Employment at Commercial Service Airports in the USA: Survey Results

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ABSTRACT

The purpose of this research was to ascertain the size and scope of employment at US commercial service airports (CSAs) by: (1) determining the number of full-time and part-time employees employed directly by the operating entities of CSAs; (2) determining the total number of employees employed at these CSAs, including those working not only for airport operators, but also for airport tenants; and (3) comparing the findings to figures found in literature. A literature review was conducted, and all 510 US CSAs were contacted by phone and/or mail and asked to complete a five-question survey. A response rate of 95.1% (n = 485) was obtained. Survey results indicate there are 45,067 full-time and 2,558 part-time employees directly employed by commercial service airport operators. Additionally, when airport tenants are taken into account, survey results indicate 1,154,660 people are employed at CSAs. This study provides more detailed airport employment data than that which is available in current sources, such as the US Department of Labor. It also provides a larger sample size and more comprehensive analysis than previous recent studies, such as the one reported in the November/December issue of *Airport Magazine*.

INTRODUCTION AND PURPOSE

There are 19,576 landing sites in the United States as of January 2004 (Federal Aviation Administration [FAA], *Report to Congress*, p. 1). However, only 510 of these airports are classified as commercial service airports (CSAs). CSAs are defined in the Federal Aviation Administration's (FAA) National Plan of Integrated Airport Systems (NPIAS) as "public airports receiving scheduled passenger service and having 2,500 or more enplaned passengers per year" (FAA, *Report to Congress*, p. 5). These CSAs are economic engines for their surrounding communities.

Because industry-specific employment data can be used to gauge the well-being of any given industry, it is important to remain up-to-date with employment numbers and trends. The total impact of civil aviation on the US economy exceeds $900 billion annually, which represents approximately 9% of the nation's gross domestic product (Dri-Wefa, 2002, p.4). CSAs are a vital part of the aviation industry; therefore, tracking employment at these airports is one way to judge the state of the industry. However, a complete data set regarding employment at individual CSAs could not be found in the extant literature. Because an extensive data set regarding the number of employees employed directly by operating entities and by tenants of individual CSAs is not available on a nationwide basis, further study is warranted. Therefore the purposes of this study are:

1. To conduct a literature review of sources available on airport employment to provide a more complete understanding of the data currently available related to CSA employment.
2. To conduct a survey of the size and scope of employment at CSAs by:
   - determining the total number of employees directly employed by operating entities of CSAs.
   - determining the total number of employees employed at these CSAs, including those working not only for airport operators, but also for airport tenants such as airlines, concessionaires, and freight forwarders.

Definitions

Throughout this report, the following definitions were used:

1. Commercial service airport – "Public airports receiving scheduled passenger service and having 2,500 or more enplaned passengers per year" (FAA, *Report to Congress*, p. 5)
2. Enplaned passengers – See enplanements

3. Enplanements – Paid passenger departures or "boardings" (FAA, *Report to Congress*, p. 5). There were 650,808,785 enplanements in the U. S. in Calendar Year 2003. (United States Department of Transportation, Bureau of Transportation Statistics, n. d.)
4. Large hub airport – "Airports that each account for at least one percent of total US passenger enplanements" (FAA, *Report to Congress*, p. 7)
5. Medium hub airport – "Airports that each account for between 0.25 percent and one percent of the total passenger enplanements" (FAA, *Report to Congress*, p. 7)
6. Non-hub primary airport – "Commercial service airports that enplane less than 0.05 percent of all commercial passenger enplanements but more than 10,000 annual enplanements" (FAA, *Report to Congress*, p. 7)
7. Non-primary commercial service airport – "Commercial service airports that have from 2,500 to 10,000 annual passenger enplanements" (FAA, *Report to Congress*, p. 7)
8. NPIAS – National Plan of Integrated Airport Systems (FAA, *Report to Congress*, p. v)
9. Small hub airport – "Airports that enplane 0.05 percent to 0.25 percent of the total passenger enplanements" (FAA, *Report to Congress*, p. 6)
10. General aviation airport – "Communities that do not receive scheduled commercial service or that do not meet the criteria for classification as a commercial service airport may be included in the NPIAS as sites for general aviation airports…." (FAA, *Report to Congress*, p. 8)

LITERATURE REVIEW

Employment at CSAs is discussed in various sources. Among them are federal and state government documents, trade journals, and airport Web sites. These sources are further classified as:

- documents that provide individual airport operating entity employment figures.
- documents that provide total on-airport employment figures.
- national studies that provide broad-based airport employment statistics.

Literature Reporting Employment by Airport Operating Entity

Sources that provide CSA operating entity employment data on an airport-by-airport basis include state and local economic impact studies and individual airport Web sites. Some states have compiled data regarding CSA operating entity employment in state aviation studies. A statewide airport analysis completed for the North Carolina Department of Transportation, for example, reported both full and part-time employees employed by the airport operator (Hartgen, Bondurant, Dakai, Morris, & Stuart, 1997); as is the case with many such studies, this report discussed not only CSAs, but also general aviation airports.

In addition, economic impact statements conducted for individual airports may include CSA operating entity employee counts. An economic impact report summary carried out by San Jose International Airport revealed that 194 people were employed by the airport's administration (San Jose International Airport, 1986, p. 3).

Furthermore, several CSAs list operating entity employment figures on their respective Web sites. These statistics are often found on Web pages titled "Airport Facts," "Fast Facts," or "About the Airport." For instance, Lambert St. Louis International Airport's Web site stated that the airport employs 550 City of St. Louis employees (*General Information about Lambert*, p. 6). Other Web sites, such as that of Baltimore/Washington International Airport, offered operating entity employment figures for the number of allocated positions as well as the number of filled positions (*General Statistics BWI Facts and Figures*, Employment section). It is not only the large hub airports that list employment information; even smaller airports, like Gallatin Field in Bozeman, Montana, provide their operating entity employment figure

(*Gallatin Field Airport Fact Sheet*, 2004, Employment section).

Because of the dynamic nature of Web pages, it is straightforward to obtain up-to-date airport employment figures, provided that CSAs update their Web pages on a regular basis. However, a significant number of CSAs do not provide operating entity employment information on their Web pages, and some do not even have a Web site. Another limitation is that CSAs rarely have the need to break down operating entity employees in terms of full-time and part-time employees on their Web sites, so those aspects of each airport's employment remain unknown.

Literature Reporting Total On-Airport Employment

Numerous sources, such as state and local economic impact studies and airport Web sites, give an account of total on-airport employment. Note that these sources are identical to those that report employment by CSA operating entity, as described above. Indeed, a few of these sources provide both CSA operating entity employment and total on-airport employment figures. However, documents containing total on-airport employment numbers are more commonly found in literature.

Many of the state publications that report total on-airport employment take the form of aviation or airport economic impact studies. Some sources show total on-airport employment on airport-by-airport basis, whereas others only provide aggregates. For example, the Illinois Department of Transportation's Division of Aeronautics released a study in 1996 in which 119 CSAs and non-CSAs in Illinois were surveyed for various data, including employment figures. In this report, total on-airport employment, in terms both of full-time and part-time employees, was reported on an airport-by-airport basis for the majority of Illinois CSAs (Jamison, 1996). Similar airport-by-airport economic impact reports that showed CSA on-airport employment were conducted for Florida (Wilbur Smith Associates, 2000) and Washington (Washington State Department of Transportation Aviation Division).

On the other hand, various state publications list total on-airport employment without specifying employment figures for individual airports. A pamphlet issued by the New Mexico Department of Transportation's Aviation Division stated that there were 4,580 full-time on-airport jobs at New Mexico CSAs in 2002 (New Mexico Department of Transportation Aviation Division, 2003, Commercial Aviation section). Vermont's Agency of Transportation published a similar document, stating there are a total of 8,500 employees at its two CSAs (Vermont Agency of Transportation, Commercial and General Aviation Section). Similar documents are available from Arizona (Arizona Department of Transportation Aeronautics Division, 2004); Georgia (Georgia Department of Transportation, 2004); and Iowa (Swenson & Eathington, 2000).

Yet another category of state documents that provide total on-airport employment are those that include employment based on total economic impacts rather than just direct economic impacts; these employment figures incorporate not only employment segments supporting aviation activity (total on-airport employment), but also employment due to indirect impacts and economic multiplier effects, as spending re-circulates within the airport's region. Thus, these CSA employment numbers take into account a broader spectrum of employees and are much larger than the ones mentioned previously. For example, Colorado's CSAs were reported to produce a total impact of 260,803 jobs on the Colorado economy in 2003 (Colorado Department of Transportation Aeronautics Division, 2003, p. 6). Studies completed for Missouri (Missouri Department of Transportation) and Texas (Texas Department of Transportation) reported CSA employment numbers in a similar fashion.

Additionally, some CSAs individually commission economic impact studies, which often include total on-airport employment figures. A 2003 study performed for Wichita's Mid-Continent International airport, for instance, stated that a total of 15, 006 existed at the airport (Harrah, Gallagher, & Townsend, 2003).

The final group of sources that discuss total on-airport employment are the respective Web

sites of CSAs. Again, as for operating entity employee numbers, total on-airport employment figures are usually found on Web pages entitled "Airport Facts," "Fast Facts," or "About the Airport." Newark Liberty International Airport's Web site, for example, states that "over 24,000 people are employed at the airport" (Port Authority of New York and New Jersey, Employment and Economic Impact section). Many other airports list total on-airport employment numbers on their Web sites, such as Palm Springs International Airport, Little Rock National Airport, and Cincinnati/Northern Kentucky International Airport.

Overall National Studies

Some publications describe CSA employment on a broader level; they do not break down employment on an airport-by-airport basis or even by state. Rather, they provide aggregate data related to CSA employment. These sources include federal documents, national studies, and national trade journals.

One of the most comprehensive sources of employment statistics is maintained by the United States Department of Labor's Bureau of Labor Statistics (BLS). The BLS tracks employment related to airports in two categories: airport operations (North American Industry Classification System Code 48811) and airport operations specialists (Standard Occupational Classification Code 53-2022). However, neither of these sources provides CSA-specific data. For example, the North American Industry Classification System Code 48811 (NAICS 48811) "comprises establishments primarily engaged in (1) operating international, national, or civil airports or public flying fields or (2) supporting airport operations (except special food service contractors), such as rental of hangar space, air traffic control services, baggage handling services, and cargo handling services" (United States Census Bureau, p. 1). In 2003, the BLS reported a total of 112,923 employees working for federal, state, and local government agencies and private entities in the NAICS 48811 classification (United States Bureau of Labor Statistics [BLS], *Quarterly Census of Employment and Wages*). The problem with this data, however, is that it not only fails to specify the number of employees employed directly by CSA operating entities, but it also includes employment at non-CSAs, which distorts the employment information. Even if the BLS kept track specifically of CSA operating entity employment for their internal use, this data is not available to the public, since the BLS does not release "microdata" in order to protect the confidentiality of respondents (R. Stephens, personal communication, March 2, 2005).

Furthermore, the BLS Standard Occupational Code 53-2022 estimated that in November 2003, there were 4,670 people employed as airfield operations specialists, defined as those who "ensure the safe takeoff and landing of commercial and military aircraft" (BLS, *Occupational Employment and Wages*, p. 1). Again, these employees may or may not be employed by CSAs, and because airfield operations specialists are not the only employees employed by operating entities of CSAs, this number is an underestimate of CSA operating entity employment. Therefore, the data provided by the BLS is either too broad or too narrow, and it does not adequately reflect CSA employment, which renders it not applicable to this study.

Next, national aviation studies also discuss airport employment in a general manner. For example, a study carried out by Wilbur Smith Associates entitled *The Economic Impact of Civil Aviation on the U.S. Economy* showed that aviation had a direct impact of 2,165,728 jobs and an indirect impact of 5,632,945 jobs in 1993 (1995, p. 5). The combined impacts total 7,798,673 jobs, which accounted for approximately 88.2% percent of 1993's total civil aviation-related jobs (Wilbur Smith Associates, p. 5). Note that these figures take into account an economic multiplier effect, as described earlier.

In addition, a study conducted by Airports Council International-North America (ACI-NA) in 2002 regarding the impact US airports have on local regions found that there are 1.9 million on-airport jobs at US airports and 4.8 million jobs created in local communities, which result in $190 billion in earnings (Airports Council International-North America [ACI-NA], 2002, p. 1). The study also projected that U.S airport

related employment will be 9.9 million in 2013 (ACI-NA, p. 2). This growth is projected to correspond with the increase in outputs and earnings of the airports (ACI-NA, p. 3). The study showed the significance commercial service has on airport employment. For example, it highlights the example of Baltimore/Washington International Airport (BWI), where 12,030 jobs result directly from airport activity, totaling $358 million in wages and salaries in 2000; of the total jobs, 10,465 jobs, or 87%, were generated by commercial service activities (ACI-NA, p. 10). At a smaller airport—Blue Grass Airport in Lexington, Kentucky—commercial service activities also accounted for the majority (57%) of the 1,760 jobs it contributed to the local economy in 2001 (ACI-NA, p. 11).

The Airports Council International's *Fifth Annual Economic Survey* stated that in North America, 43,000 people are directly employed by airport operators and that there are 1,106,000 jobs on airport sites ("That Was Then…," 2001, p. 42) Note that this number includes CSAs outside of the US as well. Similarly, in September 2004, the International Civil Aviation Organization provided somewhat similar numbers in its *Thirty-Fifth Assembly Session Economic Commission Working Paper* presented by the ACI. It estimated that in North America, 42,000 employees are directly employed by airport operators and 2 million jobs are at on-airport sites (International Civil Aviation Organization, 2004).

Moreover, trade journals contain various articles regarding CSA employment. For instance, two recent articles published in AAAE's *Airport Magazine* described CSA employment by hub category. Page (2004, p. 24) reported an average number of CSA operating entity employees at large, medium, small, and non-hub CSAs at 606, 276, 81, and 27 employees, respectively. Although this survey provides recent data regarding CSA operating entity employees, it does not list data on an airport-by-airport basis. Furthermore, the survey was based on only 188 responses (Page, 2004). The January/February 2005 issue of *Airport Magazine* showed that airport jobs are dependent on the size of the airport (Page, 2005). That study provided equations for estimating the optimum number of airport staff. While the relationship between airport size and number of employees may be logically obvious, this study helped explain the variance in the employment figures at different airports.

Moreover, prior studies regarding aviation employment reported approximately 2.1 million aviation employees in the US (NewMyer, Kaps, & Sharp, 1997; NewMyer & Owen, 2003). However, these studies were generic in nature, as they focused on obtaining an overall US aviation industry employment estimate. The 2003 study by NewMyer and Owen reported a total of 37,088 persons employed directly by the operating entities of the 100 busiest CSAs; however, the remaining 400 CSAs— a vital segment of the nation's airport system—were excluded in that survey.

Literature Review Conclusion

This study was warranted because of several limitations with existing CSA employment data. First and foremost, a complete set of data regarding the number of people employed by CSA operating entities—and by airport tenants—is not available on an airport-by-airport basis. Many inconsistencies exist within the existing literature. For example, in economic impact studies, some state documents provide airport-by-airport-breakdowns of both CSA operating entity employment and total on-airport employment, whereas others only provide total on-airport employment. Similarly, some airport Web sites list employees employed by the operating entity, others list total on-airport employees, and still others do not provide any employment count whatsoever.

Next, the data available in literature was not collected at the same time, so it is difficult to compare data sets, and one cannot expect to arrive at accurate conclusions about CSA employment trends. Furthermore, much of the data is no longer current. National tragedies such as the terrorist attacks of September 11, 2001, and local events such as the closing of a major regional business can affect employment at CSAs, so it is imperative that current data be used.

Another issue in using the data in literature to reach conclusions about CSA employment is

that the methods of data collection differed from study to study. Some studies provided employment estimates, while others extrapolated data based on trends. Some studies provided CSA employment numbers based on the total economic impact of the airport, whereas others merely provided direct airport employment.

Thus, after reviewing literature, it was found that no detailed and same-date CSA employment data was available in an airport-by-airport method. Because the employment numbers were inconsistent in their methods and dates of collection, a specific number of CSA operating entity employees and total on-airport employees could not be firmly established.

METHODOLOGY

In order to have a systematic approach to collecting and recording data, the study used the FAA's 2002 enplanement data as its primary source of CSAs (FAA, *Passenger boardings*). This provided the study with a set of 509 CSAs ranked by enplanements, as well as other information—such as location identities and hub classification which would be useful in analyzing the data collected. To obtain a more recent data set, the FAA 2002 enplanement ranking was compared to the CSAs included in the 2005-2009 NPIAS (FAA, Report to Congress). All the CSAs in the 2002 enplanement ranking were included in the NPIAS dataset with the exception of Charlevoix Municipal Airport (CVX). CVX was therefore added to the enplanement list, resulting in a total of 510 CSAs contacted for this study. However, because CVX was not a CSA in 2002, it was not included in any of the data analyses that dealt with enplanement data.

The collection of data for this research entailed contacting airport personnel at CSAs. Therefore, as is required by research policy at Southern Illinois University Carbondale (SIUC), an approval to conduct research involving human subjects was obtained from the SIUC Human Subjects Committee in 2004, prior to beginning the study. An extension of the approval was granted on October 14, 2004, effective through November 21, 2005.

The data collection was undertaken between September 30, 2004 and March 30, 2005. During this period, there were two approaches to the collection of data. First, the study started out with a phone survey. Airport personnel were asked questions from the study's questionnaire (see Appendix A). This was conducted for about a month, during which approximately 125 CSAs were contacted, most of which were called more than once. Approximately 50 responded. Due to the low response rate, expense, and time consumed, the researchers opted to switch to a mail survey in order to collect the data needed.

After obtaining contact names and addresses from sources such as airport Web sites, the AAAE print and online directories (American Association of Airport Executives, 2003), and the *World Aviation Directory & Aerospace Database* (Jackman, 2004), the surveys were mailed. Due to the time, it took to gather contact information of appropriate airport personnel, the surveys in the first mailing were sent in batches during the week of October 18, 2004. However, the first mailing did not include any non-continental US CSAs because contact information was not yet in hand. These CSAs were located in Hawaii, Alaska, Puerto Rico, Guam, American Samoa, and the Northern Mariana Islands, and surveys for these CSAs were sent as soon as contact information was obtained. Depending on contact information available, surveys were addressed to a variety of airport personnel, such as airport managers, airport directors, human resource managers, and public relations managers. Additionally, because some operating entities were known to run multiple CSAs—such as the majority of Alaskan CSAs—only one person may have been contacted to provide employment data for those CSAs.

As responses were received, the data set was updated. A second mailing was completed during the week of December 15, 2004. A third mailing was sent during the week of January 21, 2005 and a final mailing sent during the week of February 7, 2005. These mail surveys gave CSAs the option to respond by mail (return envelopes were enclosed with each survey), fax, e-mail, or phone. However, majority of the responses were received by mail. Representatives at nine airports responded by fax and data for 78 airports was received by e-mail. (Note that 71 of these e-mail responses

were obtained from one source in Alaska.) Despite the study's reliance on mail surveys, phone surveys were not completely abandoned.

Phone surveys were continued throughout the mailing process, especially to follow-up on mail responses that were not clear. Furthermore, after all mailings were completed, an additional 34 CSAs responded to the survey by phone.

Data collection was completed during the week of April 1, 2005. The study had an extremely robust response rate of 95.1%. As shown in Figure 1, out of the 510 total CSAs surveyed, 485 responses were received and only 25 CSAs (4.9%) did not respond.

It is also important to note that all of the top 100 airports ranked by 2002 enplanements responded to the survey, as shown in Figure 2. Only two airports ranked within the top 200 CSAs did not respond to the survey. The remaining 23 airports that did not respond were among airports ranked lower than position 200 based on enplanements.

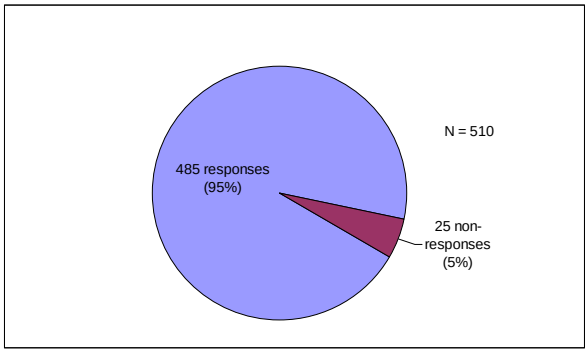


Figure 1. Overall response rate: operating entity employment

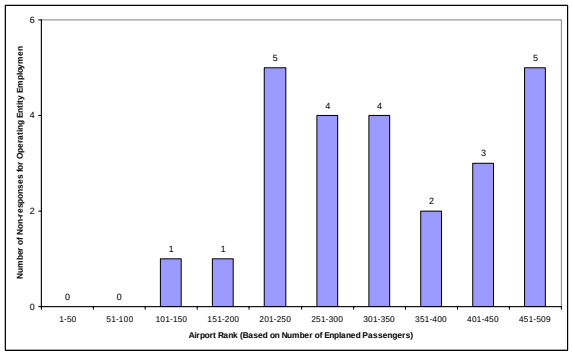


Figure 2. Distribution of non-responses for operating entity employment

Assumptions and Guidelines Used in Analysis

In recording the responses received from CSAs, the following guidelines were used in order to maintain a systematic study:

1. Unless otherwise noted by the respondent, the employment statistics provided were assumed to be current and accurate as of the day the survey was completed.
2. If a range of employment statistics was given instead of a single figure, the low employment estimate was used.
3. If multiple surveys were received from any given CSA, the survey completed by the person of higher organizational rank was used.
4. Contract positions were included in operating entity employment numbers.
5. Seasonal employment numbers were combined with part-time employment numbers to make a category of part-time and seasonal operating entity employees.
6. When recording the responses for the type of operating entity in the "other" category, similar responses were batched together. For example, aviation commission and airport commission were all reported as airport commissions.
7. CSAs opting to have their employment numbers remain confidential were noted, and their numbers will not be disclosed but will be included in statistical analyses.

Limitations

Despite the wide representation this study has due to its high response rate, the study also has its limitations, as is expected with any study. Below are some of these limitations.

1. The data reported as survey results are self-reported data and can not be independently verified for each airport.
2. Because the survey data were collected over a six month period of time spanning the end of 2004 and early 2005, no one date can be attributed to the results.

3. Question 5 in the survey (See Appendix A) did not specifically instruct the respondent to include or not data reported in Question 4. Therefore, the reported overall airport employment figures may or may not include airport operating entity employment data in a consistent fashion.
4. Though updated by the NPIAS 2005-2009 list, the 2002 FAA enplanement ranking list is the base of this study. When the study was started, this was the most recent enplanement data available.
5. The study may have understated the results because:
   A. Some CSAs did not include their total on-airport employment numbers. Out of the top 100 airports ranked by enplanements, eight did not provide their total employment figure. This includes San Antonio International, TX (ranked 48); Kahului, HI (56), Tulsa International, OK (71); A.B. Won Pat Guam International, GU (75); Lihue, HI (78), Hilo International, HI (92); Pensacola Regional, FL (96); and Harrisburg International, PA (97). There were also twenty three other CSAs ranked between 100 and 509 that did not provide total on-airport employment.
   B. Eight airports reported being seasonal airports; their employment numbers fluctuate and may increase significantly during peak seasons. Half of these seasonal airports are located in Colorado.
   C. Seven airports reported their employment numbers using full-time equivalents rather than an actual employee head count.
   D. Ten airports reported employment statistics from previous years.
   E. Five airports listed on the FAA 2002 enplanement ranking list no longer have commercial service. These airports are: Kileen-Fort Hood Regional, TX (ranked 208); Ellington Field, TX (265); Groton-New London, CT (411); Los Alamos, NM (440); and Smith Reynolds, NC (498).

SURVEY RESULTS AND ANALYSIS

Overall Results

Respondents were asked to provide the number of employees employed by the airport operating entity, and of the 95.1% who responded to the survey question, a total of 47,625 employees are reported to be employed by operating entities of CSAs. Of this total, 45,067 (94.6%) are full-time employees and 2,558 (5.4%) are part-time employees. The top 20 CSAs in terms of airport operating entity employment are shown in Figure 3. As noted in the figure, there are four airports that employ 1600 or more full and part time employees: Los Angeles International (LAX), Miami International (MIA), Dallas/Fort Worth International (DFW) and Chicago O'Hare International (ORD). The LAX total of 2,460 employees far and away is the leading number of operating entity employees at any one airport. Note that the top 20 airports ranking by operating entity employees employ a total of 20,833 employees, or 43.7% of the total reported by all respondents.

Based on an 89.2% response rate for the survey question regarding the total number of employees working at the airport (on-airport employees), there are 1,154,660 employees reported to be working at CSAs. This number includes businesses at the airport, such as airlines, concessionaires, fixed base operators (FBO's) and freight forwarders. Figure 4 shows the top 20 airports ranked by their reported on-airport employment. Three of the reporting airports indicated that they had 40,000 or more on-airport employees each. These airports were Hartsfield-Jackson Atlanta International Airport (ATL) at 48,000, Chicago O'Hare International Airport (ORD) at 45,000, and Dallas/Fort Worth International Airport (DFW) at 40,000. The top 20 airports listed in Figure 4 employ 557,982 or 48.3% of the total reported on-airport employees. See Appendix B for additional data regarding employment at various categories of top 20 airports.

	Airport Name	Operating Entity	Total Operating Entity Employees	Full-time Operating Entity Employees	Part-time Operating Entity Employees	Total Reported Employees Working at Airport
1	Los Angeles International	City	2,460	2,250	210	37,500
2	Miami International	County	1,692	1,648	44	37,700
3	Dallas / Fort Worth International	Airport District or Authority	1,608	1,600	8	40,000
4	Chicago O'Hare International	City	1,600	1,600	0	45,000
5	San Francisco International	Other: Airport commission	1,277	1,183	94	23,304
6	Ronald Reagan Washington National	Airport District or Authority	1,147	1,116	31	9,735
7	General Edward Lawrence Logan International	Port District or Authority	1,124	1,093	31	15,000
8	McCarran International	County	1,120	1,100	20	15,120
9	George Bush Intercontinental	City	1,000	900	100	30,000
10	Denver International	City	950	950	0	25,000
11	John F. Kennedy International	Port District or Authority	800	800	0	35,000
12	Seattle - Tacoma International	Port District or Authority	800	723	77	19,017
13	Philadelphia International	City	782	754	28	22,000
14	Detroit Metropolitan Wayne County	Airport District or Authority	718	706	12	18,171
15	Hartsfield-Jackson Atlanta International	City	700	700	0	48,000
16	Orlando International	Airport District or Authority	665	618	47	16,600
17	Phoenix Sky Harbor International	City	657	654	3	31,000
18	Washington Dulles International	Airport District or Authority	585	554	31	18,504
19	Salt Lake City International	City	584	576	8	14,000
20	Tampa International	Airport District or Authority	564	564	0	7,000
TOTALS			**20,833**	**20,089**	**744**	**507,651**

Figure 3. Top 20 airports based on total operating entity employment

	Airport Name	Total Reported Employees Working at Airport	Full-time Operating Entity Employees	Part-time Operating Entity Employees	Total Operating Entity Employees	2002 Passenger Boardings
1	Hartsfield-Jackson Atlanta International	48,000	700	0	700	37,720,556
2	Chicago O'Hare International	45,000	1,600	0	1,600	31,706,328
3	Dallas / Fort Worth International	40,000	1,600	8	1,608	24,761,105
4	Miami International	37,700	1,648	44	1,692	14,020,686
5	Los Angeles International	37,500	2,250	210	2,460	26,911,570
6	City of Colorado Springs Municipal	36,985	116	2	118	1,038,027
7	John F. Kennedy International	35,000	800	0	800	14,552,411
8	Phoenix Sky Harbor International	31,000	654	3	657	17,271,519
9	George Bush Intercontinental	30,000	900	100	1,000	15,865,479
10	Denver International	25,000	950	0	950	16,943,564
11	Minneapolis - St Paul International	25,000	532	11	543	15,544,039
12	Lambert - St Louis International	25,000	500	0	500	12,474,566
13	Newark Liberty International	24,000**	*	*	*	14,553,843
14	San Francisco International	23,304	1,183	94	1,277	14,736,137
15	Philadelphia International	22,000	754	28	782	11,954,469
16	Louisville International - Standiford Field	20,801	171	9	180	1,740,526
17	Memphis International	20,000	300	0	300	5,231,998
18	Seattle - Tacoma International	19,017	723	77	800	12,969,024
19	Washington Dulles International	18,504	554	31	585	7,848,911
20	Detroit Metropolitan Wayne County	18,171	706	12	718	15,525,413
TOTALS		**581,982**	**16,641**	**629**	**17,270**	**313,370,171**

*Note: Newark Liberty International Airport's numbers are not included because they requested confidentiality.
**Obtained from http://www.panynj.gov/aviation/ehisfram.htm

Figure 4. Top 20 airports based on total number of reported employees working at airport

Employees by Operating Entity

The purpose of this section of the article is to discuss the distribution of employees at commercial service airports (CSAs) by their type of operating entity. The reason for this type of analysis is that states, over the years, have subdivided themselves into many different forms of local government entities. In addition to the states, many of these local government entities have become airport operating entities. The survey asked respondents to report their operating entity by the categories shown in Figure 5. Based on the study's 95.1% response rate, it was determined that cities and airport districts/authorities operated most of the CSAs, 26% and 25%, respectively, as shown in Figure 6. The remaining 49% of the CSAs are operated by various entities such as states, which operate 18%; counties/parishes/boroughs , which operate 13%; and port districts/authorities, which operate only 7%. "Other" entities operate 11% of the CSAs, and a detailed listing of these "other" operating entities is listed in Figure 7.

Operating Entity
City
County
Port District or Authority
Airport District or Authority
State
Other

Figure 5. Operating entities as listed on survey

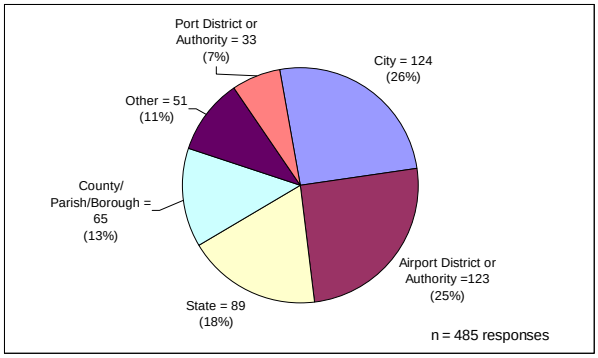


Figure 6. Results by airport operating entity

Of all operating entities, Figure 8 shows that the largest number of total operating entity employees were reported at city airports (16,116) followed by airport authorities/airport districts (13,593). Figure 9 illustrates the average number of employees by airport operating entity type, which shows that an average of 162 employees work at 33 port authority/port district airports while an average of 130 employees work at 124 city airports and an average of 111 employees work at 123 airport authority or district airports.

Operating Entity	**Airports Reporting This Operating Entity**		**Operating Entity**	**Airports Reporting This Operating Entity**
Airport commission	18		Unattached board of the City of New Orleans	1
Airport board	5		Aviation commission	1
Joint city and county	5		Combined city and borough	1
Private company	4		Unified city-county government	1
Quasi-private company	2		Township	1
Town	2		Development authority of former United States Air Force base	1
University	2		Economic development corporation	1
Airport board created by city/county joint resolution	1		Multi-mode transportation authority	1
City/county joint powers board	1		Park district	1
Joint powers board	1		University and airport authority	1
Total 51				

Figure 7. "Other" operating entities (as submitted by respondents)

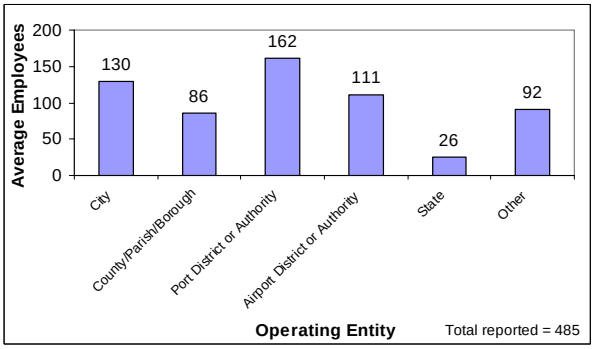


Figure 8. Total (full-time and part-time) operating entity employees

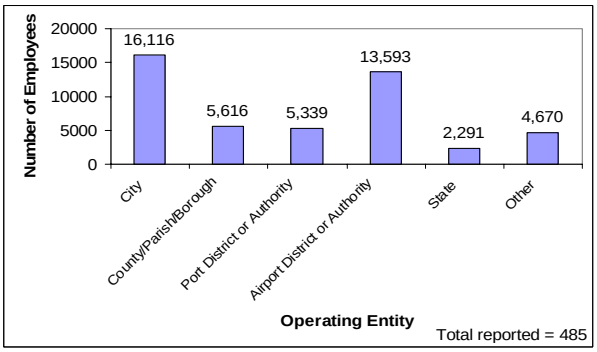


Figure 9. Mean total (full-time and part-time operating entity employment

Total Number of Employees Working at Airports

In the survey, respondents were asked for the total number of employees (at the airport) employed by the entity that operates their given airport. As depicted in Figure 10, CSAs run by cities had the highest total number of on-airport employees at 443,228. Airports operated by airport districts or authorities had the second highest total while those CSAs operated by states had the least total on-airport employment.

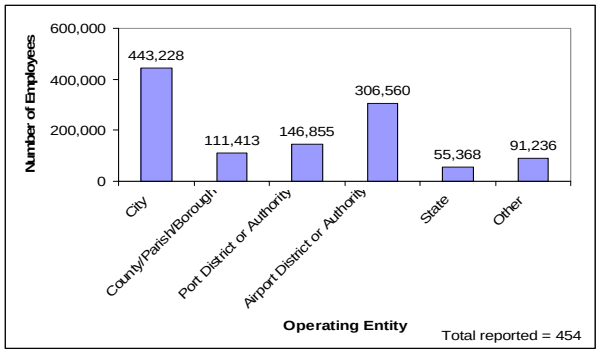


Figure 10. Total reported number of employees working at airport

In an attempt to illustrate how the data might be used to estimate airport employee productivity, Figures 11 (by airport classification) and 12 (by airport enplanement rank) show the average passengers per employee working at the airport while Figures 13 and 14 show the average passengers served per operating entity employee at a given category of CSA, as calculated from the survey results. In these analyses, the employees at the large hub airports or top 50 airports ranked by enplanements cater to considerably more passengers than the airports not in the top 50 CSAs. However, as shown in Figure 11, there is not a large difference in the average passenger departures per total on-airport employee at small hub CSAs versus non-hub CSAs. This is because there was a large number of non-hub CSAs that reported having large numbers of total on-airport employees. For instance, the following non-hub CSAs reported having greater than 1,500 total on-airport employees: St. Petersburg-Clearwater International (PIE), Fort Wayne International (FWA), Lincoln Municipal (LNK), Montgomery Regional (MGM), and Greater Peoria Regional (PIA).

On the other hand, Figure 12 shows a lower average number of passenger departures per employee in the airports ranked between 51 and 100 compared to those between 101 and 150. The understatement on the airports ranked between 51 to 100 airports is because some CSAs in this category did not provide their employment figures, and the information was not available to the study through other sources.

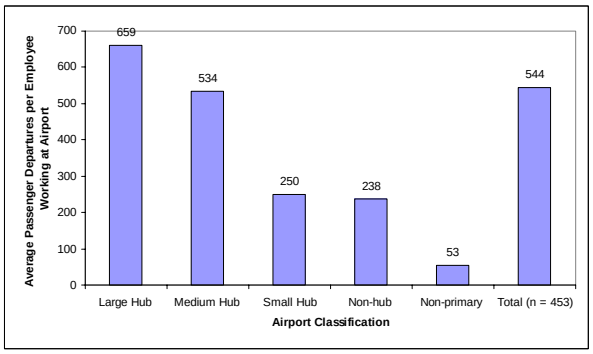


Figure 11. Average passenger departures per employee working at airport (based on airport classification)

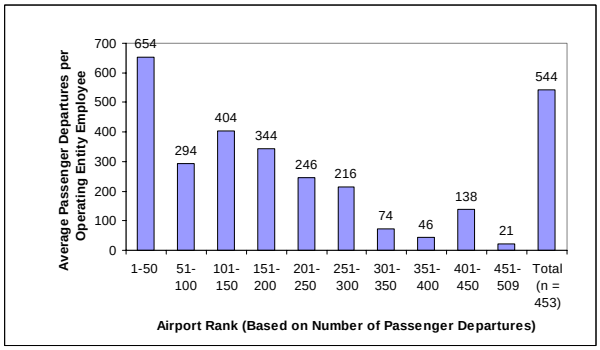


Figure 12. Average passenger departures per employee working at airport (based on enplanement rank)

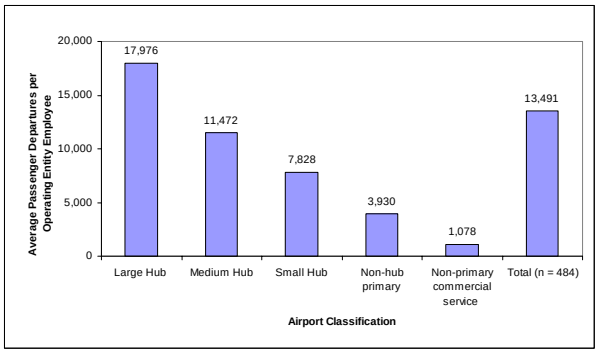


Figure 13. Average passenger departures per operating entity employee (based on airport classification)

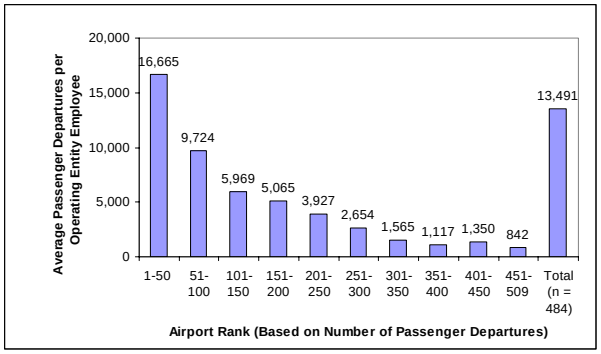


Figure 14. Average passenger departures per operating entity employee based on airport rank)

Furthermore, after obtaining the number of calendar year 2003 aircraft operations, (Airports Council International, *Traffic Movements*) for the top 10 airports (based on enplanements), a comparison in Figure 15 shows the passengers served per operating entity employee and the number of aircraft operations per operating entity employee. Note that the employment numbers do not have a direct relationship with the airports' operations in regards to enplaned passenger and aircraft operations. However, as shown in Figure 15, both values are illustrated to have identical trends.

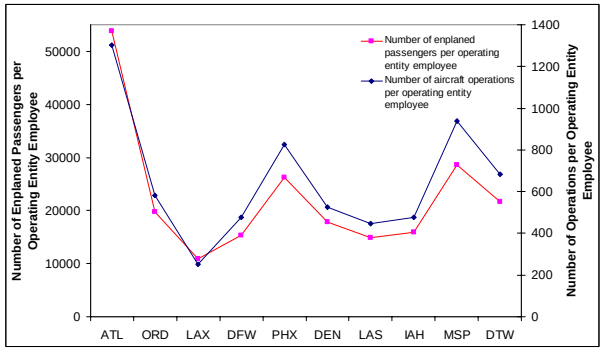


Figure 15. Aircraft operations and enplaned passengers vs. operating entity employees at the top 10 airports

Commercial Service Airport Employment Survey Results Compared to Other Sources

It should be noted again that the data reported on in this study are self-reported data provided by the airport operating entities. It is assumed that these data are correct since they have been provided by the airport operating entities themselves. However, there is no way to absolutely verify the accuracy of the data reported. This is particularly true of the data reported for "the total number of employees working at the airport (ALL employees, including those employed by airlines, FBO/s, concessions…." (See Appendix B). These data must be considered estimates and not hard data.

The results obtained from this study can be compared to employment data provided by various sources in literature. First, as stated in the literature review, the US Department of Labor maintains statistics regarding airport operations employees. In 2003, the BLS reported a total of 112,923 employees working at US airports (United States Bureau of Labor Statistics [BLS], *Quarterly Census of Employment and Wages*). Additionally, the BLS estimated that there were 4,670 people employed as airfield operations specialists in 2003 (BLS, *Occupational Employment and Wages*, p. 1). The differences between both of the BLS figures and those collected in this study are: (1) the BLS figures include employment at non-CSAs, whereas this study strictly surveyed CSAs, and (2) this study provides data for both operating entity employees (47,625) and total on-airport employees (1,154,660), whereas the BLS numbers do not provide further details of their employment figures. Thus, the current study provides a more detailed account of CSA employment than the BLS.

Moreover, the data collected in this study can be compared to a recent report in *Airport Magazine* (Page, 2004). As shown in Figures 16 and 17, there are four airport hub classifications—large hub, medium hub, and small hub—for which the average number of operating entity employees was found to be greater in this study than that reported in *Airport Magazine*. Note that the sample size for the *Airport Magazine* study was only 188, compared to a more-than-double response rate of 485 in this survey. In addition, this study provides more comprehensive and detailed data, such as employment by type of operating entity, which the *Airport Magazine* study does not offer.

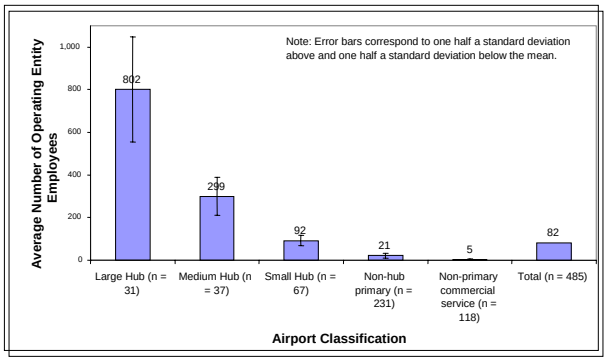
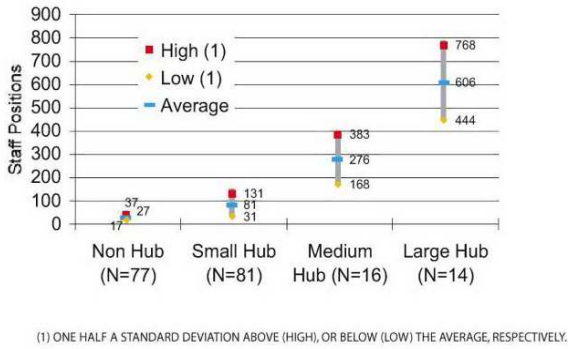


Figure 16. Average number of operating entity employees by airport hub category



Source: *Airport Magazine*, November/December 2004, p. 24

Figure 17. Average number of operating entity employees as reported in *Airport Magazine*

Finally, it should be noted that the data collected in this study compares favorably with

Other airport-related employment data reported by the ACI and others:

	Operating Entity Employment	Overall Employment
Current Study	**47,625**	**1,154,660**
ACI Study for ICAO (2004)	42,000*	2,000,000*
ACI Study (2002)	N/A	1,900,000
ACI Study (2001)	43,000	1,106,000
Wilbur Smith Study (1993)	N/A	2,165,728**

*Figures for all of North America
**Figures for all of aviation, not just airports

CONCLUSIONS AND RECOMMENDATIONS

As is elaborated in the literature review, sources that provide statistics on economic impacts of airports are numerous. Some CSAs have individual economic impact studies, which help to show the significance that CSAs have to regional development. However, a breakdown of the employment at these airports showing employment by airport operating entities is unavailable within these prior airport economic impact studies. However, the current study reported on here provides some specific, self-reported data on airport operating entity employment at the CSAs.

From this study, it can be concluded that:

- there are approximately 47,625 full and part-time employees employed by the entities that operate CSAs in the USA, as reported by the respondents to this survey.
- the top twenty airports (ranked by operating entity employees) employ 20,833, or 43.7%, of the total.
- the top airport in terms of operating entity employees is LAX with 2,460 employees.
- a total of 1,154,660 people are employed at CSAs by all on-airport employers (operating entities, airlines, general aviation companies and others).
- cities and airport authorities are the most numerous airport operating entities present at CSAs, with 124 and 123 respectively, or 50.9% of the total reporting.

Further, this study shows that there is a diverse range of operating entities of United States CSAs. Some of the operating entities are defined by regional history; for example, most Alaskan airports are operated by the state because the state attempts to maintain access to various areas of its jurisdiction. Most airports in large cities are operated by the city governments

as the cities attempt to develop economic gateways in their jurisdiction. There are exceptions to large cities such as New York City, in which its three big airports—Newark Liberty International Airport, La Guardia Airport, and John F. Kennedy International Airport—are run by a port authority. This is because the region's transportation has historically been dependent of the port system.

Most of the total on-airport employment, as well as a large percentage of the operating entity employment, are concentrated at the CSAs that are airline hubs. This mass employment helps to support the United States' hub-and-spoke airport system.

Recommendations

This study provides a simple methodology for studying employment at United States airports, from which further studies can be conducted at airports other than Commercial Service Airports. In addition, a more complex survey design could be instituted to collect information from multiple sources at the same airport, therefore increasing the overall validity of the results at specific airports. A future study could be conducted to analyze the impact that airport revenues and airport acreage have on airport employment. In doing so, the study could determine whether or not revenues and acreage are good predictors of employment at CSAs. Finally, comprehensive, all-inclusive models for estimating airport employee productivity along the lines of those presented in *Airport Magazine* could be calibrated using the results of surveys at all categories of airports.

Acknowledgements

The authors would like to thank the respondents at all of the airports who completed our survey. We especially acknowledge Mr. Carl Siebe of the Alaska Department of Transportation and Public Facilities for providing extensive employment figures at state-operated Alaskan airports.

We would also like to thank Mr. Rick Lanman at Southern Illinois University Carbondale for his assistance in completing statistical analyses.

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APPENDIX A

Airport Employment Survey

The purpose of this research is to update a study of aviation employment that was completed in 2003. One aspect of the research is to obtain an estimate of employment at commercial service airports in the USA. If you wish your airport's employment numbers to remain confidential, please inform us so that we may protect that confidentiality. In any case, Southern Illinois University Carbondale will not publish the names of those contacted for this survey.

1. Job title of person completing survey: _____

2. Airport name and associated city: _____

3. What is the operating entity of the airport?
   A. City
   B. County
   C. Port District or Authority
   D. Airport District or Authority
   E. State
   F. Other, please specify: _____

4. What is the total number of employees (at the airport) employed by the entity that operates the airport?
   Full-time employees: _____
   Part-time employees: _____

5. What is the total number of employees working at the airport (**ALL** employees, including those employed by airlines, FBOs, concessions, etc.)?
   _____

6. Comments: _____
   _____
   _____

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APPENDIX B

Additional Results—Operating Entity Analyses

Table B1. *Top 20 airports ranked by enplanements*

	Airport Name	2002 Passenger Boardings	Operating Entity	Full-time Operating Entity Employees	Part-time Operating Entity Employees	Total Operating Entity Employees	Total Reported Employees Working at Airport
1	Hartsfield-Jackson Atlanta International	37,720,556	City	700	0	700	48,000
2	Chicago O'Hare International	31,706,328	City	1,600	0	1,600	45,000
3	Los Angeles International	26,911,570	City	2,250	210	2,460	37,500
4	Dallas / Fort Worth International	24,761,105	Airport District or Authority	1,600	8	1,608	40,000
5	Phoenix Sky Harbor International	17,271,519	City	654	3	657	31,000
6	Denver International	16,943,564	City	950	0	950	25,000
7	McCarran International	16,600,807	County	1,100	20	1,120	15,120
8	George Bush Intercontinental	15,865,479	City	900	100	1,000	30,000
9	Minneapolis - St Paul International	15,544,039	Other: Airport commission	532	11	543	25,000
10	Detroit Metropolitan Wayne County	15,525,413	Airport District or Authority	706	12	718	18,171
11	San Francisco International	14,736,137	Other: Airport commission	1,183	94	1,277	23,304
12	Newark Liberty International	14,553,843	Port District or Authority	*	*	*	24,000**
13	John F. Kennedy International	14,552,411	Port District or Authority	800	0	800	35,000
14	Miami International	14,020,686	County	1,648	44	1,692	37,700
15	Seattle - Tacoma International	12,969,024	Port District or Authority	723	77	800	19,017
16	Orlando International	12,921,480	Airport District or Authority	618	47	665	16,600
17	Lambert - St Louis International	12,474,566	City	500	0	500	25,000
18	Philadelphia International	11,954,469	City	754	28	782	22,000
19	Charlotte / Douglas International	11,743,157	City	230	120	350	15,694
20	General Edward Lawrence Logan International	11,077,238	Port District or Authority	1,093	31	1,124	15,000
	TOTALS	**349,853,391**		**18,541**	**805**	**19,346**	**548,106**

*Note: Newark Liberty International Airport's numbers are not included because they requested confidentiality.
**Obtained from http://www.panynj.gov/aviation/ehisfram.htm

Table B2. *Top 20 city-operated airports ranked by enplanements*

	Airport Name	2002 Passenger Boardings	Full-time Operating Entity Employees	Part-time Operating Entity Employees	Total Operating Entity Employees	Total Reported Employees Working at Airport
1	Hartsfield-Jackson Atlanta International	37,720,556	700	0	700	48,000
2	Chicago O'Hare International	31,706,328	1,600	0	1,600	45,000
3	Los Angeles International	26,911,570	2,250	210	2,460	37,500
4	Phoenix Sky Harbor International	17,271,519	654	3	657	31,000
5	Denver International	16,943,564	950	0	950	25,000
6	George Bush Intercontinental	15,865,479	900	100	1,000	30,000
7	Lambert - St Louis International	12,474,566	500	0	500	25,000
8	Philadelphia International	11,954,469	754	28	782	22,000
9	Charlotte / Douglas International	11,743,157	230	120	350	15,694
10	Salt Lake City International	8,997,942	576	8	584	14,000
11	Chicago Midway International	7,878,438	207	0	207	9,915
12	Norman Y. Mineta San Jose International	5,248,193	388	5	393	6,707
13	Kansas City International	5,161,518	422	6	428	5,700
14	Cleveland - Hopkins International	5,146,975	450	0	450	10,000
15	William P. Hobby	3,819,306	237	0	237	5,907
16	San Antonio International	3,224,764	420	1	421	Unknown
17	Austin - Bergstrom International	3,186,381	375	15	390	3,600
18	Ontario International	3,092,677	390	18	408	5,000
19	Albuquerque International Sunport	2,973,093	260	5	265	3,400
20	Dallas Love Field	2,815,907	152	1	153	8,558
	TOTALS	**234,136,402**	**12,415**	**520**	**12,935**	**351,981**

Table B3. *Top 20 airport district or airport authority-operated airports ranked by enplanements*

	Airport Name	2002 Passenger Boardings	Full-time Operating Entity Employees	Part-time Operating Entity Employees	Total Operating Entity Employees	Total Reported Employees Working at Airport
1	Dallas / Fort Worth International	24,761,105	1,600	8	1,608	40,000
2	Detroit Metropolitan Wayne County	15,525,413	706	12	718	18,171
3	Orlando International	12,921,480	618	47	665	16,600
4	Cincinnati /Northern Kentucky International	10,316,170	366	53	419	15,000
5	Pittsburgh International	8,975,111	360	0	360	9,000
6	Washington Dulles International	7,848,911	554	31	585	18,504
7	Tampa International	7,726,576	564	0	564	7,000
8	San Diego International	7,392,389	273	1	274	5,000
9	Ronald Reagan Washington National	6,172,065	1,116	31	1,147	9,735
10	Memphis International	5,231,998	300	0	300	20,000
11	Raleigh - Durham International	4,198,873	245	0	245	4,500
12	Nashville International	4,009,959	398	15	413	3,113
13	Port Columbus International	3,283,639	350	20	370	5,000
14	Southwest Florida International	2,551,187	285	3	288	3,500
15	Jacksonville International	2,462,399	240	20	260	4,000
16	Burbank - Glendale - Pasadena	2,305,747	258	42	300	1,395
17	Reno / Tahoe International	2,170,828	218	11	229	2,900
18	Eppley Airfield	1,747,320	123	14	137	1,140
19	Louisville International - Standiford Field	1,740,526	171	9	180	20,801
20	Norfolk International	1,731,105	200	4	204	2,000
	TOTALS	**133,072,801**	**8,945**	**321**	**9,266**	**207,359**

Table B4. *Top 20 county-operated airports ranked by enplanements*

	Airport Name	2002 Passenger Boardings	Full-time Operating Entity Employees	Part-time Operating Entity Employees	Total Operating Entity Employees	Total Reported Employees Working at Airport
1	McCarran International	16,600,807	1,100	20	1,120	15,120
2	Miami International	14,020,686	1,648	44	1,692	37,700
3	Fort Lauderdale / Hollywood International	8,266,788	400	12	412	10,500
4	Sacramento International	4,260,514	434	0	434	3,915
5	John Wayne - Orange County	3,968,978	138	0	138	4,000
6	General Mitchell International	2,779,197	200	0	200	6,500
7	Palm Beach International	2,716,514	145	0	145	3,681
8	Greater Rochester International	1,176,736	100	1	101	2,000
9	Gerald R. Ford International	960,482	114	20	134	1,680
10	Dane County Regional - Truax Field	759,506	60	6	66	6,500
11	Myrtle Beach International	614,828	103	0	103	500
12	Westchester County	461,448	50	3	53	1,400
13	Austin Straubel International	359,230	24	0	24	400
14	Eglin AFB	324,962	32	0	32	Unknown
15	St Petersburg - Clearwater International	310,650	61	0	61	1,648
16	Key West International	272,440	23	1	24	500
17	Outagamie County Regional	259,624	25	2	27	1,200
18	Daytona Beach International	234,558	40	0	40	700
19	Kalamazoo / Battle Creek International	233,554	13	1	14	200
20	Rogue Valley International - Medford	219,569	35	15	50	1,000
	TOTALS	**58,801,071**	**4,745**	**125**	**4,870**	**99,144**

Table B5. *Top 20 port district or port authority-operated airports ranked by enplanements*

	Airport Name	2002 Passenger Boardings	Full-time Operating Entity Employees	Part-time Operating Entity Employees	Total Operating Entity Employees	Total Reported Employees Working at Airport
1	Newark Liberty International	14,553,843	*	*	*	24,000**
2	John F. Kennedy International	14,552,411	800	0	800	35,000
3	Seattle - Tacoma International	12,969,024	723	77	800	19,017
4	General Edward Lawrence Logan International	11,077,238	1,093	31	1,124	15,000
5	La Guardia	11,076,032	500	0	500	9,000
6	Metropolitan Oakland International	6,164,548	265	6	271	8,000
7	Portland International	5,978,025	280	27	307	8,963
8	Luis Munoz Marin International	4,607,290	285	0	285	16,912
9	Orlando Sanford	648,144	65	10	75	4,000
10	Saipan International	513,734	195	0	195	720
11	Cyril E King	512,986	44	0	44	80
12	Toledo Express	323,988	67	3	70	4,000
13	Tri - Cities	211,473	36	10	46	596
14	Henry E Rohlsen	179,581	37	0	37	Unknown
15	Craven County Regional	74,884	5	36	41	77
16	Bellingham International	70,517	14	0	14	149
17	Pangborn Memorial	41,858	8	0	8	50
18	Worcester Regional	37,298	22	1	23	46
19	Williamsport Regional	32,883	8	14	22	450
20	Walla Walla Regional	28,076	11	3	14	56
	TOTALS	**83,653,833**	**4,458**	**218**	**4,676**	**146,116**

*Note: Newark Liberty International Airport's numbers are not included because they requested confidentiality.
**Obtained from http://www.panynj.gov/aviation/ehisfram.htm

Table B6. *Top 20 state-operated airports ranked by enplanements*

	Airport Name	2002 Passenger Boardings	Full-time Operating Entity Employees	Part-time Operating Entity Employees	Total Operating Entity Employees	Total Reported Employees Working at Airport
1	Honolulu International	9,406,467	550	0	550	17,000
2	Baltimore - Washington International	9,367,499	542	0	542	15,100
3	Bradley International	3,221,081	100	0	100	4,500
4	Kahului	2,663,824	116	4	120	Unknown
5	Ted Stevens Anchorage International	2,388,563	350	22	372	12,000
6	Lihue	1,238,972	100	0	100	Unknown
7	Kona International at Keahole	1,200,897	77	0	77	2,494
8	Hilo International	712,162	*	*	*	Unknown
9	Fairbanks International	380,576	96	4	100	1,600
10	Grand Canyon National Park	337,189	15	0	15	325
11	Bethel	132,057	9	0	9	159
12	University of Illinois - Willard	117,503	26	7	33	357
13	Molokai	93,307	12	0	12	Unknown
14	Sitka Rocky Gutierrez	70,095	9	0	9	44
15	Lanai	64,583	9	1	10	Unknown
16	Kodiak	62,862	5	0	5	30
17	Ralph Wien Memorial	52,106	5	0	5	40
18	Nome	49,602	8	0	8	43
19	King Salmon	35,882	6	0	6	31
20	Dillingham	34,746	6	0	6	51
	TOTALS	**31,629,973**	**2,041**	**38**	**2,079**	**53,774**

*Note: Hilo International Airport's numbers are not included because they requested confidentiality.