiveness of national economies and industries will increasingly depend on airports and aviation infrastructure.

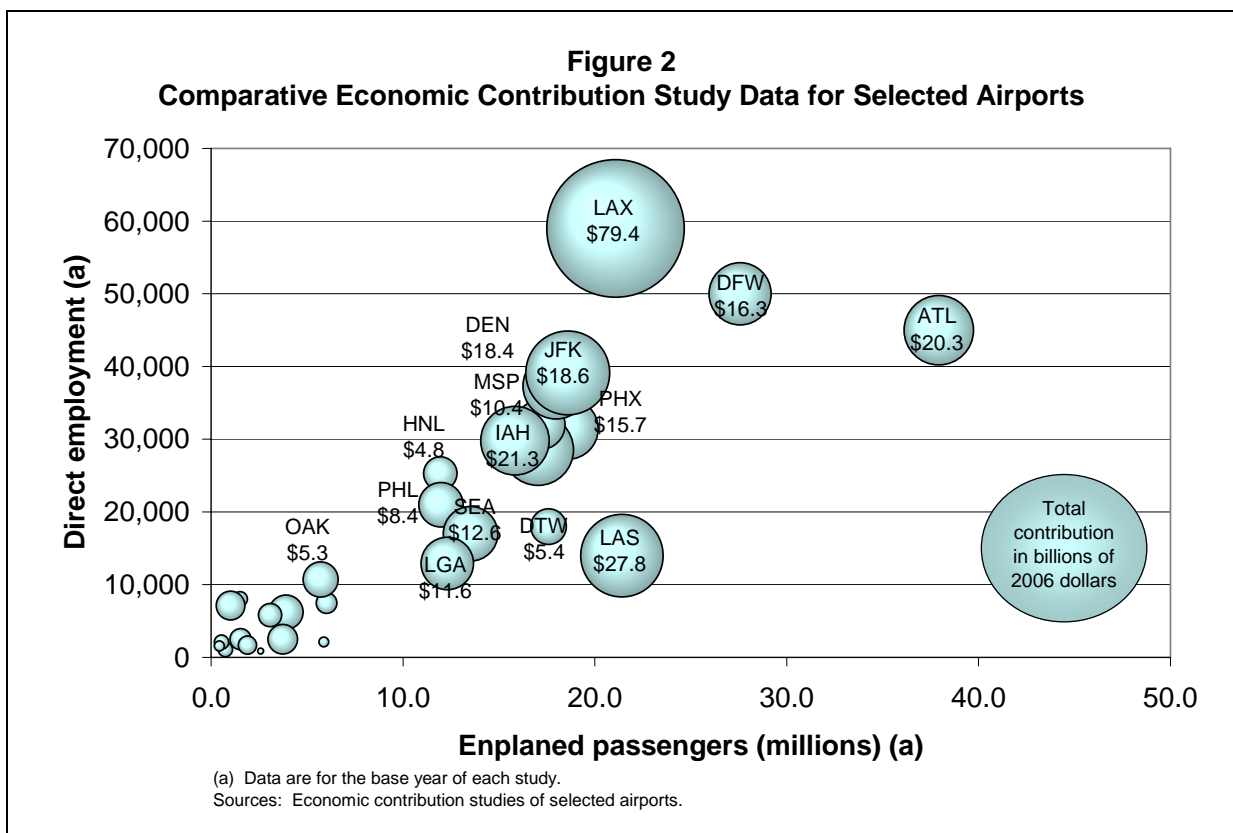
THE ECONOMIC IMPORTANCE OF U.S. AIRPORTS

The U.S. civil aviation sector (including air transportation, related manufacturing, and air-based travel and tourism) collectively generated more than \$1.3 trillion of national output in 2004, which accounted for 12.3 million U.S. jobs and \$418 billion in payroll expenditures.* Commercial aviation accounted for most of this contribution, with \$1.2 trillion in output, \$380 billion in earnings, and 11.4 million jobs. The importance of commercial aviation to the U. S. economy is reflected in its share of national output, personal earnings, and employment, as illustrated on Figure 1.



*Air Transport Association of America, *Commercial Aviation and the American Economy*, March 2006, prepared by The Campbell-Hill Aviation Group, Inc.

The United States has the world's most extensive airport system. According to the Federal Aviation Administration (FAA), there are more than 19,300 airports in the United States, 28% of which are public facilities operated by a state or local government agency. In 2006, there were 383 primary commercial service airports in the United States (which accounted for 99% of passengers), including 31 airports classified as large hubs, 37 as medium hubs, 68 as small hubs, and 247 as non-hubs. A comparison of the economic contribution generated by individual airports indicates that the contribution varies depending on the characteristics of the population and economic base and the type of airline and aviation services provided. As shown in Figure 2, there is a relationship between the level of passenger traffic and direct employment, while the total contribution varies, depending on the characteristics of a particular airport.



The economic importance of airports stems not only from the fact that they are major generators of economic activity but also because they can act as a catalyst for a wide range of economic activities. An airport can act as a strategic catalyst by:

- Influencing business location decisions
- Attracting new investment from U.S. and overseas companies

- Retaining and securing the expansion of existing businesses in the face of competition from other areas
- Promoting the export success of businesses located in the area
- Enhancing the competitiveness of the economy through the fast and efficient delivery of passenger and freight services
- Attracting high technology businesses that have a high demand for air travel and the shipment of goods
- Acting as centers of employment and training in a region by generating demand for a wide range of skills
- Integrating isolated communities with the global community

PURPOSE AND SCOPE OF THIS STUDY

The purpose of this economic contribution assessment is to estimate the current and projected economic contribution of A.B. Won Pat International Airport, Guam (the Airport) on the economy of Guam. The Airport is owned by the A.B. Won Pat International Airport Authority, Guam (herein after referred to as GIAA or the Authority).

The scope of the assessment included (1) defining the regional service role and use of the Airport, (2) identifying the current direct employment and expenditures by Airport-related businesses, (3) ascertaining the level of expenditures by visitors, (3) estimating the total contribution of those expenditures on the regional economy for 2006, (4) projecting the future economic contribution of the Airport based on the Master Plan Update* forecast aviation activity through 2023, and (5) identifying and evaluating the potential constraints on future Airport development and economic contributions.

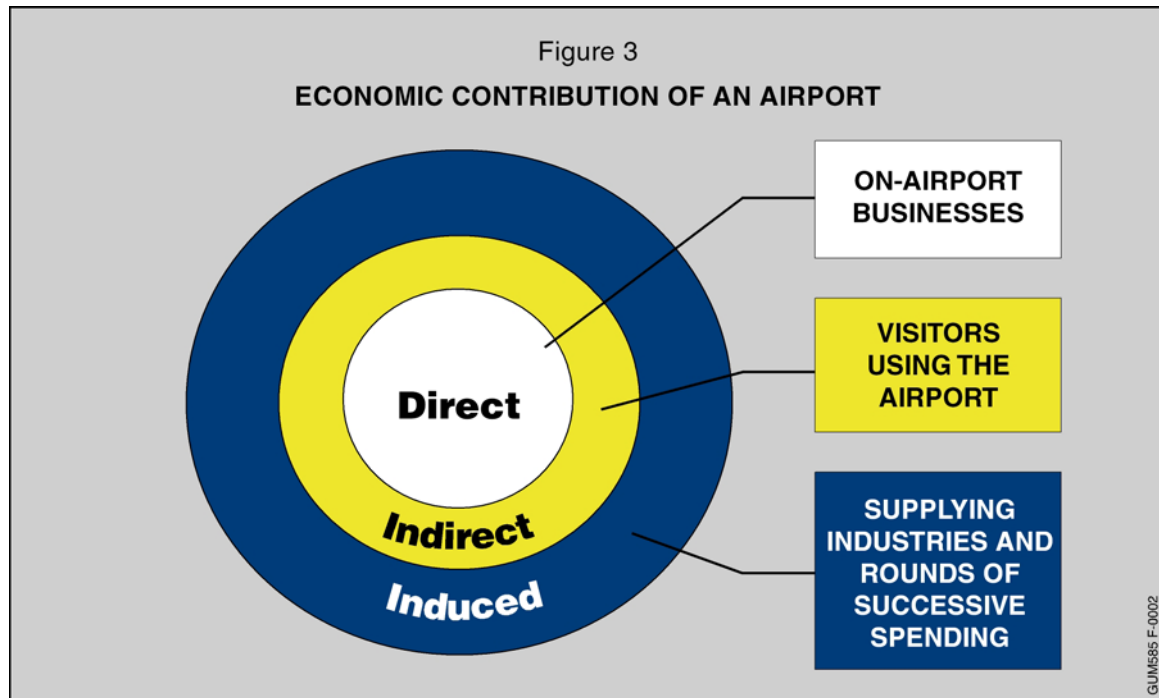
CURRENT ECONOMIC CONTRIBUTION (2006)

The total economic contribution is the sum of direct (on-Airport) and indirect and induced (off-Airport) contributions. The direct contribution is that generated at the site of economic activity—in this case, the Airport. The indirect contribution results off-site and includes the contribution of visitors coming to Guam via the Airport, including employment, payroll, and local expenditures in the area but outside the Airport. Visitors to the area spend money locally on lodging, food and beverages, entertainment, retail, and other items; such spending has an indirect but quantifiable

*A. B. Won Pat International Airport Authority, *Guam, Master Plan Update, Final*, April 2005, prepared by Leo A. Daly. (Agreement No. GIAA-FY03-P1)

contribution on the economy of the region served by the Airport. The induced contribution is the off-Airport contribution above and beyond the combined direct and indirect contributions of an economic activity, where successive rounds of spending create additional income, also known as the “multiplier” effect.

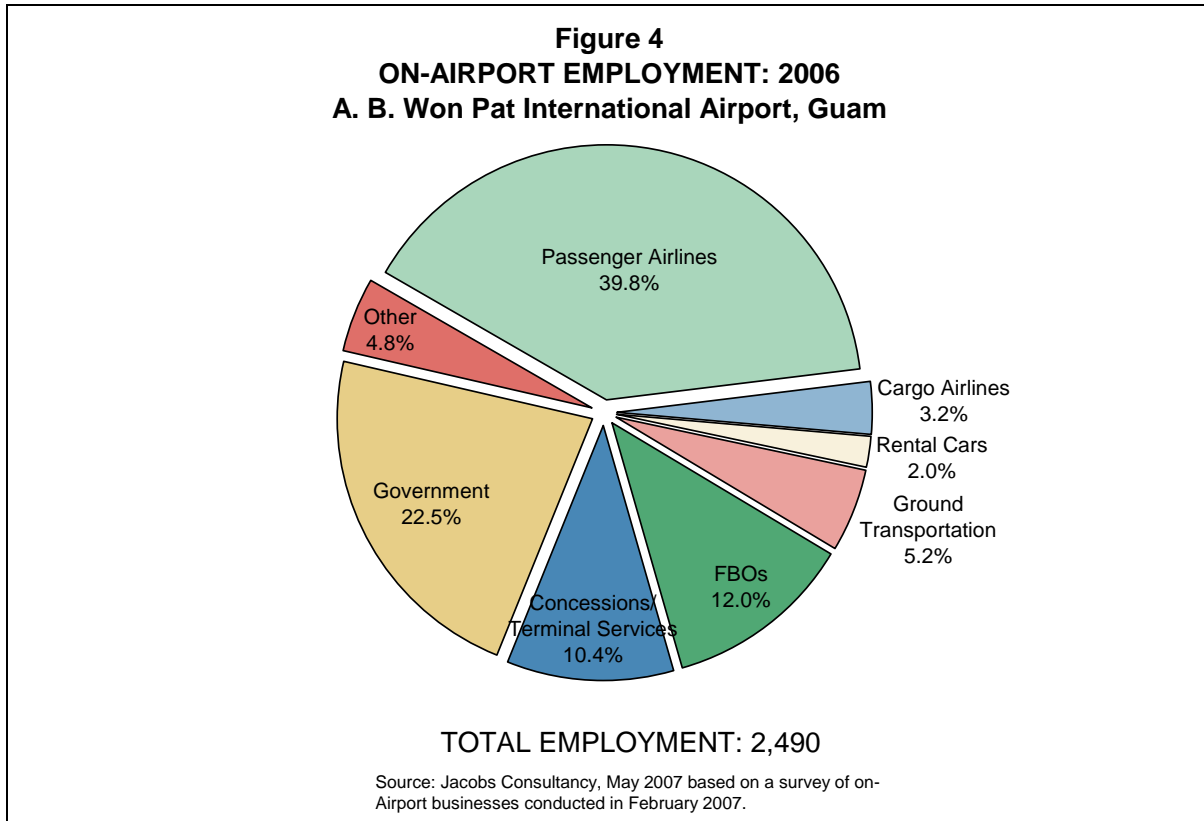
A description of the analytical methodology is provided in Appendix A. Figure 3 illustrates the relationship among the direct, indirect, and induced economic contribution of the Airport.



Direct Economic Contribution

The current direct expenditures of on-Airport organizations—airlines, passenger terminal concessionaires, fixed base operators, ground transportation operators, government agencies, and others—were measured by means of a survey conducted with the assistance of Authority staff. From the surveys, it was estimated that 2,490 people were employed at the Airport in 2006, representing a payroll of \$150 million.

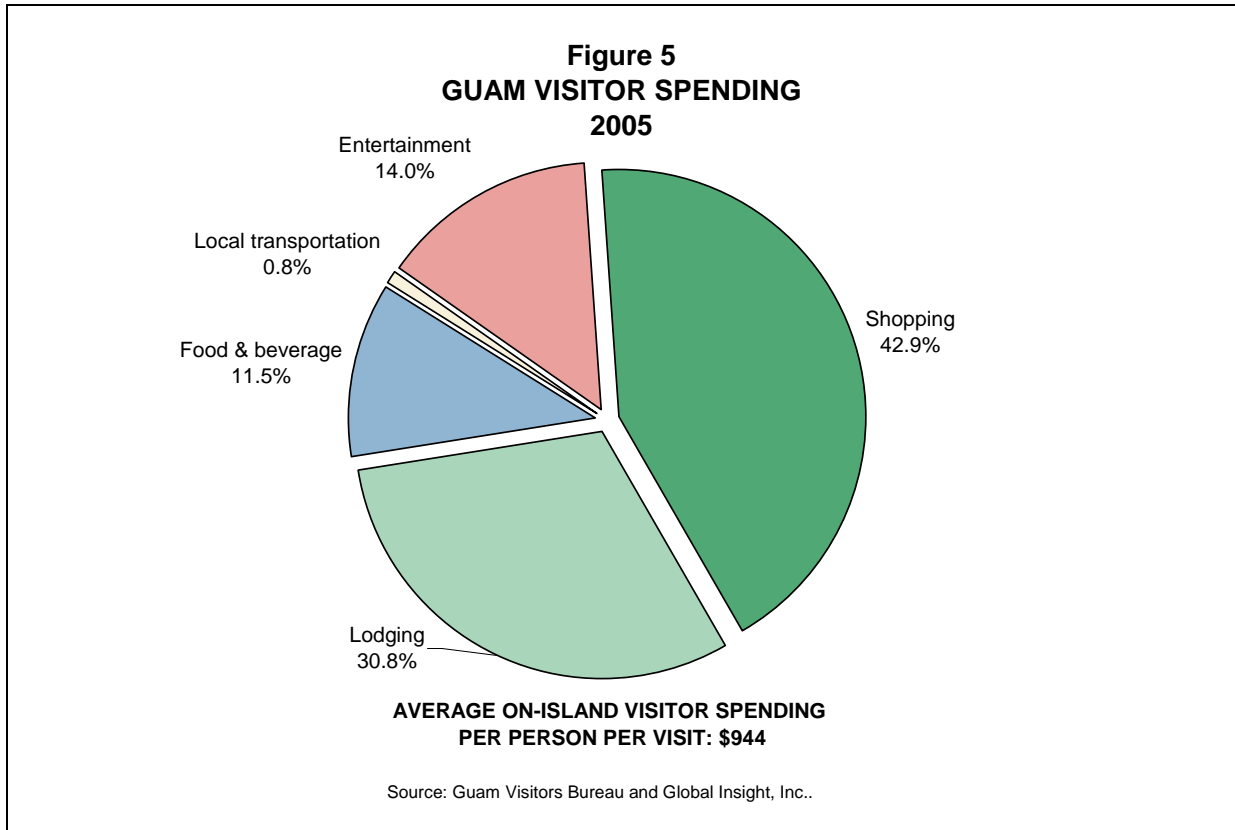
As shown on Figure 4, the airlines accounted for 39.8% of Airport employment and government agencies accounted for 22.5%. Fixed base operators (FBOs), ground transportation providers, passenger terminal concessionaires and terminal services (food and beverage, rental car, and others), and other businesses accounted for the remaining 37.7%. Total expenditures of on-Airport organizations for wages, goods and services in 2006 were estimated to be \$291 million, which represents the direct contribution of Airport-related activity.



Indirect Economic Contribution

The indirect contribution of the Airport is defined in this evaluation as local spending by visitors coming to Guam via the Airport. In 2006, there were a total of 1,217,211 visitors to Guam, 97% of whom arrived by air; the remaining visitors arrived by sea. Visitor contributions were based on data provided by the Guam Visitors Bureau and Global Insight Inc., a private market research consulting company, who conducted a separate analysis of Guam visitor contributions. Visitors to Guam spent an average of \$944 per person per visit in 2005 (the base year of the study).* As shown in Figure 5, shopping accounted for the largest share of visitor spending in 2005 (42.9%), followed by spending for lodging (30.8%). Based on the results of this study and the share of air visitors to Guam noted above, visitors coming to Guam via the Airport were estimated to spend about \$1,105 million in 2006.

*Guam Visitors Bureau and Global Insight, Inc., *The Economic Impact & Tourism, Guam Tourism in 2005*, June 2007.



Induced Economic Contribution

As discussed previously, the induced contributions are defined in this evaluation as the additional local business that is generated specifically because of the Airport's presence, including related employment, payroll, and employer expenditures. The induced contributions or "multiplier effects" resulting from the direct expenditures of on-Airport businesses were estimated to be \$326 million in 2006. Ordinarily, the induced contribution of air visitor expenditures would be estimated to reflect subsequent rounds of spending using a multiplier that accounts for import leakages. For the purposes of this analysis, the estimation of air visitor expenditures was limited to the actual spending of each visitor per visit based on the Guam Visitors Bureau and Global Insights study mentioned earlier. Therefore, the induced impacts related to air visitor expenditures were not included.

Total Economic Contribution

As shown in Table 1, the total economic contribution of the Airport was estimated to be about \$1.7 billion in 2006, \$628 million of which was payroll paid to the estimated 20,440 people whose jobs were attributable to the Airport.

Table 1	
2006 ECONOMIC CONTRIBUTION	
A.B. Won Pat International Airport, Guam	
	Total
Total economic contribution (millions)	\$1,722
Payroll (millions)	\$628
Employment (jobs)	20,440
Sources: Jacobs Consultancy, May 2007.	

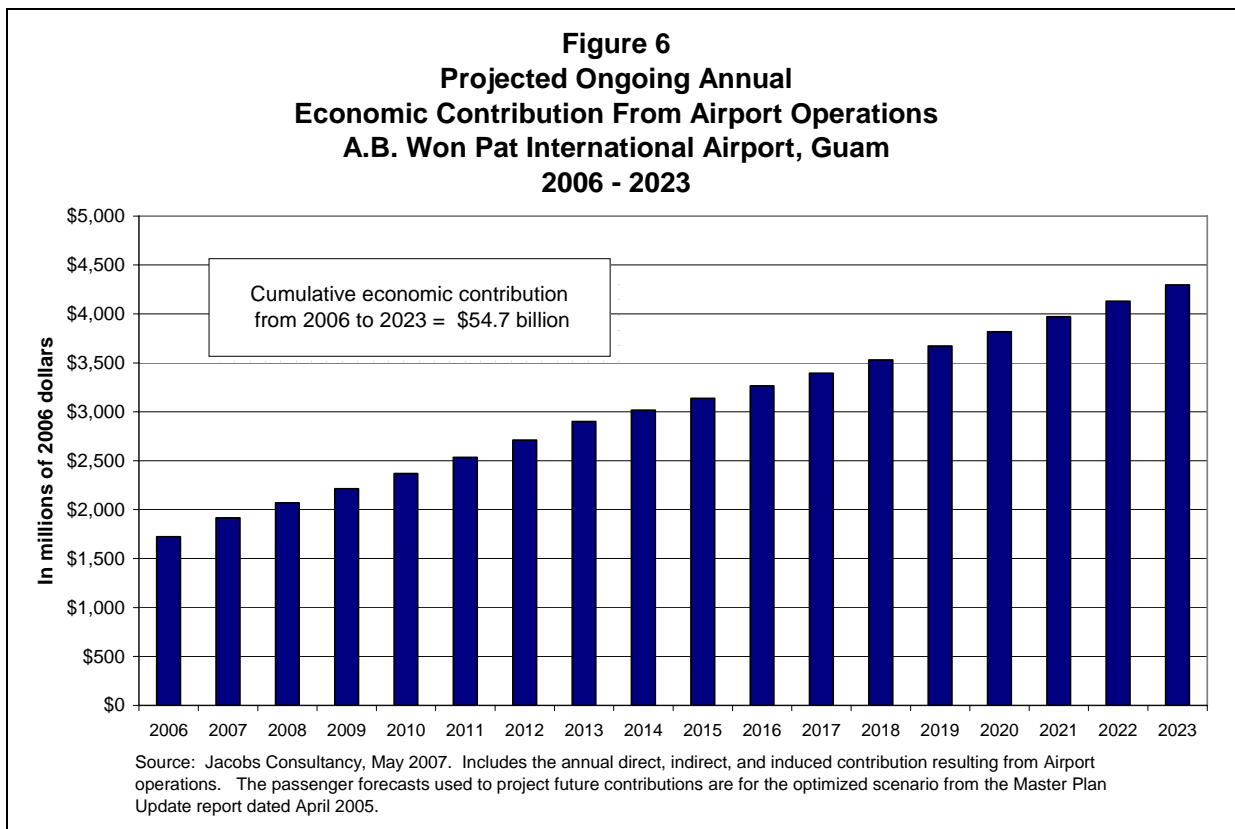
PROJECTED ECONOMIC CONTRIBUTION

Continued future growth in enplaned passenger activity at the Airport is expected to lead to increased employment, expenditures, and total economic contribution of government agencies and other businesses at the Airport. The future economic contribution of the Airport on the region was projected using the optimized forecast scenario from the Master Plan Update to reflect an optimal but achievable level of planned development, passenger traffic, and airline service. The optimized case includes assumptions for strong growth in passenger activity reflecting expanded airline service, strong economic activity, no natural disasters and epidemics, and that a “variety of grants are pursued and administered by the Airport and government of Guam to develop revenue producing entities” during the forecast period.

Projected Ongoing Annual Economic Contribution

The ongoing annual contribution from Airport operations was projected to increase in proportion to aviation activity. In the optimized scenario, enplaned passenger levels (excluding transit passengers) were forecast to increase an average of 5.4% per year between 2002 (the base year) and 2023. The annual ongoing economic contribution associated with the optimized scenario forecasts is expected to reach \$4.3 billion in 2023, as shown on Figure 6, reflecting strong passenger traffic growth

and the pursuit and use of federal grants to fund Airport capital improvements to facilitate growth and service.



Projected Cumulative Economic Contribution

The projected cumulative economic contribution of the Airport on the economy of Guam totaled \$54.7 billion for the period from 2006 through 2023.

POTENTIAL CONSTRAINTS ON FUTURE AIRPORT DEVELOPMENT AND ECONOMIC CONTRIBUTIONS

In 2006, the Airport contributed \$1.7 billion to the economy of Guam. By 2023, the annual ongoing economic contribution of Airport operations is expected to increase to \$4.3 billion assuming an optimal but achievable level of planned development, passenger traffic, and airline service. However, it was recognized that the achievement of Airport economic contributions in the future may be constrained by external influences. In this assessment, a number of potential constraints were identified and evaluated, including the recent events related to the disputed land in the vicinity of the Airport, transportation infrastructure improvements and related cargo and other development, and regulatory compliance and federal funding sources for the Airport Capital Improvements Program (CIP).

Recent Events—Disputed Land

In 2000, 1,417 acres of federal surplus property that was, formerly known as Agana Naval Air Station (NAS) and now referred to as Tiyan, was conveyed to the Airport under a Public Benefit Transfer through the Base Realignment and Closure Commission of 1993. Other portions of NAS, containing a road and former military housing along the north side of the airport property, were also transferred, through the Federal Highway Administration (FHWA), to the Guam Department of Public Works (DPW) to be used and maintained as a public road (Laderan Parkway). Future Airport development plans are based on the public road being aligned and maintained by the Guam DPW to provide access to prime Airport leasehold areas for commercial aeronautical development. These two public benefit conveyances were included in the NAS closure to promote the economic development of Guam.

Since that time, the Guam legislature has passed a number of public laws which allowed the Government of Guam to return what was determined to be excess federal properties to the estates of subsequent claimants. In 2004, the Guam Ancestral Lands Commission began the process of transferring what was to be the Laderan Parkway property to the estates of the subsequent claimants, some of whom are occupying those lands today.

For GIAA, the recent events related to the disputed land raise several issues:

- Possible incompatible land uses in the Airport vicinity
- Conflict with proposed infrastructure improvement that is critical to development of Airport property
- FAA regulatory compliance problems and an contribution on the ability to fund the long-term capital program

In the event the land disputes are not resolved consistent with the Airport's master plan for future development, it is likely that there would be significant constraints on overall development and therefore on the Airport's future contribution to the Guam economy:

1. At a minimum, loss of economic activity associated with property development that is dependent on the improved access to be provided by the Laderan Parkway
2. At a maximum, major disruption in airport funding sources and ability to accommodate forecast demand, with associated significant reduction in overall airport economic contribution

Transportation Infrastructure Improvements and Related Cargo and Other Development

Future Airport development and the associated economic contributions are affected by the improvements to Guam's transportation infrastructure. These transportation improvements also facilitate related future development in the cargo industry and other businesses on- and off-Airport. In particular:

- The Guam Comprehensive Economic Development Strategy (CEDS) proposed project list includes two projects that are expected to have a direct effect on Airport planned development and operations: the Tiyan Infrastructure System (which includes the Laderan Parkway described earlier) and the Marine Drive Bypass, an alternate roadway that will follow the western boundary of the roadway corridor that leads to the Naval Air Station and continue eastward to the Route 16 underpass.
- In terms of Airport economic contribution, the inability to complete the infrastructure projects listed above would likely constrain much of the expected development of airport property by air cargo operators and limit the development of property near the Airport for other compatible uses. The estimated economic contribution that would be "lost" includes:
 - Temporary construction contributions of cargo developments of \$14 million
 - Annual (recurring) cargo-related jobs of 970 and estimated annual payroll contributions of \$59 million
 - Other potential off-Airport business development (other than Home Depot) discouraged by the lack of transportation access
 - Temporary construction contributions of transportation infrastructure improvements of \$67 million

The projected future economic contribution of the Airport could be reduced by 5% to 10% from loss of these specific projects alone. However, much more significant are the broader effects on GIAA's ability to finance the overall capital program and accommodate forecast demand. This is discussed in the next section.

Regulatory Compliance and Federal Funding Sources

The return of the disputed land to the subsequent claimants may impact Airport planned development and federal funding. The Federal Aviation Administration (FAA) contends that the return of the disputed land to the subsequent claimants violates the Airport's obligations under FAA grant assurances and limits land use

for commercial aeronautical development, restricts growth at the Airport, and jeopardizes GIAA eligibility for federal financial assistance.

For the purposes of evaluating a potential disruption in airport funding sources and the associated reduction in Airport planned development and overall economic contribution, three scenarios were defined as outlined below and discussed in the main report.

- 1. Unfunded Airport Capital Improvement Program (CIP):** It is assumed that key funding sources are not available for the Airport CIP and GIAA does not implement the CIP. The “lost” or foregone cumulative economic contribution associated with an unfunded CIP is estimated to be \$14.7 billion for the period from 2006 through 2023. In addition to the lost overall economic contribution, the temporary construction expenditures associated with the Airport CIP would also be lost, totaling approximately \$420 million between 2006 and 2023.
- 2. CIP Funded With Airline Revenues:** It is assumed that GIAA increases airline user charges to make up for the loss of FAA grants and PFC funds. In order-of-magnitude terms, this would increase airline cost per enplaned passenger (CEP) from roughly \$13 today to over \$30 during the Master Plan implementation period. It can’t be known for certain how much this would constrain future activity levels at the Airport, but it is possible that the contribution could be similar to the constrained scenario presented directly above. That is, up to \$15 billion of Airport economic contribution could be at risk.
- 3. CIP Funded With Replacement Guam Government Revenues:** It is assumed that a replacement source of government funding is provided that allows implementation of the CIP in a cost-effective manner for the airlines serving the Airport. This is the only scenario that could reasonably be expected to preserve the potential to realize most of the projected Airport economic contribution (\$4.3 billion by 2023). Even in this case, however, there is likely to be some foregone airport development and associated economic contribution if the transportation infrastructure improvements discussed previously are not undertaken.

Chapter 1

PURPOSE AND SCOPE OF THIS STUDY

The purpose of this economic contribution assessment is to estimate the current and projected economic contribution of A.B. Won Pat International Airport, Guam (the Airport) on the economy of Guam. The Airport is owned by the A. B. Won Pat International Airport Authority, Guam (herein referred to as GIAA or the Authority), which is an autonomous agency of the Government of Guam. To provide the context for the economic contribution assessment for the Airport, this chapter sets forth the included scope of work tasks for both the current and projected scenarios.

SCOPE OF WORK

Jacobs Consultancy was requested by GIAA to conduct an independent assessment of the economic contributions associated with the Airport in 2006.

The economic assessment was conducted in two phases: (1) Phase 1 included data collection efforts related to the survey of on-Airport businesses and an initial evaluation of future Airport developments that may be constrained by certain land use issues and (2) Phase 2 included a detailed analysis of the economic contribution of the total Airport facility. Throughout the work plan, Jacobs Consultancy coordinated with the Authority and provided updates on intermediate findings and key analytic assumptions necessary for the work. As part of completing the economic contribution assessment, the following subtasks were performed:

- Conducted surveys of on-Airport businesses to collect current data on employment and expenditures at the Airport,
- Completed an inventory of off-Airport economic benefits of air travel, such as for tourism. Incorporated expenditure data for visitors to Guam from passenger surveys conducted by the Guam Visitors Bureau.
- Met with Authority staff to present the key inputs to be used in the economic contribution assessment and conducted a presentation on the inputs and preliminary results.
- Using the State of Hawaii version* of the Regional Input-Output Modeling System (RIMS II) developed by the U.S. Department of Commerce, estimated the total economic contributions of Airport activity, including

*State of Hawaii, Department of Business, Economic Development, and Tourism, Research and Economic Analysis Division, *The 2002 State Input-Output Study for Hawaii*, March 2006.

employment and expenditures, and total economic contribution. The State of Hawaii model was used in the absence of a RIMS II model for Guam to reflect a similar island economy with a higher than average dependence on imported goods.

- Projected the ongoing annual economic contribution of Airport operations from 2006 through 2023 based on (1) the Master Plan Update forecasts for the Airport and (2) the current relationship between activity at the Airport and the economic contribution and number of jobs generated for the local economy.
- Estimated the cumulative economic contribution of the Airport from 2006 through 2023 based on the projected annual economic contribution of Airport operations.
- Identified and evaluated potential constraints to future Airport development and economic contribution, including the recent events related to the disputed land in the vicinity of the Airport, transportation infrastructure improvements and related cargo and other development, and regulatory compliance and federal funding sources for the Airport Capital Improvements Program (CIP).

Chapter 2

THE ECONOMIC IMPORTANCE OF AIRPORTS

Airports are important because they provide an essential role in the movement of passengers and cargo, facilitate commerce and national defense, and link communities with one another—on a local, regional, national, and global basis. As globalization continues, the competitiveness of national economies and industries will increasingly depend on airports and aviation infrastructure.

COMMERCIAL AVIATION SHARE OF U.S ECONOMY

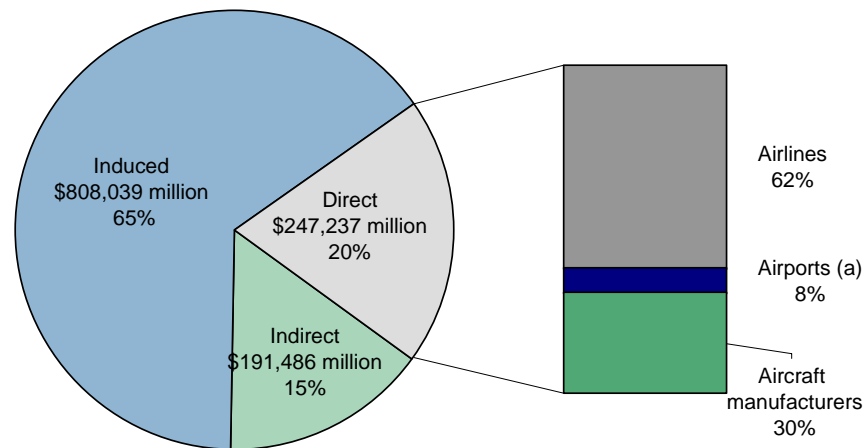
The U.S. civil aviation sector (including air transportation, related manufacturing, and air-based travel and tourism) collectively generated more than \$1.3 trillion of national output in 2004, which accounted for 12.3 million U.S. jobs and \$418 billion in payroll expenditures, as shown in Table 2. Commercial aviation accounted for most of this contribution, with \$1.2 trillion in output, \$380 billion in earnings, and 11.4 million jobs. The importance of commercial aviation to the U. S. economy is reflected in its contribution to national output, personal earnings, and employment.

	<u>Commercial aviation</u>	<u>General aviation</u>	<u>Total</u>
Output (billions)	\$1,247	\$118	\$1,365
Earnings (billions)	380	38	418
Employment (thousands)	11,393	956	12,349

Source: Air Transport Association of America, Commercial Aviation and the American Economy, March 2006, prepared by the Campbell-Hill Aviation Group, Inc.

The primary contributions of commercial aviation on the U.S. economy are related to (1) airlines and supporting services (commercial and noncommercial), (2) aircraft, engines, and parts manufacturing, and (3) air visitor travel and other trip-related expenditures. In the above referenced study, U.S. commercial aviation accounted for \$247 billion in direct contributions, with more than half of the direct contributions accounted for by passenger and cargo airlines, as shown in Figure 7.

Figure 7
Total Economic Contribution of U.S. Commerical Aviation in 2004
(in terms of total output)



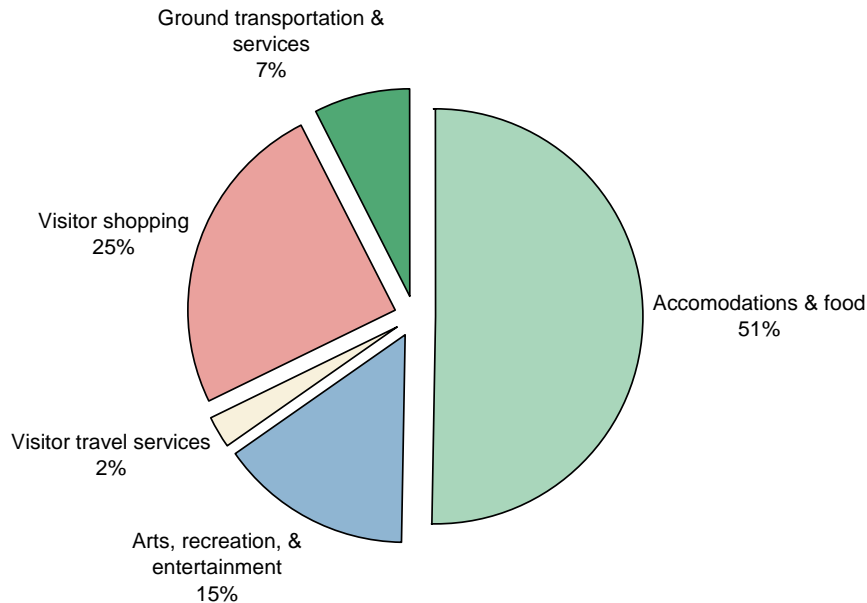
(a) Includes air transportation support services provided by local airports, commercial entities at those airports (e.g., FBOs and aircraft maintenance), and government agencies.

Source: Air Transport Association of America, *Commerical Aviation and the American Economy*, March 2006, prepared by the Campbell-Hill Aviation Group, Inc.

In 2004, commercial airlines accounted for 241 million passenger trips to U.S. destinations, including 215 U.S. domestic visitors and 26 million international visitors, according to this study. Indirect contributions include air visitor expenditures and result from money spent at these destinations for lodging, food, and entertainment, local and other travel, and tourist items. Figure 8 shows the shares of air visitor expenditures by type.

The commercial aviation sector has a significant effect on the U.S. economy, based on air transportation and airport services, manufacturing of air transportation equipment, and travel and tourism expenditures by air passengers. This study also evaluated the economic contributions of states and congressional districts and found that the districts with major tourist destinations (e.g., Hawaii and Las Vegas) or top aviation manufacturing centers (e.g., western Washington) had the greatest contributions, although every district had a significant level of contribution.

Figure 8
Indirect Economic Contribution of U.S. Commercial Aviation in 2004
Air Visitor Spending



Source: Air Transport Association of America, *Commercial Aviation and the American Economy*, March 2006, prepared by the Campbell-Hill Aviation Group, Inc.

THE DIRECT CONTRIBUTION OF AIRPORTS

The United States has the world's most extensive airport system. According to the Federal Aviation Administration (FAA), there are more than 19,300 airports in the United States, 28% of which are public facilities operated by a state or local government agency. In 2006, there were 383 primary commercial service airports in the United States (which accounted for 99% of passengers); including 31 airports classified as large hubs, 37 as medium hubs, 68 as small hubs, and 247 as non-hubs.

Similar to other major industries, airports make a major and direct contribution to their surrounding areas, providing direct employment, economic prosperity, and stability to regions. To understand the economic contribution which an airport can make to a region, its economic value needs to be quantified. The direct contribution of an airport is estimated by considering the economic value of the activities of companies operating on-site at the airport or adjacent to the airport whose operations directly support on-site activity. Economic value can be described generally as the employment, income or value added, output and tax revenues generated by the companies and agencies operating at an airport.

A study of 23 European airports sponsored by Airports Council International (ACI) concluded that on-site direct employment averaged approximately 1,100 employees

per million passengers (enplaned and deplaned) for the airports studied*. The results of this study confirmed the findings of a 1992 ACI study that “airports are major economic assets offering major economic returns and benefits. Decisions made in respect of airports are decisions that affect local regional and economic performance.”

A comparison of the direct contribution of 30 selected U.S. airports indicates that the average on-site direct employment was approximately 800 employees per million passengers (enplaned and deplaned), as shown in Table 3. Although the detailed direct employment results for the Airport will be discussed in the following chapters of this report, the average on-site direct employment for the Airport averaged 870 employees per million passengers, similar but higher than the overall average for all the selected U.S. airports (800 employees). In addition, the total output for the Airport averaged \$602 million per million passengers, somewhat higher than the average for the all 30 selected U.S. airports (\$547 million).

AIRPORTS AS ECONOMIC CATALYSTS

The economic importance of airports stems not only from the fact that they are major generators of economic activity but also because they can act as a catalyst for a wide range of economic activities. An airport can act as a strategic catalyst by:

- Influencing business location decisions
- Attracting new investment from U.S. and overseas companies
- Retaining and securing the expansion of existing businesses in the face of competition from other areas
- Promoting the export success of businesses located in the area
- Enhancing the competitiveness of the economy through the fast and efficient delivery of passenger and freight services
- Attracting high technology businesses that have a high demand for air travel and the shipment of goods
- Acting as centers of employment and training in a region by generating demand for a wide range of skills
- Integrating isolated communities with the global community

*Airports Council International Europe, *Creating Employment and Prosperity in Europe: A Study of the Social and Economic Contribution of Airports*, September 1998.

Table 3
COMPARATIVE DATA ON ECONOMIC CONTRIBUTIONS OF SELECTED U.S. AIRPORTS

<u>Airport</u>	<u>Hub size</u>	<u>Study year</u>	<u>Study year total passengers (millions) (a)</u>	<u>Direct employment</u>	<u>Direct jobs per million passengers</u>	<u>Total output (millions of 2006 dollars)</u>	<u>Output per million passengers (millions of 2006 dollars)</u>
Los Angeles International	L	1995	42.1	59,000	1,400	\$79,370	\$1,883
Fresno Yosemite International	S	2004	1.1	2,100	1,950	915	849
John F. Kennedy International	L	2004	37.2	39,100	1,052	29,467	793
Miami International	L	2004	29.0	38,273	1,318	20,143	694
Las Vegas McCarran International	L	2005	42.8	14,000	327	28,697	670
State of Hawaii	--	2004	30.5	10,234	336	19,722	647
Houston William P. Hobby	M	2003	7.8	6,227	798	4,930	632
Newark International	L	2004	31.7	29,810	942	19,794	625
Houston Bush Intercontinental	L	2003	34.1	28,559	838	21,256	624
Portland International	S	2005	1.5	1,070	729	893	608
A. B. Won Pat International, Guam	S	2006	2.9	2,490	870	1,722	602
Bangor International	S	2005	0.9	1,583	1,825	455	524
Southwest Florida International	M	2005	7.5	2,500	335	3,716	498
LaGuardia	L	2004	24.6	12,920	525	11,587	471
Seattle International	L	2000	27.0	17,000	629	12,644	468
Oakland International	M	2000	11.4	10,700	937	5,268	461
Phoenix Sky Harbor International	L	2003	37.2	31,437	846	15,678	422
Norfolk International	M	2004	3.8	1,685	444	1,448	382
Port Columbus International	M	2004	6.1	5,828	949	2,336	380
Philadelphia International	L	2000	24.0	21,000	877	8,429	352
Spokane International	S	2004	3.0	8,033	2,662	957	317
Minneapolis/St. Paul International	L	2000	34.3	32,000	933	10,420	304
Dallas/Fort Worth International	L	2001	55.1	50,000	907	16,278	295
Atlanta Hartsfield International	L	2000	75.9	45,000	593	20,254	267
Kansas City International	M	2000	12.0	7,492	623	1,873	156
Detroit Metropolitan Wayne County	L	2005	35.2	18,000	512	5,407	154
Hilo International	S	1997	1.7	1,320	791	248	149
Des Moines International	S	1998	1.7	1,380	801	225	131
Kahului	M	1997	5.9	2,116	360	398	68
Lihue	S	1997	2.6	879	341	165	64

(a) Includes enplaned and deplaned passengers.

Source: Published economic contribution studies of individual airports listed.

Chapter 3

AIRPORT ROLE AND SERVICE

The Airport is located in the central part of Guam called Tiyan, which was formerly the U.S. Naval Air Station, Agana. The airport is located approximately six miles northeast of Agana, the capital of Guam, and about two miles from the island's tourist area located in the village of Tumon, as shown in Figure 9. Guam is known as the "Hub of the Pacific" and is a major tourist destination for visitors from Asian countries such as Japan and Korea. In addition, the Airport serves as the Pacific hub for Continental Micronesia.

The Airport is a vital element in the transportation system serving Guam, and makes a substantial contribution to the local economy. The expenditures of air visitors to Guam were included in the estimate of the total economic contribution of the Airport. The Airport supports tourism (an economic mainstay of the island). Therefore, a portion of the expenditures of visitors to Guam is attributable to the existence of the Airport.

This chapter presents discussions of the economy of Guam, the regional service role of the Airport, and aviation activity at the Airport, including airline service, passengers, and cargo.

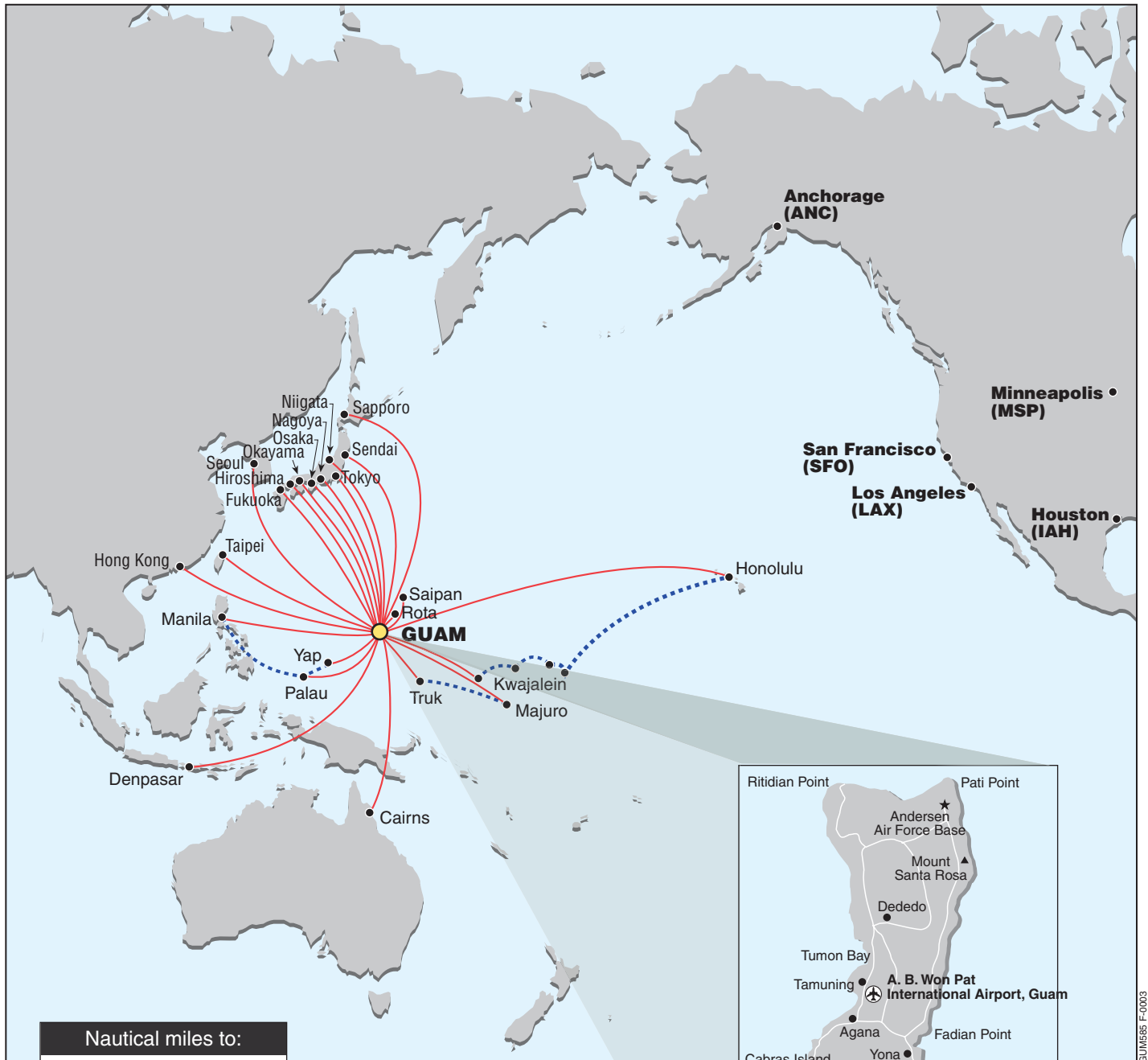
ECONOMY OF GUAM

Guam's economy is influenced by its geographical location. As shown in Figure 9, the island's proximity to Japan (1,358 miles southeast of Tokyo), Hong Kong (1,834 miles southeast), the Philippines (1,382 miles east of Manila), and Korea (1,740 miles from Seoul) account for Guam's popularity as a tourist destination for travelers from Asia. Guam is the westernmost boundary of the United States (5,043 miles west of San Francisco and 3,299 miles west of Honolulu) and plays an important role in the strategic plans of the U.S. military.

The current estimated population of Guam was 171,019 in 2006*. Another 82,459 persons occupied the Commonwealth of the Northern Marianas Islands (CNMI), as a U.S. commonwealth, whereas Guam is a U.S. territory.

The economy of Guam is driven by two primary sectors: tourism and the U.S. military. The influence of tourism on the economy of Guam is reflected in the shares of employment by industry sector, as shown on Figure 10. The services sector accounted for the largest share of Guam employment in 2007 (26.8%). One-third of service sector employment on Guam is related to hotels and lodging, reflecting the

*First Hawaiian Bank, *Economic Forecast*, Guam Edition 2006-2007.

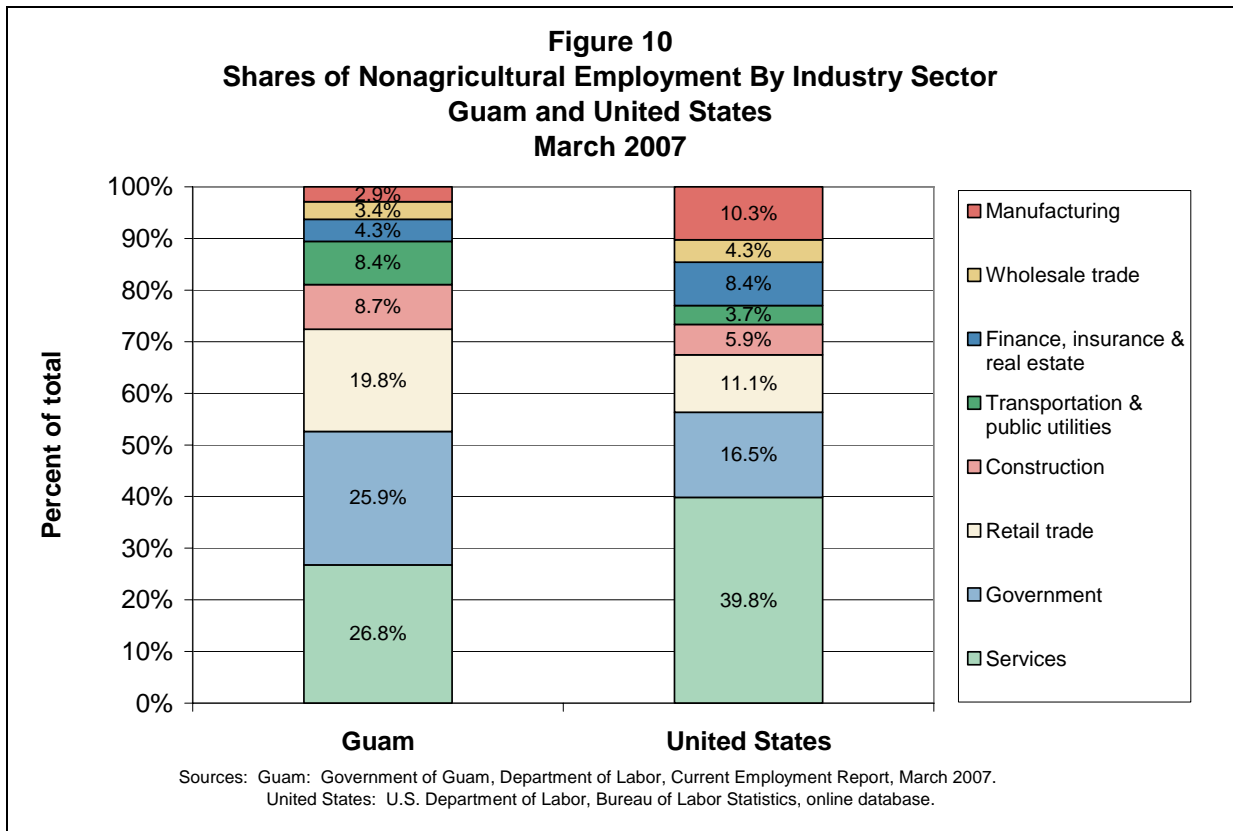


Nautical miles to:	
Anchorage	3,983
Hong Kong	1,834
Honolulu	3,299
Houston	6,461
Los Angeles	5,283
Manila	1,382
Minneapolis	6,095
San Francisco	5,043
Seoul	1,740
Tokyo	1,358

- LEGEND**
- Nonstop service
 - ⋯ Same plane service



Figure 9
AIRPORT SERVICE REGION
 A.B. Won Pat International Airport, Guam
 July 2007



importance of the tourism industry. Government is the second largest industry sector on Guam, with 25.9%, a larger share than that for the United States as a whole (16.5%).

Retail trade accounted for the third largest share of employment, with 19.8%, larger than that for the United States (11.1%). The large share of employment in retail trade reflects the characteristics of an island economy with a higher than average dependence on imported goods as well as the influence of visitor spending. According to preliminary data from the Guam Visitors Bureau, shopping accounts for 42.9% of visitor spending.

The construction sector in Guam accounted for a larger share of employment (8.7%) than that for the nation (5.9%) as a result of tourism, infrastructure, and housing construction. Similarly, Guam's transportation sector accounted for 8.4% of employment, more than twice the national share (3.7%), reflecting the importance of the Airport and other transportation businesses such as tour and sightseeing companies.

The military sector is important to the Guam economy. Guam is home to two important U.S. military bases: Naval Base, Guam, headquarters for the Commander, Naval Forces Marianas and Andersen Air Force Base, home base for the Commander, 36th Wing. In May 2006, the United States signed an agreement with Japan that provides for the relocation of U.S. forces from Okinawa to Guam by 2014. In addition, other U.S. troops may be moved from South Korea as well as the potential relocation of a squadron and other units. According to the Guam Integrated Military Development Plan, these relocations may add as many as 26,000 people to the Guam population (representing a potential increase of 15% in the total population), including an additional 14,500 active duty personnel and 11,600 dependents.* In addition, the move of the military personnel and their families from Okinawa to Guam is expected to cost an estimated \$10.7 billion, most of which will be used to build military and family housing as well as infrastructure projects to accommodate the additional population. Of this cost, Japan will fund \$6.1 billion and the U.S. will fund the remaining portion.

In the future, economic growth in Guam is expected to be caused by, among other influences: (1) an expanding tourism sector, (2) expansion of the region's service industries and the firms that support them, and (3) the relocation of U.S. military forces and the related growth in infrastructure and businesses necessary to support them.

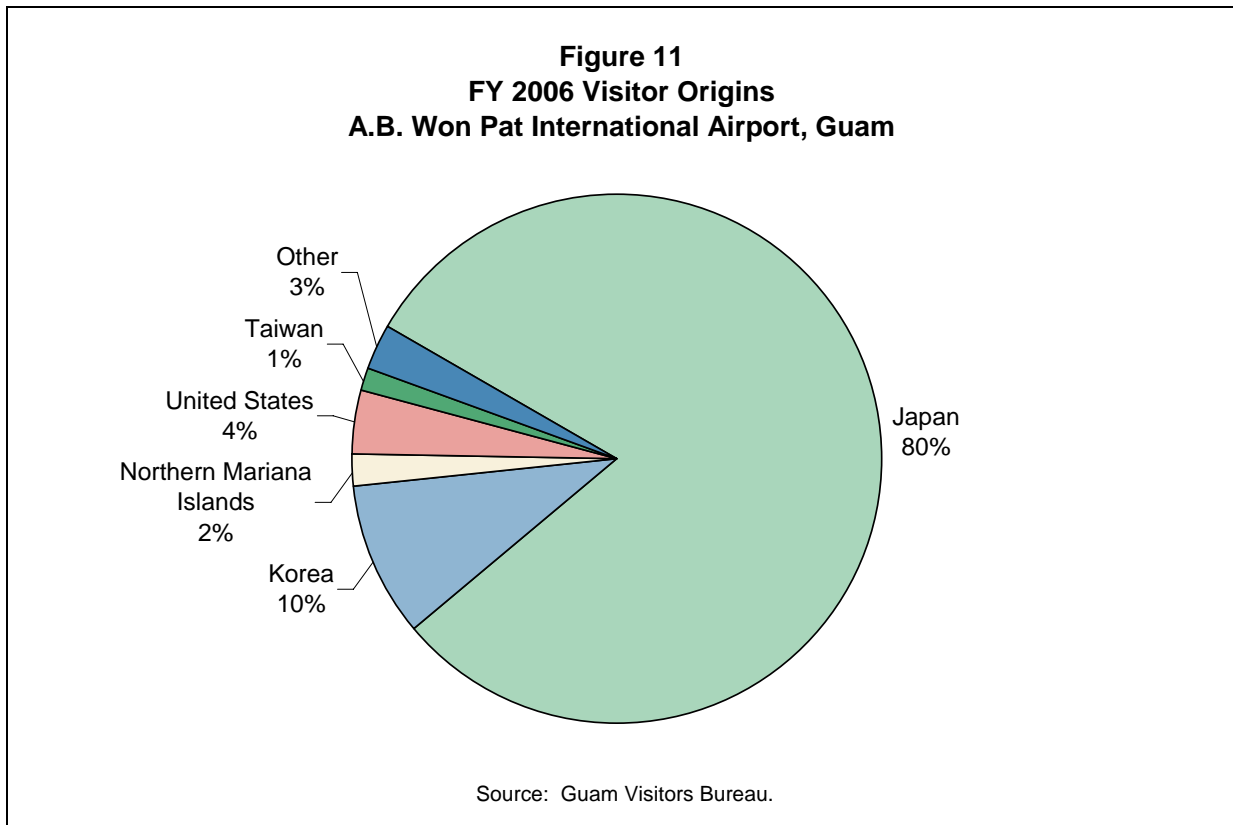
REGIONAL SERVICE ROLE

The primary role of the Airport is to provide air transportation and related services to accommodate the demand generated in Guam and in Micronesia. Guam is currently the most developed island in Micronesia and is expected to be the region's focal point for development. Neighboring Micronesian islands have greatly depended on Guam's services, especially for the shipping of supplies and commodities. The future development of Guam is essential to the needs of these islands and it is expected that Guam will continue to play a major role, especially in the economic future of Micronesia.

The Airport is an important factor in Guam's multibillion-dollar tourist industry. Recent growth in tourism in Guam relates to the region's attraction as a popular resort destination for visitors from Asian countries such as Japan and Korea. According to the Guam Visitors Bureau, more than \$1 billion was spent in 2005 in Guam on tourist and recreation activities and amenities. As shown on Figure 11, during FY 2006, the Japanese visitors market share comprised 80.8% of the total visitors to Guam (up from 80.6% in FY 2005). The Korean visitor market share comprised 9.6% of the total visitors to Guam in FY 2006—up from 9.0% in FY 2005.

*Guam Integrated Military Development Plan, Chapter 3: Facility Requirements & Analysis.

According to a recent study of small island tourist economies,* tourism is a viable engine of growth for small island economies. In this study, Guam was identified as one of the nine “most developed” small island economies, out of the 36 islands studied. According to the study, Guam had the highest total visitor spending (\$2.0 billion in 2001 dollars) of all the islands studied and a higher than average per resident in-country visitor expenditures (\$12,918 per resident).



AVIATION ACTIVITY AT THE AIRPORT

Airline Service

The following airlines serve the Airport with scheduled or charter overseas passenger flights: Continental Micronesia, Northwest Airlines, All Nippon Airways, China Airlines, Japan Airlines, Korean Airlines, Philippine Airlines, Asia Pacific Airlines, and Aerospace Concepts who operate a business jet service. The principal commuter airlines providing inter-island passenger flight service to and from Guam and the Commonwealth of the Northern Mariana Island (CNMI) are Freedom Air, Micronesian Aviation Systems, and Cape Air. The 5 passenger airlines currently serving the Airport accounted for 93% of enplaned passengers in FY 2006, as shown

*McElroy, Jerome L., *Small Island Tourist Economies Across The Life Cycle*, Asia Pacific Viewpoint, Vol. 47, No.1, April 2006.

in Table 4. The scheduled airlines provide daily nonstop service between the Airport and 22 cities, including 9 cities in Japan—Fukuoka, Hiroshima, Nagoya, Niigata, Okayama, Osaka, Sapporo, Sendai, and Tokyo and 6 cities in CNMI—Koror, Majuro, Rota, Saipan, Truk, and Yap.

	<u>Average daily aircraft departures</u>	<u>Percent of enplaned passengers</u>
Continental Micronesia	22	44.9%
Japan Airlines	3	20.0
Korean Airlines	1	8.4
Northwest Airlines	3	14.8
All Nippon Airways	1	4.9
Other	<u>3</u>	<u>7.0</u>
Total	33	100.0%

Source: A. B. Won Pat International Airport Authority, Guam.

As of the end of FY 2006, significant airline service changes included:

- New daily service to Osaka (Kansai) by Northwest Airlines.
- 1 additional daily departure to Saipan (from about 5 to 6) by Cape Air, Continental Micronesia's regional airline affiliate.
- 2 less daily departures to Rota (from about 6 to 4) by Cape Air and Pacific Aviation, regional airline affiliates for Continental Micronesia and Northwest Airlines, respectively.

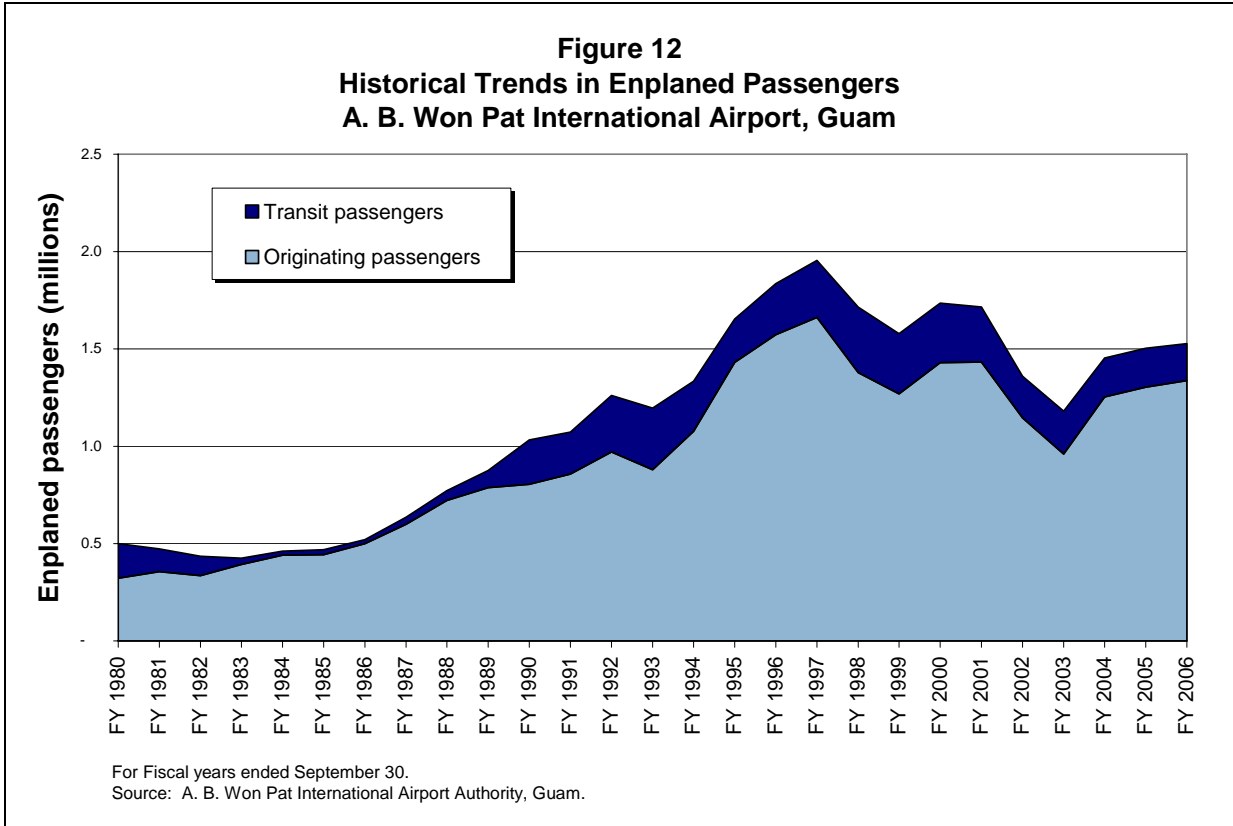
Passengers

Reflecting the region's strong population and economic growth, the total number of passengers enplaned at the Airport increased an average of over 4.4% per year between FY 1980 and FY 2006, from about 0.5 million to about 1.5 million, as shown on Table 5 and Figure 12. Figure 12 shows the historical growth in enplaned passengers (originating and in-transit) from FY 1980 to FY 2006.

Table 5
HISTORICAL ENPLANED PASSENGERS
 A. B. Won Pat International Airport, Guam

Fiscal year	Originating	Transit	Total	Average annual percent increase (decrease) from the previous year shown	Transit enplaned passengers as a percentage of total
1980	322,127	177,975	500,102	--%	35.6%
1990	805,279	227,213	1,032,492	7.5	22.0
1995	1,431,091	222,236	1,653,327	9.9	13.4
1996	1,573,157	262,767	1,835,924	11.0	14.3
1997	1,662,274	292,537	1,954,811	6.5	15.0
1998	1,378,420	336,049	1,714,469	(12.3)	19.6
1999	1,269,902	308,062	1,577,964	(8.0)	19.5
2000	1,429,517	305,707	1,735,224	10.0	17.6
2001	1,398,830	282,000	1,680,830	(3.1)	16.8
2002	1,114,621	213,000	1,327,621	(21.0)	16.0
2003	959,910	220,688	1,180,598	(11.1)	18.7
2004	1,309,168	200,251	1,509,419	27.9	13.3
2005	1,303,975	199,329	1,503,304	(0.4)	13.3
2006	1,337,630	189,301	1,526,931	1.6	12.4
	<u>Average annual increase (decrease)</u>				
1980-2006	5.6%	0.2%	4.4%		

Source: A.B. Won Pat International Airport Authority, Guam.



The Airport accommodated approximately 2.9 million arriving, departing, and in-transit passengers in FY 2006—a 2.1% increase from FY 2005. This is similar to the FAA TAF forecast growth rate of 2.6% for the same period. This increase was principally the result of continued growth in tourism arrivals from major Asian markets, including Japan, Korea, and Taiwan, increased travel through the region, particularly between Guam and the Federated States of Micronesia and the Commonwealth of the Northern Mariana Islands.

According to data published by Airports Council International (ACI), as of 2005 the Airport was the 15th largest international gateway in the United States, as shown in Table 6.

Table 6
TOP 16 UNITED STATES INTERNATIONAL GATEWAYS
 2005

Airport	International enplaned passengers (millions)
1. New York—JFK	8.7
2. Los Angeles—LAX	8.1
3. Miami	6.9
4. Chicago O'Hare	5.3
5. Newark	4.2
6. San Francisco	3.8
7. Houston—IAH	3.2
8. Atlanta	3.1
9. Dallas-Fort Worth	2.5
10. Washington—IAD	2.3
11. Honolulu	2.1
12. Philadelphia	2.0
13. Boston	1.9
14. Detroit	1.4
15. Guam	1.4
16. Seattle	1.2

Source: Airports Council International, *North American Traffic Report*, 2005.

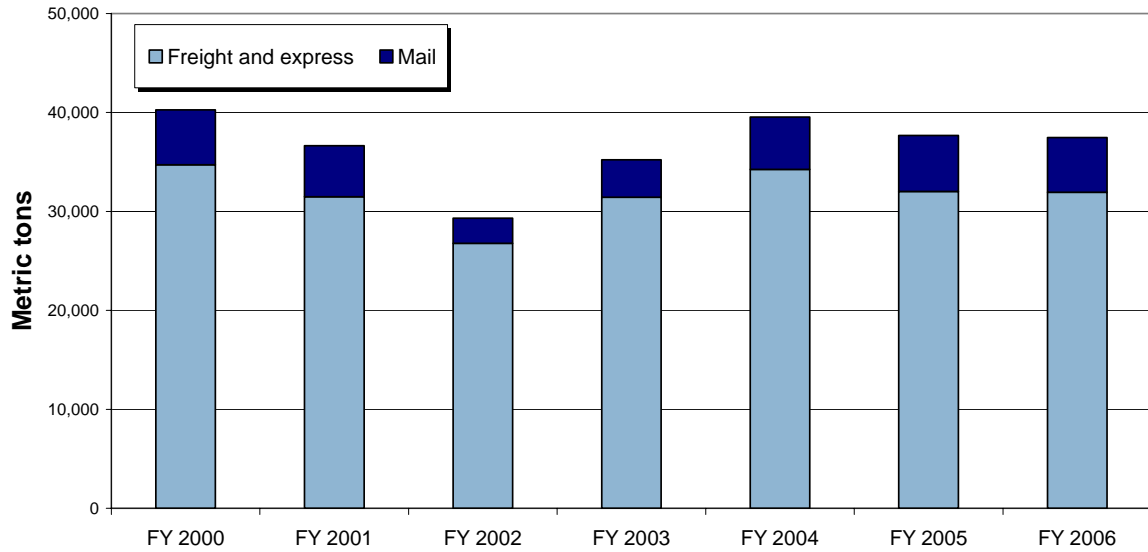
Cargo

Cargo tonnage at the Airport (freight, express, and mail) has averaged about 40,000 metric tons since FY 2000, except for a decrease in FY2002 related to the events of September 11, as shown in Figure 13. In FY 2006, the Airport processed 16,391 metric tons of enplaned cargo—a 6.5% increase from FY 2005. Enplaned cargo accounted for 44% of total cargo tonnage at the Airport in FY 2006.

Aircraft Operations

In FY 2006, total aircraft operations (arrivals and departures) increased 6.3%, to a total of 36,234 operations (from 34,101 operations in FY 2005).

Figure 13
Trends in Total Cargo
A. B. Won Pat International Airport, Guam
(in metric tons)



For Fiscal years ended September 30.
 Note: A metric ton equals 2,204.62 pounds. Includes enplaned and deplaned cargo.
 Source: A.B. Won Pat International Airport Authority, Guam.

Chapter 4

CURRENT ECONOMIC CONTRIBUTION

The economic contribution of the Airport affects the population and economy of Guam. Unlike other economic studies of airports that evaluate economic contributions on a subset of counties or areas, the Airport has a quantifiable contribution on the Guam economy as the only commercial service airport serving the island.

ECONOMIC CONTRIBUTION METHODOLOGY

The methodology used to evaluate the current economic contribution of the Airport involved (1) gathering primary data on the direct economic contribution of on-Airport organizations, (2) supplementing these primary data with applicable data from prior Airport economic contribution studies and related data gathering efforts, (3) using tourism and visitor information for Guam to estimate the indirect economic contribution, and (4) using models and other statistical techniques to estimate the induced economic contributions of on-Airport activity.

Definition of Terms

The total economic contribution of an airport is the sum of related direct, indirect, and induced contributions.

- ***Direct Economic Contribution.*** The direct economic contribution of the Airport is the contribution generated on-site, including the employment, payroll, and local expenditures of all enterprises located at the Airport—airlines, terminal concessionaires, general aviation businesses, ground transportation providers, government agencies such as the FAA, and other businesses. These enterprises have a direct and quantifiable contribution on the economy of the region.
- ***Indirect Economic Contribution.*** The indirect economic contribution is the contribution resulting off-site, and includes the employment and expenditures of the businesses serving visitors arriving at the Airport, such as hotels and motels, restaurants, rental car companies, travel agencies, and taxicab operators. Visitor spending has an indirect but quantifiable contribution on the economy of the region served by the Airport.
- ***Induced Economic Contribution.*** The induced economic contribution is the off-Airport contribution above and beyond the combined direct and indirect contributions of an economic activity, where additional income is created by successive rounds of spending known as the “multiplier” effect. Induced

economic contribution includes the employment and expenditures of (1) supplying industries that provide the services, materials, or machinery to support industries that derive business from on-Airport businesses, such as wholesale food distributors, office supply firms, and jet fuel suppliers and (2) expenditures by airport employees on goods and services within the area.

The direct, indirect, induced, and total economic contributions of the Airport are measured in terms of total dollars, payroll, and employment. The estimates of the Airport's current economic contribution presented in this report were derived from surveys of on-Airport businesses conducted at the Airport in 2007 and air visitor expenditure data collected by the Guam Visitors Bureau. These estimates of direct contribution were categorized by industry sector and used in combination with the State of Hawaii version of the Regional Input-Output Modeling System (RIMS II) developed by the U.S. Department of Commerce. Using these inputs, the total economic contributions of Airport activity were estimated, including employment and expenditures, and total economic contribution. The State of Hawaii model was used in the absence of a RIMS II model for Guam to reflect a similar island economy with a higher than average dependence on imported goods.

The results of this assessment are intended to be estimates of economic contribution, stated in terms of expenditures and jobs related to operations at the Airport. They should not be interpreted as benefits of Airport operations in the sense that such expenditures or employment would not occur if the Airport were not in existence; they simply represent dollar flows and jobs in the economy related to activity at the Airport.

In general, the economic contributions presented in this report correspond to the long-term demand for aviation services in Guam, regardless of the fluctuations in economic activity that may occur as a result of the entry or exit of specific businesses at the Airport.

Summary of Survey Results

As discussed in greater detail in Appendix A, surveys of on-Airport businesses were used to obtain employment and expenditure data for analysis of direct on-Airport economic contributions; expenditures for services and supplies, capital improvements, and local taxes; and other expenditures contributing to the Airport's economic contribution.

As shown in Table 7, the overall response rate to the on-Airport business surveys conducted at the Airport was 57%, better than the 33% to 35% average response rate for a survey of this type. The economic contribution of businesses that either did not respond to the survey or provided only partial information was estimated based on survey information obtained from similar responding businesses, and supplemented

Table 7
ON-AIRPORT BUSINESS SURVEY RESPONSES

	<u>Total surveyed</u>	<u>Number of survey responses</u>	<u>Response rate (percent)</u>
Passenger airlines	9	7	78%
Cargo airlines/freight forwarders	6	3	50
Concessionaires/terminal services	26	10	38
Rental car companies	6	4	67
Ground transportation operators	5	4	80
Fixed base operators	9	6	67
Government agencies	8	3	38
Other businesses	<u>5</u>	<u>5</u>	100
Total/average	74	42	57%

Source: A. B. Won Pat International Airport Authority, Guam, On-Airport Tenant List, dated April 25, 2007 and Jacobs Consultancy, July 2007.

with Authority data on security badges issued to on-Airport employees by business, as appropriate. The employment, payroll, and total economic contribution estimates provided in this report, therefore, reflect an above-average sample size.

DIRECT ECONOMIC CONTRIBUTION

Estimation of the current direct economic contribution of the Airport on the overall economy of the region was based on an analysis of the on-Airport business surveys (see Appendix A for a summary of the analytical methodology used). The direct economic contribution of the Airport on the economy of Guam was estimated to be \$291 million in 2006, as shown in Table 8.

Employment

From information supplied by on-Airport employers, 2,490 people were estimated to have been employed at the Airport in 2006. The passengers and cargo airlines (including freight forwarders) together employed an estimated 1,070 people, accounting for about 43% of total Airport employment. Terminal concessionaires, including rental car companies, employed an estimated 310 people, representing about 12% of total Airport employment.

Table 8
ESTIMATED DIRECT ECONOMIC CONTRIBUTION BY TYPE OF BUSINESS IN 2006

Type of business	Number of on-Airport employees	Local expenditures (millions)		
		Payroll (a)	+ Expenditures (b)	= Direct economic contribution
Airlines				
Passenger	990	\$ 96	\$104	\$200
Cargo	<u>80</u>	<u>2</u>	<u>1</u>	<u>3</u>
	1,070	\$ 98	\$105	\$203
Terminal concessionaires				
Concessionaires/ Terminal services				
	260	\$ 5	\$ 4	\$ 9
Rental car companies	<u>50</u>	<u>2</u>	<u>5</u>	<u>7</u>
	310	\$ 7	\$ 9	\$ 16
Other				
Ground transportation	130	\$ 3	\$ 4	\$ 7
Fixed base operators	300	8	3	11
Government agencies	560	31	17	48
Other industries	<u>120</u>	<u>3</u>	<u>3</u>	<u>6</u>
	<u>1,110</u>	<u>\$ 45</u>	<u>\$ 27</u>	<u>\$ 72</u>
Total	2,490	\$150	\$141	\$291

(a) Includes wages, salaries, and proprietors' income.

(b) Includes any other local expenditures.

Sources: Jacobs Consultancy, July 2007, based on surveys of on-Airport businesses, February 2007.

Employer Expenditures

Table 8 also summarizes on-Airport business expenditures by type of business. Payroll expenditures by on-Airport businesses were estimated to be \$150 million in 2006, \$98 million of which represented wages and earnings of passenger and cargo airline employees. On-Airport businesses spent an additional \$141 million on other local expenditures during 2006. Overall, the local expenditures of on-Airport businesses—the direct economic contribution of the Airport—totalled an estimated \$291 million in 2006.

INDIRECT ECONOMIC CONTRIBUTION

The off-Airport indirect contributions of the Airport on the economy of Guam are substantial. As discussed previously, the indirect contribution of the Airport is defined in this evaluation as the spending made locally by air passenger visitors while in Guam. In 2006, there were a total of 1,217,211 visitors to Guam, 97% of whom arrived by air; the remaining visitors arrived by sea. Visitor contributions were based on data provided by the Guam Visitors Bureau and Global Insight Inc., a private market research consulting company, who conducted a separate analysis of Guam visitor contributions. According to the Guam Visitors Bureau study, visitors to Guam spent an average of \$944 per person per visit in 2005 (the base year of the study). These data were based on annual total spending per visitor on lodging, food and beverage, shopping, entertainment, and transportation. Based on the results of this study and the share of air visitors to Guam noted above, the indirect contribution of the Airport on the economy of the Airport service region totaled \$1,105 million in 2006.

INDUCED ECONOMIC CONTRIBUTION

As discussed previously, the induced contributions are the additional local business activity generated specifically because of the presence of the Airport, including related employment and payroll and employer expenditures. Induced contribution also includes the successive rounds of spending caused by the direct and indirect contributions. This “multiplier effect” measures the extent to which the induced contributions flow from the direct and indirect contributions. For the purposes of this analysis, the induced contribution of the Airport on the economy of the Airport service region totaled \$326 million in 2006, and included the spending of Off-Airport companies who provided supplies and services to businesses located on-Airport and employed 3,730 people in 2006 (the induced effects of on-Airport spending). Ordinarily, the induced contribution of air visitor expenditures would be estimated to reflect subsequent rounds of spending using a multiplier that accounts for import leakages. For the purposes of this analysis, the estimation of air visitor expenditures was limited to the actual spending of each visitor per visit based on the Guam Visitors Bureau and Global Insights study mentioned earlier. Therefore, the induced impacts related to air visitor expenditures were not included.

TOTAL CURRENT ECONOMIC CONTRIBUTION

As shown in Table 9, the total economic contribution of the Airport—direct, indirect, and induced—was estimated to be \$1.7 billion in 2006, based on the analysis described in Appendix A. A total of 20,440 direct, indirect, and induced jobs were estimated to result from activity at the Airport in 2006

Table 9

TOTAL ECONOMIC CONTRIBUTION BY TYPE OF BUSINESS IN 2006

Type of business	Total employment	Total economic contribution (millions)
Airlines		
Passenger	3,230	\$ 452
Cargo/freight forwarders	<u>250</u>	<u>8</u>
	3,480	\$ 460
Terminal concessionaires		
Concessionaires/ terminal services	430	\$ 17
Rental cars	<u>70</u>	<u>14</u>
	500	\$ 31
Other		
Ground transportation	220	\$ 13
Fixed base operators	890	24
Government agencies	910	78
Other industries	<u>210</u>	<u>11</u>
	<u>2,230</u>	<u>\$ 126</u>
Visitor contributions (off-Airport)	<u>14,230</u>	<u>\$ 1,105</u>
Total	20,440	\$1,722

Sources: Jacobs Consultancy, July 2007, based on surveys of on-Airport businesses, February 2007, except for visitor contributions, which are based on annual spend data.

Chapter 5

PROJECTED ECONOMIC CONTRIBUTION

The future Airport economic contribution is expected to increase with forecast growth in enplaned passengers at the Airport and lead to increased employment, expenditures, and total economic contribution of government agencies and other businesses at the Airport. In this assessment, the future economic contribution of the Airport was projected using the optimized forecasts from the Master Plan Update and the current relationship between activity at the Airport and the economic contribution and number of jobs generated for the local economy.

This chapter summarizes the Master Plan Update forecasts and the projected economic contribution of the Airport from 2006 through 2023 for (1) the ongoing annual economic contribution of Airport operations and (2) the cumulative economic contribution of the Airport.

AIRPORT MASTER PLAN UPDATE FORECASTS

The Airport Master Plan Update presented forecasts of enplaned passengers for three scenarios, using 2002 as the base year, as illustrated in Figure 14. The three scenarios define a range of growth and activity at the Airport through 2023. Each scenario is based on a specific set of assumptions as summarized below:

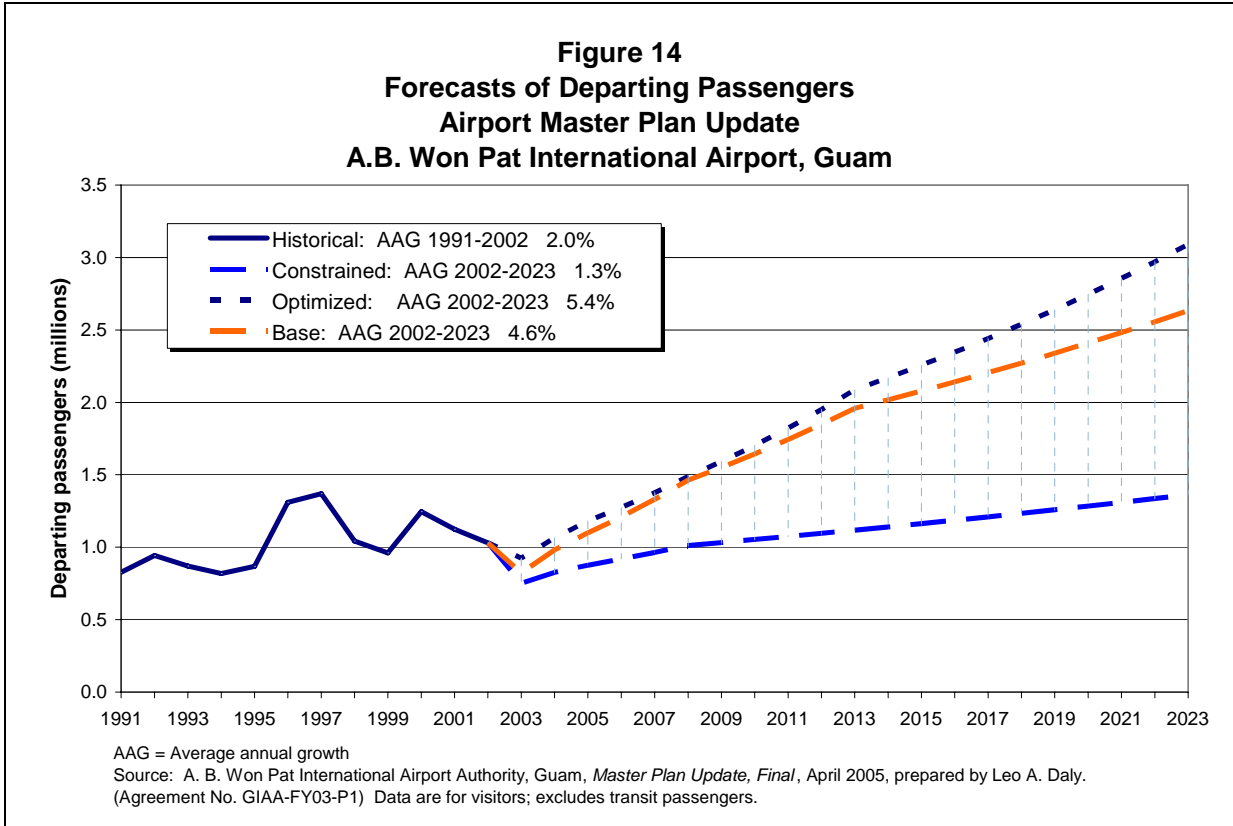
- An optimal level of passenger activity and growth was forecast in the optimized scenario—an average increase of 5.4% per year between 2002 and 2023—reflecting a strong U.S. economy, strong diversified Guam/Pacific island economies, an expanding airline industry, an absence of natural disasters and epidemics, infrastructure development stays ahead of demand, and federal funding sources are pursued and administered by GIAA.
- The base scenario incorporates somewhat slower growth and lower passenger activity than the optimized scenario—an average increase of 4.6% per year between 2002 and 2023—reflecting a stable U.S. economy, stable Guam/Pacific island economies, a moderately expanding airline industry, a small number of less destructive natural disasters and contained epidemics, infrastructure development keeps pace with demand, and the Airport is awarded federal funding.

- In the constrained scenario, enplaned passenger levels were forecast to increase an average of 1.3% per year between 2002 and 2023—reflecting a weak U.S. economy, weak diversified Guam/Pacific island economies, a contracting airline industry, a large number of destructive natural disasters and uncontained epidemics, little or no infrastructure development, and federal grant programs are not pursued and administered by GIAA.

As mentioned earlier, since the Master Plan forecasts were prepared, the U.S. signed an agreement with Japan to relocate military personnel from Okinawa to Guam by 2014. In addition, other U.S. troops may be moved from South Korea as well as a squadron and other units. According to the Guam Integrated Military Development Plan, these relocations may add as many as 26,000 people to the Guam population (representing a potential increase of 15% in total population), including an additional 14,500 active duty personnel and 11,600 dependents.

While military activity is concentrated at Andersen Air Force Base and the US Navy facility at Apra Harbor, it could reasonably be expected that some related economic activity could occur at the Airport, in terms of (1) military personnel or their dependents using commercial airline service either for military movement or personal activity, (2) use of civilian air cargo services and (3) “overspill” military transport aircraft activity at the Airport. While not specifically envisaged in the Master Plan Update forecasts, the optimized scenario includes the assumption that there will be a “strong U.S. military presence” and, therefore, captures the additional growth that may occur as a result of the relocation of these military personnel.

The Authority has also conducted air service initiatives since the Master Plan forecasts were prepared to promote passenger traffic growth at the Airport. In addition to the passenger and air cargo initiatives conducted by the Authority, a bilateral agreement is being considered between CNMI states and secondary cities in China such as Guangzhou. While not specifically envisaged in the Master Plan Update forecasts, the optimized scenario includes the assumption that “the airline industry expands greatly and increases flights and new routes, including additional service to Vietnam, China, and India” and, therefore, captures the additional growth that may occur as a result of the air service initiatives conducted by the Authority.



PROJECTED ONGOING ANNUAL ECONOMIC CONTRIBUTION

For the purposes of this evaluation, the future economic contribution of the Airport on the region was projected using the optimized forecast scenario from the Master Plan Update to reflect an optimal but achievable level of planned development, passenger traffic, and airline service. Since 2006 was the study year of the economic contribution study and the year when the primary survey data was collected, the annual growth rates were applied to 2006 data.

The ongoing annual contribution from Airport operations was projected to increase in proportion to aviation activity. The annual ongoing economic contribution associated with the optimized scenario forecasts is expected to reach \$4.3 billion in 2023, as shown in Table 10, reflecting strong passenger traffic growth and the pursuit and use of federal grants to fund Airport capital improvements to facilitate growth and service.

PROJECTED CUMULATIVE ECONOMIC CONTRIBUTION

The projected cumulative economic contribution of the Airport on the economy of Guam totaled \$54.7 billion for the period from 2006 through 2023, as shown on Table 10.

Table 10

**PROJECTED ONGOING AND CUMULATIVE
TOTAL ECONOMIC CONTRIBUTION**

A. B. Won Pat International Airport, Guam

Year	Ongoing annual economic contribution from Airport operations (millions of 2006 dollars)
2006	\$1,722
2007	1,915
2008	2,069
2009	2,213
2010	2,368
2011	2,534
2012	2,712
2013	2,901
2014	3,017
2015	3,138
2016	3,264
2017	3,394
2018	3,530
2019	3,671
2020	3,818
2021	3,971
2022	4,130
2023	4,295
Cumulative (2006 - 2023)	\$54,664

Source: Jacobs Consultancy, June 2007. Projected economic contributions were calculated based on the optimized scenario from the Master Plan Update.

Chapter 6

POTENTIAL CONSTRAINTS ON FUTURE AIRPORT DEVELOPMENT AND ECONOMIC CONTRIBUTIONS

In 2006, the Airport contributed \$1.7 billion to the economy of Guam. By 2023, the economic contribution of Airport operations is expected to increase to \$4.3 billion assuming an optimal but achievable level of planned development, passenger traffic, and airline service. However, it was recognized that the achievement of Airport economic contributions in the future may be constrained by external influences. In this assessment, a number of potential constraints were identified and evaluated, including the recent events related to the disputed land in the vicinity of the Airport, transportation infrastructure improvements and related cargo development, and regulatory compliance and federal funding sources for the Airport Capital Improvements Program (CIP).

This chapter presents a discussion of the potential constraints on planned development at the Airport that may have a direct effect on future economic contributions, including (1) the ongoing economic benefits to the Guam economy from employment and economic activity generated by the planned developments, (2) the temporary economic benefits related to construction of the planned developments, and (3) an evaluation of the lost economic contribution that might result if the optimal level of activity and planned development is not achieved.

RECENT EVENTS—DISPUTED LAND

In 2000, 1,417 acres of federal surplus property that was formerly known as Agana Naval Air Station (NAS) and now referred to as Tiyan, was conveyed to the Airport under a Public Benefit Transfer through the Base Realignment and Closure Commission of 1993. Other portions of NAS, containing a road and former military housing along the north side of the airport property, were also transferred, through the Federal Highway Administration (FHWA), to the Guam Department of Public Works (DPW) to be used and maintained as a public road (Laderan Parkway). Future Airport development plans are based on the public road being aligned and maintained by the Guam DPW to provide access to prime Airport leasehold areas for commercial aeronautical development. These two public benefit conveyances were included in the NAS closure to promote the economic development of Guam.

Since that time, the Guam legislature has passed a number of public laws which allowed the Government of Guam to return what was determined to be excess federal properties to the estates of subsequent claimants.

In 2004, the Guam Ancestral Lands Commission began the process of transferring what was to be the Laderan Parkway property and other property transferred by the Navy to the Guam Economic Development and Commerce Agency to the estates of the subsequent claimants, some of whom are occupying those lands today.

The disputed land is referred to as the Tiyan property and consists of two areas to the north of the Airport and one to the south, as shown in Figure 15. The disputed land includes:

- *Disputed Land Area Originally Deeded to Guam DPW and Planned Laderan Parkway Route*, is located directly north of the planned air cargo developments, and is also the site of the planned Laderan Parkway. This area was originally deeded to the Guam DPW for road development, and GIAA considers that future airport development relies on the Guam DPW realigning the road (the planned Laderan Parkway).
- *Disputed Land Originally Deeded to GEDCA*, in the north and south areas, were deeded to the Guam Economic Development and Commerce Agency (GEDCA). These areas have been reacquired by the Government of Guam and the north area has already been leased to the subsequent claimants, who have occupied residential units. At the time of this report, the south area had not had any property leased to subsequent claimants.

For GIAA, the recent events related to the disputed land raise several issues:

- Incompatible land uses in the Airport vicinity
- Conflict with proposed infrastructure improvement that is critical to development of Airport property
- FAA regulatory compliance problems and an effect on the ability to fund the long-term capital program

In the event the land disputes are not resolved consistent with the Airport's master plan for future development, it is likely that there would be significant constraints on overall development and therefore on the Airport's future contribution to the Guam economy:

- (1) at a minimum, loss of economic activity associated with property development that is dependent on the improved access to be provided by the Laderan Parkway
- (2) at a maximum, major disruption in airport funding sources and ability to accommodate forecast demand, with associated significant reduction in overall airport economic contribution

These potential constraints on development are discussed and analyzed in the following sections.

TRANSPORTATION INFRASTRUCTURE IMPROVEMENTS AND RELATED CARGO AND OTHER DEVELOPMENT

Future Airport development and the associated economic contributions are affected by the improvements to Guam's transportation infrastructure. These transportation improvements also facilitate related future development in the cargo industry and other businesses on- and off-Airport.

Transportation Infrastructure Improvements

In 2003, the Government of Guam developed and received approval of the Guam Comprehensive Economic Development Strategy (CEDS) which "presents the community's vision and goals, sets its strategic direction for action, establishes priority programs and projects for implementation, and outlines the standards for a progress update of the plan and its related process."* The 2003 CEDS requires the development of a strategy to remain eligible for assistance from the U.S. Department of Commerce, Economic Development Administration (in compliance with 13 CFR Part 303). As part of its 2003 CEDS, the Government of Guam defined a list of proposed projects to facilitate the goals and objectives of the CEDS, including project budget amounts and priority ratings (high, medium, low). The CEDS proposed project list includes two projects that are expected to have a direct effect on Airport planned development and operations: the Tiyan Infrastructure System (which includes the Laderan Parkway described earlier) and the Marine Drive Bypass.

Tiyan Infrastructure System. The Tiyan Infrastructure System project was identified in response to the Base Realignment and the need to address the deterioration of the existing 50-year old infrastructure to meet future demands. The Tiyan Infrastructure Improvements Plan is scheduled to occur over a five year period and is expected to cost \$35.5 million, including the elements shown in Table 11.

In the June 2005 update of the CEDS, the Guam Economic Development and Commerce Authority noted that the Tiyan Infrastructure System project "is not actively being pursued as the land area on which the system is to be located was transferred to the Guam Ancestral Lands Commission for transfer to private landowners as required by local law."

*Government of Guam, *The Guam Comprehensive Economic Development Strategy*, April 2003, prepared by the Guam Economic Recovery and Development Team: Bureau of Statistics and Plans and the Guam Economic Development and Commerce Authority.

In April 2007, GIAA and the Guam DPW signed a Memorandum of Understanding (MOU) to address how the agencies can proceed with the development of the Airport's Tiyan property and the maintenance of public areas in light of the transfer actions of the Guam Ancestral Land Commission. This MOU was drafted at the request of the FAA and Federal Highway Administration (FHWA) to document the agreements and commitments made by GIAA, Guam DPW, FAA and FHWA.

Table 11

TIYAN INFRASTRUCTURE BUDGET ESTIMATES

Improvements	Budget estimate (millions)
Roadways	\$ 21.2
Water system	2.0
Wastewater system	1.5
Storm drainage system	4.3
Power system	3.5
Street lighting	1.6
Telephone system	<u>1.4</u>
Total	\$ 35.5

Source: Government of Guam, *The Guam Comprehensive Economic Development Strategy*, April 2003, prepared by the Guam Economic Recovery and Development Team: Bureau of Statistics and Plans and the Guam Economic Development and Commerce Authority.

Marine Drive Bypass. The objective of the Marine Drive Bypass project (as defined in the 2003 CEDS and cited in the Public Benefit Transfer mentioned earlier) was to enable the Government of Guam to design a bypass at Tiyan, considered crucial to the success of the Guam 2010 Highway Master Plan and the GIAA development plan. The anticipated contributions and benefits of the bypass project were to “reduce congestion on Marine Drive as well as to improve access to the Airport and the circulation of vehicles, and entice further development of airport type activities that will provide for more economic benefits to the local economy”. The Marine Drive Bypass project is scheduled to occur over a two year period and is expected to cost \$31.7 million.

Cargo Development

Continued cargo development at the Airport is linked to the implementation of the transportation infrastructure projects described in the previous section and to the planned development of an air cargo transfer hub at the Airport. The increased use of the Airport as a regional Asia-Pacific air cargo hub is expected to lead to warehousing, product assembly and potentially light manufacturing activity on Guam.

Two recent events support the growth and development of the Airport as a cargo transfer hub. On February 4, 2006, the Government of Guam submitted an application to the USDOT for Expanded Air Services at the Airport (Docket OST-2006-23918) in order to enable all foreign carriers to engage in expanded cargo and passenger activities at the Airport, including transfer traffic between points in the Asia/Pacific region and points in the U.S. or third countries via an en-route transit stop in Guam. On December 28, 2006, the U.S. Department of Transportation (USDOT) issued its final Order 2008-8-5 to permit foreign carriers to provide expanded cargo transfer operations at the Airport and to support GIAA's planned development of cargo transfer facilities. Additionally, in May 2007, negotiations took place between the U.S. and the People's Republic of China to establish a bilateral agreement which separates Guam and the CNMI from restrictions identified in the bilateral negotiations.

The causal link between air cargo development and economic contribution is relatively straight-forward. Since jobs in time-critical industries tend to be higher paying than country averages, they raise the income levels of the population, as well. Air cargo enables communities, regardless of location, to efficiently connect to distant markets and global supply chains in a speedy, reliable manner. In our new fast-cycle logistics era, regions with good air cargo capability have competitive trade and production advantage over those without such capability.

In this assessment, the economic contributions of third party cargo facility development at the Airport were estimated in terms of the additional employment, payroll, and expenditures generated in Guam's economy. These estimates were prepared for the specific air cargo developments within the Airport Business Park, which has been divided into five blocks, as summarized in Table 11. The value of the handled goods does not count as a direct contribution, assuming that the goods would be in transit at Guam, and not added to the Guam market. There also would be induced contributions from this employment, discussed later in this report.

Block 1. Developer Triple B is proposing to construct a mixed air/sea multimodal facility with targets throughout the Pacific region, concentrating in the markets of Micronesia, Honolulu, and Los Angeles. The proposed investment of \$1.7 million will assist in constructing a 20,000 square foot facility on a 70,000 square foot area that will accommodate the sorting process, storage, and pallet build-up and breakdown of cargo activity.

Given the mixed use of air/sea transportation of the Block 1 area, we assume an even split of facility use for air eligible commodities (economic analysis on air only). Assuming that 10,000 square feet of warehouse space will be used to accommodate air cargo activity, our general planning axiom of one ton of air cargo per 0.8 square feet suggests that Block 1 would handle 12,500 tons of air cargo and sustain 60 jobs.

Block 2. DHL has recently confirmed their interest in expanding their facility on Block 2, an area of approximately 3 to 4 acres, with a proposed investment of \$1.8 million. The company currently has 31 employees on Guam and occupies a facility of approximately 7,500 square feet. The site has the potential to accommodate an additional 5,000 square feet of warehouse space and while the airline does not currently operate their own freighter aircraft at the Airport, indications are that two DHL aircraft may be routed through Guam with potential routings of GUM-SPN-GUM and SFO-GUM-OKA-SFO.

The fully expanded DHL facility on Block 2 would include 12,500 square feet of facility space. Not counting what would certainly be a large amount of trans-shipment freight, the building would accommodate approximately \$72 million worth of air cargo tonnage and create 70 direct jobs on Guam.

Since DHL does not currently operate its own freighter aircraft at the Airport, the company uses the most outsourced cargo capacity. More specifically, DHL relies extensively on the available cargo capacity in the bellies of passenger airlines. Their current operation relies solely on the connectivity to the passenger airlines; however, the future use of the Airport could include direct freighter aircraft as indicated earlier. The Laderan Parkway, as discussed earlier on page 41, is critical in order to extract the value from the future facility (and increase in freighter capacity) at the Airport.

Blocks 3-5. Blocks 3 through 5 comprises 12 acres and developer, PacAir Properties, has proposed an initial investment of \$10 million as a budget to construct the first phase of an air cargo facility. These blocks have close proximity to airfield and ground access so in addition to the proposition of future freighter activity; this site is enhanced by the connectivity to the belly capacity of the wide-body passenger aircraft.

Using the typical building to acre ratio (50,000 square feet per four acres), this site would conservatively accommodate 150,000 square feet of cargo warehouse space. The general planning axiom of one ton of air cargo per 0.8 square feet of warehouse space would suggest that this site could handle approximately 187,500 tons of cargo per year. The PacAir Properties development is estimated to accommodate an annual value of \$866 million worth of air cargo tonnage and create 840 direct jobs.

Other Blocks. The Authority is currently negotiating the lease of about 36 acres of property to Ironbridge, for multi-use warehouse, distribution and cargo uses. The Authority estimates that about \$74 million could be invested by

Ironbridge, Inc. a property development company specializing in multiuse warehousing.

Potential Cargo Development Contributions. As shown on Table 12, cumulatively, the planned cargo developments could support 970 additional jobs in Guam upon completion, with the assumptions outlined in Appendix A. These contributions exclude the potential Ironbridge development, which is still under negotiation. These jobs could generate an additional \$39.5 million in annual payroll. This cargo activity would support a total economic contribution of payroll and expenditures of \$59.3 million annually. For the purposes of this analysis, the contributions of additional cargo airline service are assumed to be reflected here.

Table 12

ESTIMATED ANNUAL CONTRIBUTIONS OF POTENTIAL CARGO DEVELOPMENT
A.B. Won Pat International Airport, Guam

<u>Developer</u>	<u>Block</u>	<u>Area</u> <u>(sq ft)</u>	<u>Tonnage</u>	<u>Value</u> <u>(millions)</u>	<u>Jobs</u>	<u>Annual contributions (millions)</u>		
						<u>Direct</u> <u>payroll</u> <u>contributions</u>	<u>Induced</u> <u>household</u> <u>spending</u>	<u>Total annual</u> <u>economic</u> <u>contributions</u>
Triple B	1	10,000	12,500	\$ 57.8	60	\$ 2.5	\$ 1.3	\$ 3.8
DHL	2	12,500	15,625	72.2	70	2.8	1.4	4.2
PacAir	3, 4, 5	<u>150,000</u>	<u>187,500</u>	<u>866.3</u>	<u>840</u>	<u>34.2</u>	<u>17.1</u>	<u>51.3</u>
Total		172,500	215,625	\$ 971.3	970	\$39.5	\$19.8	\$59.3

Source: Jacobs Consultancy, July 2007.

Off-Airport Development

Off-Airport business development is also linked to the implementation of the transportation infrastructure projects. A Home Depot store is currently under construction on Airport Road and is due to open in late 2007, with an estimated \$21 million construction cost and 200 full-time and part-time employees. If these employees are assumed to be 150 full-time equivalent jobs, this would generate approximately \$6.1 million in annual payroll. The Home Depot would make use of new approach roads being developed and would likely increase traffic along airport access roadways.

Conclusions

In terms of Airport economic contribution, the inability to complete the infrastructure projects discussed above would likely constrain much of the expected development of airport property by air cargo operators and limit the development of property near the Airport for other compatible uses. The estimated economic contribution that would be “lost” includes:

- Temporary construction contributions of cargo developments of \$14 million
- Annual (recurring) cargo-related jobs of 970 and estimated annual payroll contributions of \$59 million
- Other potential off-Airport business development (other than Home Depot) discouraged by the lack of transportation access
- Temporary construction contributions of transportation infrastructure improvements of \$67 million

The projected future economic contribution of the Airport could be reduced by 5% to 10% from loss of these specific projects alone. However, much more significant are the broader effects on GIAA’s ability to finance the overall capital program and accommodate forecast demand. This is discussed in the next section.

REGULATORY COMPLIANCE, FEDERAL FUNDING SOURCES AND OTHER REGULATORY ISSUES

The return of the disputed land to the subsequent claimants may impact Airport planned development and federal funding. The Federal Aviation Administration (FAA) contends that the return of the disputed land to the subsequent claimants violates the Airport’s obligations under FAA grant assurances and limits land use for commercial aeronautical development, restricts growth at the Airport, and jeopardizes GIAA eligibility for federal financial assistance. The disputed land, as shown on Figure 15, includes the roadway easement for the planned Laderan Parkway that provides access to the Airport. FAA has stated that the Airport Sponsor Assurances which describe the conditions and obligations under which GIAA receives federal funds under each AIP grant agreement, may be in violation, specifically:

- **Assurance No. 5. – Preserving Rights and Powers.** This assurance states that GIAA will not take or permit any action which would deprive it of any rights and powers to perform terms, conditions and assurances of the grant agreement.
- **Assurance No. 21 – Compatible Land Use.** This assurance states that GIAA will take appropriate action, including adoption of zoning laws, to restrict

the use of land adjacent to or in the immediate vicinity of the Airport to activities compatible with normal Airport operations. FAA considers the return of properties for residential occupancy to be an incompatible land use within noise impacted areas.

- **Special Condition No. 13 to AIP Grant Agreement No. 3-66-0001-38.** This special condition relates to a \$16.9 million grant for projects that include the replacement of the perimeter security fence, and states that GIAA will secure the entire Airport property, and that structures located on Airport property that pose an obstruction, hazard or that are not to code shall be removed. FAA considers that the 22 structures that have been deeded back to the subsequent claimants are illegally occupied and also may contain hazardous substances or are not otherwise up to code.

FAA has stated that GIAA's contravention of these assurances and conditions is jeopardizing the planned growth of the Airport and GIAA's compliance status with its Airport Sponsor Assurances. Additionally, were GIAA to be found in noncompliance with the Airport Sponsor Assurances, GIAA's eligibility for Airport Improvement Program (AIP) discretionary funds and the authority to collect Passenger Facility Charge (PFC) funds would be jeopardized.

Air Cargo Regulatory Exemptions

Background. Led by globalization and time-based competition, the air cargo industry and supply chain management is rapidly changing. New economy products (typically small, light, compact, high value-to-weight parts, components and assembled products) are increasingly shipped internationally by air in a fast and flexible manner. In the new speed-driven, globally-networked economy, individual companies are no longer the effective competing units. Rather, competitive advantage resides in networks of globally dispersed firms whose integrated supply chains move via air.

The huge volume of high-value, time-critical products traversing international boundaries by air annually has resulted in air cargo accounting for 40 percent of the value of today's world trade (vs. under two percent by weight). In order to gain competitive advantage through speedy global supply chain connectivity that air cargo provides, high-tech manufacturers and other time-critical shippers are locating at sites around or accessible to operationally efficient and cargo "friendly" airports. This is driving substantial investment in airport regions and their nations as a whole.

USDOT Regulatory Exemption. The GIAA realizes that opportunity to expand air cargo activity exists, along with the associated economic contribution, and has developed a cargo facilities development plan. To support this effort, and to remain competitive in this evolving environment, the Government of Guam applied for,

and was granted, the rights to conduct expanded cargo transfer rights under the USDOT Expanded Air Services program in December 2006.

GIAA granted foreign carriers, excluding those from China, Japan, and the United Kingdom,* the right to conduct cargo transfer operations at the Airport between points in the Asia/Pacific region and points in the U.S. or third countries via an en-route transit stop in Guam. Specifically, the ruling allows the following expanded air cargo transfer rights:

1. Interline to/from non-US carriers
2. Interline to/from US carriers
3. Transfer on-line between flights
4. Change of gauge/"starburst" service
5. Commingling of US and non-US traffic on the same flight

Ultimately, the ability to transfer cargo from one airline to another could significantly increase the volume of cargo accommodated at Guam International Airport and stimulate the economic development from associated activities, facility development, and corporate investment.

Potential Contribution From USDOT Regulation. The new initiative allows the carriage of international origin and destination cargo on foreign aircraft between Guam and other points in the US in the course of continuing international transportation.

These expanded air cargo transfer rights will allow air carriers utilizing Guam International Airport (GUM) to:

- Take advantage of the alliance partnerships through true interlining capabilities;
- Lower operating costs by eliminating lower revenue producing routes;
- Increase market penetration while reducing costs by eliminating beyond GUM flights;
- Achieve higher aircraft utilization;
- Take advantage of opportunities for true transfer and transload operations;
- Test market conditions without committing aircraft by utilizing code-share agreements.

* US DOT order subsequently lifted the ban on carriers from the United Kingdom.

With the strategic geographic location, access to emerging Asian markets, and the evolving air cargo industry environment (i.e. freight forwarders seeking more direct service), Guam is primed to take advantage of this unique opportunity. The potential to increase cargo activity could translate into significant regional economic development in several ways: (1) airlines can achieve efficiencies by locating their aircraft operations centers at this strategic location, (2) manufacturers and third party logistics providers can effectively increase their global reach and supply chain service efficiency with warehouses on Guam, (3) light industry, and value added service operations, could result in final product assembly, packaging, testing, and distribution activities, and (4) inventory and warehousing of high-value, time sensitive products. This investment and activity increase rely on the existence of superior global connectivity and sufficient air cargo capacity. The recently granted USDOT transfer rights are critical to the realization of the economic development potential on Guam and at GUM. While the link between air cargo development and economic contribution is relatively straight-forward, the decision making process of adjusting aircraft routes and corporate investment (e.g. warehouse development) requires time and research. The Government of Guam should endeavor to extend these expanded cargo transfer rights into the foreseeable future.

For the purposes of evaluating a potential disruption in airport funding sources and the associated reduction in Airport planned development and overall economic contribution, three scenarios were defined as outlined below and discussed in the following paragraphs.

1. **Unfunded CIP:** Key funding sources are not available for the Airport CIP and it is assumed that GIAA does not implement the CIP
2. **CIP Funded With Airline Revenues:** GIAA increases airline user charges to make up for the loss of FAA grants and PFC funds
3. **CIP Funded With Replacement Guam Government Revenues:** A replacement source of government funding is provided that allows implementation of the CIP in a cost-effective manner for the airlines serving the Airport

Unfunded CIP

In the event that key funding sources are not available for the Airport CIP, it is assumed, for the purposes of this analysis, that GIAA does not implement the CIP. As a result, it is expected that slow growth in passenger and cargo activity at the Airport would occur reflecting:

- No to little expansion of passenger and cargo airline service without the extension of Runway 06L/24R from 10,015 feet to 12,000 feet to facilitate service to mainland U.S. destinations (particularly the airline hubs of Los

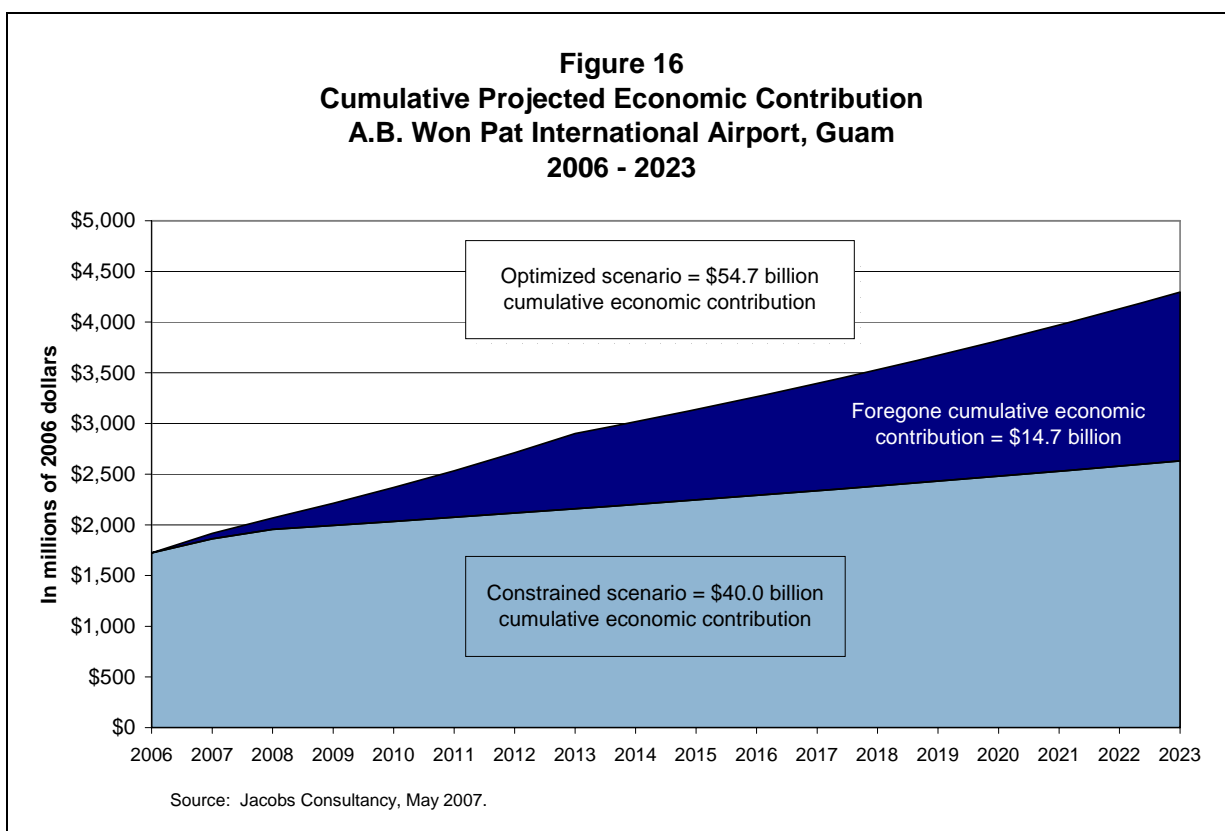
Angeles, Houston and Minneapolis). Certain airlines serving the Airport have expressed interest in providing direct passenger airline service to the United States, including Continental Airlines to Houston and Los Angeles. In the event that the runway is not extended, this would prevent airline service development to new destinations.

- No development of a regional distribution facility as a result of the lack of runway capacity to serve mainland U.S. cargo hubs, such as Los Angeles. Economic benefits from the customs pre-clearance program outlined by the Governor of Guam, which would provide pre-clearance for customs clearance for flights from Guam to the mainland U.S, would be unrealized.
- No development or economic benefits would be realized from the exemption for expanded air service (EAS) by the U.S. Department of Transportation, which granted special authority for foreign air carriers (excluding those as noted previously) to provide expanded cargo services at the Airport, and to provide expanded cargo transfer operations, including service to the mainland U.S. This authority was granted for a renewable two-year period, and as such a failure to conduct the runway expansion could potentially reduce the usefulness of any extension.
- The existing operations by DHL would not be expanded to mainland United States and Asia without additional runway capacity and transshipment activity would not occur. (Transshipment activity includes the transfer of containers from one airline to another on ramp or with minimal warehousing and may involve a change in aircraft gauge.) The additional economic benefits/ related to the activities of ramp and cargo handlers and additional facility development would not be realized.

In terms of Airport economic contribution, the inability to fund the Airport CIP and complete the infrastructure projects necessary to achieve the optimal aviation activity would likely result in a reduction in overall Airport economic contribution. In order to quantify the economic contribution that would be “lost” in this scenario, an assessment of the projected cumulative economic contribution of the Airport from 2006 through 2023 was prepared. The Airport Master Plan Update constrained forecast scenario was used as the basis for this evaluation since many of the assumptions used for the constrained case parallel the anticipated effects described above. In particular, in the constrained scenario, slow growth in passenger and cargo activity is forecast to reflect reduced airline service, weak economic activity, reoccurring natural disasters and epidemics, and the assumption that “federal grant programs are not pursued and not administered” during the forecast period.

The “lost” or foregone cumulative economic contribution associated with an unfunded CIP is estimated to be \$14.7 billion for the period from 2006 through 2023, as shown in Figure 16. In addition to the lost overall economic contribution, the

temporary construction expenditures associated with the Airport CIP would also be lost, totaling approximately \$420 million between 2006 and 2023.



CIP Funded With Airline Revenues

In the second scenario, it is assumed that GIAA increases airline user charges to fund the Airport CIP and make up for the loss of FAA grants and PFC funds. In order-of-magnitude terms, this would increase airline cost per enplaned passenger (CEP) from roughly \$13 today to over \$30 during the Master Plan implementation period. Such a significant increase in CEP would make the Airport much less economically viable for airlines, and therefore make Guam less attractive for air service development. Continental Airlines, which has the largest market share of enplaned passengers at the Airport (45% in FY 2006) and uses the Airport as its principal hub, would be significantly impacted by these higher costs. While the Authority has since reduced CEP below those levels occurring in 2003, any increases in CEP are likely to be a negative for airline service development at the Airport.

It can not be known for certain how much this would constrain future activity levels at the Airport, but we believe it is possible that the contribution could be similar to the constrained scenario presented directly above. That is, up to \$15 billion of Airport economic contribution could be at risk.

CIP Funded With Replacement Guam Government Revenues

In the third scenario, it is assumed that a replacement source of government funding is provided that allows implementation of the CIP in a cost-effective manner for the airlines serving the Airport. This is the only scenario that could reasonably be expected to preserve the potential to realize most of the projected Airport economic contribution (\$4.3 billion by 2023). Even in this case, however, there is likely to be some foregone airport development and associated economic contribution if the transportation infrastructure improvements discussed previously are not undertaken.

Appendix A

METHODOLOGY

Economic Contribution Study A.B. Won Pat International Airport, Guam

The methodology used to evaluate the current economic contribution of A.B. Won Pat International Airport, Guam involved (1) developing primary data on the direct economic contribution of on-Airport businesses, (2) supplementing these data with applicable data from comparable evaluations, and (3) using models and other statistical techniques to estimate the indirect and induced economic contributions of on-Airport activity.

The primary sources of information used in this evaluation were: (1) on-Airport data generated by surveys of on-Airport businesses and general aviation users, (2) relevant regional, State, and national economic indicators, (3) surveys of Airport passengers conducted by the Guam Visitors Bureau, and (4) where required, inputs from other reports prepared by Jacobs Consultancy.

ASSESSMENT OF CURRENT DIRECT ECONOMIC CONTRIBUTIONS

The direct economic contribution of the Airport is the contribution generated on-site at the Airport, and includes the employment, payroll, and local expenditures of all enterprises located at the Airport—airlines, terminal concessionaires, general aviation businesses, ground transportation providers, government agencies, and other businesses. These enterprises have a direct and quantifiable contribution on the economy of the region.

On-Airport Business Survey

A survey form entitled “Economic Contribution Survey” (reprinted on the following page as Table A-1) was used to obtain employment and expenditure data for analysis of direct on-Airport economic contributions. GIAA staff provided guidance on the survey content and design.

The survey form was designed to elicit information on employment and associated wage data; expenditures on services and supplies, capital improvements, and local taxes; and other expenditures contributing to the Airport’s economic contribution.

Table A-1
A. B. WON PAT INTERNATIONAL AIRPORT, GUAM
ECONOMIC CONTRIBUTION SURVEY

An airport makes a major economic contribution to the region it serves, in terms of employment, business expenditures, and local taxes paid. The A. B. Won Pat International Airport Authority Guam is conducting this survey of on-Airport businesses or agencies to determine how great an economic contribution A. B. Won Pat International Airport, Guam makes to the region. Your assistance in providing the information requested below would be greatly appreciated. All information will be held confidential and only industry totals will be discussed.

Firm or agency

Name _____	
Phone _____	Fax _____
Form completed by _____	

Employment information for February 2007

1. # of employees at the Airport _____	2. # of employees in Guam _____
--	---------------------------------

Expenditure information for most recent 12-month period with available data

3. Time period for data	_____
4. How much did your firm (or agency) spend locally for:	
a. Gross payroll	\$ _____
b. Other expenditures including services, materials, supplies, equipment and capital improvements	\$ _____
c. Local Taxes (property/school/special district)	\$ _____
d. Total	\$ _____
5. Do you plan to expand your operation at the Airport? If so, please describe your plans, and indicate how much additional land you may require on-Airport.	

6. What is your business's relationship with the Guam tourism industry? _____	

If you have any questions, please contact _____.

Survey forms were faxed to the organizations listed in Table A-2 in February 2007 under a cover letter signed by GIAA's Director of Aviation. The letter stated the importance of the survey and provided the name of a contact if there were any questions concerning the survey. Respondents were advised that all company-specific data provided would be kept confidential and that only industry totals would be reported.

During March and April 2007, telephone calls were made by GIAA staff to organizations that had not yet responded. Additional follow-up calls were made until a major portion of the businesses had responded and Jacobs Consultancy and GIAA staff jointly determined that no more responses would be received.

On-Airport Businesses Surveyed. The names and addresses of the on-Airport businesses to be surveyed were compiled with the assistance of GIAA. Table A-2 lists the businesses surveyed, by type of organization.

Partial Responses and Nonresponses. The economic contribution of businesses that either did not respond to the survey or provided only partial information was estimated based on survey information obtained from similar responding businesses, and supplemented with Authority data on security badges issued to on-Airport employees by business, as appropriate.

For those airlines that did not respond to the survey, employment and expenditures were estimated on the basis of the responses by similar responding airlines and the nonresponding airline's passenger numbers. The average number of employees per passenger for the responding airlines was used to estimate the number of employees for the nonresponding airlines. Similarly, the average expenditures (payroll, services, materials and supplies, capital, and others) per passenger for the responding airlines were used to estimate expenditures for nonresponding airlines.

Employment and expenditures for the nonresponding passenger terminal concessionaires were using the number of employees for the nonresponding terminal concessionaires and supplemented with Authority data on security badges issued to on-Airport employees by business, as appropriate. The average expenditures per employee for the responding concessionaires was used to estimate expenditures for the nonresponding concessionaires.

Table A-2

ON-AIRPORT BUSINESSES SURVEYED

A.B. Won Pat International Airport, Guam

April 2007

<u>Passenger airlines</u>	<u>Cargo airlines/Freight Forwarders</u>
All Nippon Airways	Asia Pacific Airlines
Aviation Services Ltd (Freedom Air)	DHL
China Airlines	Sky Bridge Guam
Continental Micronesia	Micom America (Jupiter)
Hyannis Air (Cape Air)	Ambyth Shipping and Trading
Japan Airlines	Triple B Freight Forwarders
Korean Airlines	
Northwest Airlines	
Philippine Airlines	
<u>Rental car companies</u>	<u>Terminal sales/concessionaires</u>
Avis Rental Car (Premiere Alliance)	Allegro Italian Café
Budget Rent-A-Car (Venture Transportation)	Audio Vision Services
Hertz Rental Car (Triple J)	Bank of Guam
National Rental Car (Emeral Pacific Group)	Bank of Hawaii
Nissan Rental Car	Call Home
Taico Automotive Corp (Japaren)	Citibank Duty Free Shops
	Denny's of Guam
	First Hawaiian Bank
	Guam Islandfone
	Guam Wireless Telephone (HafaTEL)
	HME Massage
	Intraspace Advertising
	Isla Pacific Communications
	JMC Guam (Oasis & Clippers)
	KGD LLC (Airport Tentekomai)
	Micronesia Media (Bestseller)
	Micronesian Munchies
	One-Link LLC
	Pacific Amusement
	Pacific Fastfood Associates
	Pacific Dining (Island Café & Bar)
	Shirley's Coffee Shop
	TBF Guam
	Travelex Americas
	Western Island Network
<u>Ground transportation operators</u>	
Consolidated Ground Transportation Services	
Detry Corporation (Sun Tour and Pumping)	
Guam Sanko Transportation	
Latte Bus Company	
Micronesian Hospitality	
<u>Fixed base operators</u>	
Aircraft Service International Group	
ACI Pacific	
Guam Flight Services	
Temco Skynetnetwork Services	
Fleet Services	
Tandem Skydive Saipan/Guam	
Micronesian Aviation Systems	
LSG Sky Chefs	
Hansen Helicopter	

Table A-2 (page 2 of 2)
ON-AIRPORT BUSINESSES SURVEYED
 A. B. Won Pat International Airport, Guam
 April 2007

Government agencies	Other entities
Federal Aviation Administration	Bisnes Mami (Napa Auto Parts)
Government of Guam Federal	J&RS Micronesia Pacific Enterprises
Employees Credit Union	PacAir Ltd
A. B. Won Pat International Airport Authority, Guam	Reaction Company
United States Department of Agriculture	South Pacific Petroleum Corporation
United States Department of Fish & Wildlife Service	
United States Customs & Border Protection	
United States Quarantine Agency	
Transportation Security Administration	

Source: A. B. Won Pat International Airport Authority, Guam.

ASSESSMENT OF CURRENT INDIRECT AND INDUCED ECONOMIC CONTRIBUTIONS

In addition to the direct contribution, the total economic contribution of Airport activity includes indirect and induced economic contributions, as defined below.

- ***Indirect contributions.*** The labor, services, materials and other items purchased by the industries that provide the direct economic contributions of the Airport. An airline produces a direct contribution; an oil company that sells fuel to the airline produces an indirect contribution.
- ***Induced contributions.*** The goods and services purchased by households as a result of the employment and wages paid to industries with both direct and indirect Airport-related economic contributions. Household spending (personal consumption) by both airline and oil company employees produces an induced economic contribution.

Regional input-output model analysis is a technique designed to measure the indirect and induced effects of a change in the direct economic contribution of a region's economy. The estimates of direct contribution were categorized by industry sector and used in combination with the State of Hawaii version of the Regional Input-Output Modeling System (RIMS II) developed by the U.S. Department of Commerce. Using these inputs, the total economic contributions of Airport activity were estimated, including employment and expenditures, and total economic contribution. The State of Hawaii model was used in the absence of a RIMS II model for Guam to reflect a similar island economy with a higher than average dependence on imported goods. The coefficients in the model express the change in output, wages, or employment generated by a unit change in input (the direct economic contributions).

The total contribution of Airport activity (direct, indirect, and induced) was measured in terms of total economic contribution, which economists call output or sales, payroll, and employment.

- ***Total economic contribution dollars.*** The value of output, or sales, measured in dollars. The survey of on-Airport employers produced an estimate of total expenditures (including payroll), which was assumed to equal output. This assumption is equivalent to assuming zero profits (revenues = expenses), and ensures conservative results.
- ***Employment.*** The number of employees.
- ***Payroll.*** Total wages or salaries.

As discussed previously, data from the on-Airport business surveys were used to estimate the direct employment, income, and output contributions of Airport activity in 2006. These estimates of direct contribution were categorized by industry

sector and used as inputs to the State of Hawaii RIMS II model. The total economic contributions calculated by the model are discussed in the main body of this report.

Methodology for Estimating Direct Economic Contributions of Cargo Developments

For the transportation industry, the most widely used input/output model is the BEA's RIMS II multiplier (i.e., goods and services produced as a result of the economic activity in question). Guam did not participate in the 2000 US Census, making data collection less standardized. As a result, the Territory's economic and demographic data do not compose an element (i.e., a regional "multiplier") in models such as RIMS II. Thus limited, this study follows a 2004 cargo study.

RIMS II estimates the direct and indirect economic contribution of cargo operations on a Metropolitan Statistical Area (MSA). The steps required to estimate direct and indirect contribution, using the RIMS II model, include:

- Determine or estimate the volume of air cargo activity. On average, there is one ton of cargo per 0.8 square feet of cargo warehouse space. This guideline helps account for the significant discrepancy between facility utilization of international heavy freight (longer in warehouse dwell time) versus the integrated carrier's higher efficiency ratios (more overnight and express services).
- Data for the average value of the unique mix of goods shipped to and from Guam were not available for this study. Therefore, the revenue associated with cargo activity at the Airport was calculated using an industry average value of \$2.31 per pound (reported by the U.S. Bureau of Labor Statistics, based on data from cargo integrators).
- The RIMS multipliers (for output and earnings) can then be employed to estimate economic contribution to the MSA (in terms of \$US and jobs).
- The RIMS multipliers can also be used for the comparative study of different regions, as they are based on a consistent set of estimates throughout the United States. In 2004, two large US airports used RIMS II to assess the economic contributions of their air cargo activity: Memphis and Washington/Dulles (IAD). The Memphis example concerns the worldwide FedEx hub, which may attract a disproportionate amount of manufacturing and distribution activity. The study at IAD is more relevant. In 2004, IAD accommodated 330,894 tons of air cargo that was worth \$1.53 billion and created approximately 3,000 direct jobs in the region. Jacobs Consultancy suggests that the IAD example has more applicability to type of cargo activity (integrated carrier and international wide-body cargo capacity) found on Guam. Assuming that Guam is much more of a transfer-

point for air cargo, and not a destination (such as Washington DC), Jacobs Consultancy conservatively estimates (1) that the value of the air cargo handled does not enter the Guam economy, except through (2) the wages of the employees who handle it, whose direct employment multipliers would be one-half of that at IAD, or 0.0045 jobs per ton.

- There are other methods to project direct contributions from cargo outputs. For a 2004 economic contribution study for Toronto, Jacobs Consultancy estimated that for every 1,000 cargo aircraft movements, 7 jobs were directly created.
- To quantify these jobs contributions as money, they would have to be converted into its total payroll. Toronto had an average cargo employee salary of \$53,000. Memphis's own study found theirs to be over \$44,000. According to a 2004 report by Jacobs Consultancy, the average cargo salary in Norfolk was \$41,000. A 2003 Jacobs Consultancy report for Fort Lauderdale had it at \$39,000. Because of Guam's uniqueness, this study does not estimate average annual earnings for potential air cargo employees. However, a range between \$30,000 and \$40,000 is probable.

The following specific assumptions were used in this assessment:

- Only direct jobs are counted, as the indirect jobs on the island are essentially for tourism. Likewise, only direct and induced contributions are quantified.
- Direct Multipliers:
 - Laborers' earnings = 0.2 (20% of total project cost)
 - Locally-sourced construction materials = 0.4 (40% of total project cost)
 - Jobs at private developments = 0.0045 jobs per ton
- Induced Multiplier: 0.5 (50% of direct contributions are subsequently spent, in successive iterations, in Guam's economy).
- Air cargo activity has an average value or \$2.31 per pound.
- One ton of cargo can be accommodated per 0.8 square feet of cargo warehouse space.
- Cargo facilities will have typical layouts and operational specifications (i.e., single floor buildings with no high-tech/automated sort systems) and associated service areas such as handling, marshalling, and parking areas.

Methodology for Estimating Temporary Construction Contributions

Jacobs Consultancy was provided the total construction expenditures by the Authority. From these expenditures, the number of jobs, payroll and local expenditures were estimated.

1. *Laborers' earnings from the construction of Airport capital improvements and private-party on-Airport developments.* The direct contribution of these earnings is estimated as a percentage of the total cost of capital projects. Laborers' earnings correspond to approximately 30% of total project cost in examples given by the BEA. Due to the higher cost of importing some building materials to Guam, Jacobs Consultancy conservatively revises this figure down to 20%. The BEA also gives an example of the average construction laborer in an island-environment earning \$25,000 in a year. Hence, to project the number of jobs spawned by an on-Airport construction project, one would multiply the total project cost by 20% (to get the total payroll), and then divide that amount by \$25,000. It should be noted that this is money per job-year, not job, in that a construction job lasting 6 months could pay \$50,000.
2. Expenditures on locally-produced materials for the construction of Airport capital improvements and private-party on-Airport developments. In a large metropolitan region, over 90% of (the cost of) building supplies would be locally sourced. On a remote island, however, that percentage would be much lower. Jacobs Consultancy estimates that half of building supplies for a major construction project on Guam would be locally sourced. Given that this study assumes 20% of total project cost goes to payroll, the remainder would leave 40% of total project cost going to on-island suppliers and manufacturers.