

Estimating Airline Employment: The Impact Of The 9-11 Terrorist Attacks

David A. NewMyer, Robert W. Kaps, and Nathan L. Yukna
Southern Illinois University Carbondale

ABSTRACT

In the calendar year prior to the terrorist attacks of September 11, 2001, U. S. Airlines employed 732,049 people according to the Bureau of Transportation Statistics [BTS] of the U. S. Department of Transportation (Bureau of Transportation Statistics, U. S. Department of Transportation [BTS], 2001). Since the 9-11 attacks there have been numerous press reports concerning airline layoffs, especially at the "traditional," long-time airlines such as American, Delta, Northwest, United and US Airways. BTS figures also show that there has been a drop in U. S. Airline employment when comparing the figures at the end of the calendar year 2000 (732,049 employees) to the figures at the end of calendar year 2002 (642,797 employees) the first full year following the terrorist attacks (BTS, 2003). This change from 2000 to 2002 represents a total reduction of 89,252 employees. However, prior research by NewMyer, Kaps and Owens (2003) indicates that BTS figures do not necessarily represent the complete airline industry employment picture. Therefore, one key purpose of this research was to examine the scope of the post 9-11 attack airline employment change in light of all available sources. This first portion of the research compared a number of different data sources for airline employment data. A second purpose of the study will be to provide airline industry employment totals for both 2000 and 2002, if different from the BTS figures, and report those. Finally, the third purpose of the study was to report any variations from the overall airline industry trend. A literature review was used to complete this study. Sources used in this study included government documents, government web resources, published articles, aviation industry publications and various non-government web resources such as airline websites. Among the key conclusions of the study were the following: (1) Paralleling earlier studies, it was found that the BTS data underreported the total U. S. airline employment total by at least 61,005 employees in 2000 and 61,359 employees in 2002; (2) Utilizing a combination of BTS and World Aviation Directory (Jackman, F., 2000 and 2002) airline employment data, it was found that U. S. airline employment totals dropped by 88,898 employees or 12.5% when comparing the 2000 data with the 2002 data; (3) Low cost carriers including AirTran, Frontier, JetBlue and Southwest combined to add 9,440 employees in the same 2000 to 2002 period, an addition of 25.4 percent.

INTRODUCTION

In the Fall of 2001 and into the Spring of 2002, the headlines carried by major news publications screamed "layoffs" throughout the airline industry. As of the beginning of 2004, airlines in general began to recover with some airlines beginning to hire again, albeit against the backdrop of conflict in the Middle East and rising fuel prices. It now seems timely to look back to examine the extent of the airline employment loss since the Fall of 2001. This paper will focus only on the airlines, leaving post-9/11 employment trends in other aviation segments such as aerospace manufacturing to be examined elsewhere.

The current research is an outgrowth of prior aviation employment research, particularly NewMyer, D. A., Kaps, R. W., and Owens, R. T. C. (2003, July) Airline Employment Trends in the USA Since 1978. *Proceedings of the Aviation Management Education and Research Conference* and NewMyer, D. A., and Owens, R. T. C. (2003, October) Aviation Employment in the U. S.: A Review of Data Sources in *Collegiate Aviation Review*. Both of these documents identified the problem of the lack of a common, aviation industry-wide employment data source. Therefore, it is important for this paper to examine multiple sources of airline employment information to arrive at as accurate a depiction of airline employment data as possible.

This paper will present airline employment figures from the Air Transport Association (ATA), the United States Department of Labor and the Bureau of Transportation Statistics of the US Department of Transportation, both as a whole, and by category of airline (major, national, large regional and medium regional). Other sources will also be examined such as the World Aviation Directory and airline websites. A total airline employment estimate will then be created from the various sources for both 2000 and 2002. This will allow a pre-9/11 and post-9/11 comparison to be made. In examining the data, there will be comparisons drawn among known airline data sources and some general conclusions will be made related to the coverage of the various airline employment data sources and the impact of the 9/11 attacks on the estimated airline employment totals.

METHODOLOGY

This paper is based on a literature review with a focus on a range of data sources related to airline employment. World events affecting the aviation industry, the availability of new aviation employment data sources, and the advent of increased access to employment data from on-line sources prompted the current study. Included in the review of literature were articles published in such scholarly journals as *Collegiate Aviation Review* and *Journal of Aviation/Aerospace Education and Research*, as well as information obtained from aviation industry publications such as *Aviation Week and Space Technology* and the *World Aviation Directory*. Information was also obtained from various government agencies related to aviation such as the US Department of Labor and the Bureau of Transportation Statistics of the US Department of Transportation. In addition, information about airline employment was obtained from aviation industry associations such as the Air Transport Association of America.

It is also important to mention the timeliness and validity of the data reported in each of the sources to be used in this study. Various concerns about the available airline employment data were identified in the research conducted by

NewMyer, Kaps and Owen (2003) and in the current research. These weaknesses include:

A. BTS data are reported only for those airlines who must report their employment data to the United States Department of Transportation. The non-reporting airlines are left out.

B. United States Department of Labor (USDOL) airline employment data is only available in an aggregate form and individual airline data are not available from USDOL.

C. Air Transport Association of America airline employment data are summaries of data provided for ATA member airlines only and are not inclusive of all airlines in the U. S. Also, ATA data are updated annually roughly parallel to the availability of data from the USDOT Form 41 reports that are also used by the BTS for their data. So, this source appears to duplicate the BTS data.

D. World Aviation Directory airline employment data are self-reported by each airline, are not mandated or regulated in any way, and are not necessarily updated by each airline in a timely fashion.

HISTORICAL TRENDS

Historical airline employment information from the years 1979 (deregulation took effect on October 24, 1978 and is assumed to not have an employment impact until 1979) to 2002 from the US Department of Transportation, Bureau of Transportation Statistics is presented in Table 1.

The key thing to note when reviewing the data in Table 1 is that, according to the US Department of Transportation, Bureau of Transportation Statistics, employment at major, national, and regional airlines has grown from 338,621 at the end of 1978 to 642,797 at the end of 2002. This is a near doubling (89.8%) of airline employees in the US in this period. It

also represents an annual average airline employment growth rate of 4.05% per year.

When analyzing the data provided by the BTS, you can see a couple of interesting anomalies. There are definite dips in the overall airline employment information. For example,

these declines occur in the years 1979 through 1983, 1990 to 1992 and, 2000 to 2002. Therefore, there has been at least one important economic or world event in the early part of each of these decades that has had a negative effect on airline employment.

Table 1. *Airline Employment by Year Since Deregulation, Included Is Major, National, Large And Medium Regional*

Year	Employment	Year	Employment
2002	642,797	1989	555,714
2001	653,488	1988	512,533
2000	732,049	1987	483,117
1999	725,660	1986	435,872
1998	696,202	1985	376,233
1997	656,243	1984	347,197
1996	634,866	1983	322,570
1995	600,315	1982	329,059
1994	585,427	1981	345,578
1993	577,761	1980	354,264
1992	569,005	1979	357,973
1991	566,973	1978	338,261
1990	588,926		

SOURCE: Bureau of Transportation Statistics, United States Department of Transportation, *Number of Employees-Certificated Carriers 1978-2002*. Retrieved April 4, 2004 from: <http://www.bts.gov/oai/>

One such possibility for negative impact would be an economic recession. According to Hall, Feldstein, Frankel, et. al (2003):

A recession is a significant decline in activity spread across the economy, lasting more than a few months, visible in industrial production, employment, real income, and wholesale-retail sales. A recession begins just after the economy reaches a peak of activity and ends as the economy reaches its trough. Between trough and peak, the economy is in an expansion. Expansion is the normal state of the economy; most

recessions are brief and they have been rare in recent decades.

This is particularly helpful when looking at some of the major events that have happened in the past twenty years. For example, when the recessions of the early 1980s and 1990 happened (Federal Aviation Administration, 2003, IV-4) it can be seen in Table 1 that airlines in general experienced a small contraction in employment during these same periods. It is interesting to note, however, that regional airlines experienced growth during the early 1990's (BTS, 1992). The Gulf War is another example of a major event that affected airline employment.

According to Gulf War chronology (WGBH Boston, n.d.) the first attack against Iraq was on January 17, 1991. During 1991, the major and national air carriers were in a brief decline in regards to employment. As for large and medium regional carriers, this was a substantial growth year. For example, in 1991, medium regional carriers employed 612 and 8,162 for large regional air carriers (BTS, 1992). In 1992, the employees of these two carrier groups were 2,345 and 9,610, respectively (BTS, 1993). When analyzing this further you can see that the employment growth rate during the time of the Gulf War for the medium regional segment of the air carrier industry was 283.1%. For large regional air carriers the growth rate during the same period was 17.4%. (BTS, 1993). Therefore, the regional airline employment growth that many such airlines experienced during the early part of the current decade, in spite of the poor economy and negative world events, was paralleled in the early 1990's during similar difficult times.

US DEPARTMENT OF LABOR DATA

An authoritative source of information on employment in the U. S. is the United States Department of Labor (USDOL). The USDOL classifies industries using the Standard Industrial Classification (SIC). SIC Group 45 is "Transportation by Air." This group includes "establishments engaged in furnishing domestic and foreign transportation by air and also those operating airports and flying fields and furnishing terminal services." (Office of Management and Budget, 1987, p. 277) The Department of Labor has recently adopted a new classification system called the North American Industry Classification System or NAICS (United States Department of Labor [USDOL], 2004). The NAICS is described by USDOL as a "clean slate" revision of the system used to classify employment establishments by industry type. Unlike previous SIC revisions, the NAICS changes are fundamental changes in the categories. The notice making NAICS effective in the U. S. was issued in April 1997 and the first NAICS U. S. manual was published in mid-1998. (USDOL, 2004). While the NAICS is currently being implemented, the new

classification system does not affect the statistics reported in this paper. The Department of Labor states that there were 1,251,430 people employed in the Transportation by Air group, SIC Code 45, as of March 1, 2003. (US Department of Labor, 2003). When collecting the data from the Department of Labor, either seasonal or non seasonal data can be used. The non seasonal adjustment numbers are reported here.

The SIC then narrows the "transportation by air" group further into sub-groups. For example, Major group 45 (Transportation by Air), Industry group Number 1, (451) is air transportation, scheduled, and air courier services. This group employs a total of 970,900 people. Another important subcategory of the 451 group is 4512 or 4513 (4512 is air transportation, scheduled). The 4512 industry group includes all companies that furnish air transportation over regular routes and on regular schedules. This industry classification includes air cargo carriers and air passenger carriers, (both must be scheduled). A total of 508,700 were employed in this group as of April 4, 2003 (USDOL, 2003). What is important to note about the USDOL data is that detailed information about categories of airlines (such as majors, nationals or regionals) is not available since the data are aggregated by industry and not company.

Table 2. *US Department Of Labor Employment Data for Industry Group 45: "Transportation By Air"*
(All Employees, Thousands)

Year	Total	Air Transportation Scheduled and Air Courier Services	Air Transportation Scheduled*	2001 National Industry Specific Occupation & Wage Estimates (new)	
SIC (old)	45	451	4512	45	1,251,430
				451	1,062,490
2000	1,279.9	1,085.2	582.5	4512	Not Reported
2001	1,266.0	1,070.3	581.2	458	141,140
2002	1,161.4	970.9	508.7		

SOURCE: US Department of Labor, Bureau of Labor Statistics, 2003 * 4512 is a sub-category of 451.

ATA DATA

Air Transport Association of America (ATA), the association that represents larger airlines operating in North America (including Canada), made this statement in their 2002 Annual Report: "One of the unfortunate outcomes of the terrorist attacks is that most airlines had to reduce their workforces. Airlines initially announced layoffs and furloughs of roughly 100,000 employees." (Air Transport

Association of American [ATA], 2003) Yet, these layoffs were not reflected in the ATA's own airline employment data. In 2000 this number was 625,739 and in 2002 this number was 601,356, reflecting a decline far less than 100,000 employees. (ATA, 2001 and 2003) It is important to note that ATA airline employment numbers only include employment for ATA member airlines and include no data for most cargo and regional airlines.

Table 3. *Air Transport Association Total Employees (Members)*

Year	Total
2002	601,356
2001	624,197
2000	625,739
1999	609,347
1998	575,536
1997	545,926

SOURCE: Air Transport Association Annual Reports (1998-2003).

BTS DATA

The airline employment data set consists of cargo carriers, and passenger carriers. There are four types of passenger carriers. These types are Major, National, Large Regional and Medium Regional. (See Table 4) The USDOT reporting requirements for airlines categorize them into

the above categories based on annual gross revenues, with any airline at \$1.0 billion or more in annual revenues being classified as a Major, with \$100 million to \$1.0 billion classified as a National while Large Regionals are at \$10 million to \$100 million and Medium Regionals are those below \$10 million. (Wells, 1999)

Another difference in these types of air carriers is the type of airplane they operate (by aircraft seating capacity) and also if they report to the DOT on Form 41. Form 41 is a

Department of Transportation form which air carriers that operate aircraft with over 60 seats must submit on a monthly basis.

Table 4. *Bureau of Transportation Statistics By Group*

Year	1998	1999	2000	2001	2002
Majors	623,389	650,267	672,294	607,857	585,890
Nationals	59,414	66,368	56,056	41,865	52,470
Large Regional	11,471	6,687	2,177	2,426	3,285
Medium Reg.	1,928	2,338	1,522	1,340	1,152
Total	696,202	725,660	732,049	653,488	642,797

SOURCE: US Department of Transportation, Bureau of Transportation Statistics, *Number of employees-Certificated carriers 1998-2002*. Retrieved April 4, 2004 from <http://www.bts.gov/oai/>

The data that is collected is both financial and operational and is reported to the Bureau of Transportation Statistics (BTS). Form 298 (c) is the same as Form 41 except it is for air carriers operating under Part 135 and that have aircraft with 10 seats or less and this data is reported to BTS on a quarterly basis. (Federal Aviation Administration, 2003, p. IV-1)

The recent trends the BTS data depicted in Table 4 show us that all of the airlines categories have declined in employment when comparing 2000 and 2002 figures. However, two categories of 2002 data, nationals and large regionals, had already started to rebound from 2001 figures while majors and medium regionals continued to drop in 2002. This is a bit misleading due to the fact that several airlines have been known to grow to the point where they have “jumped” from one category to another. What was particularly confusing, however, is that the number of regional airlines actually reporting employment data to BTS has dropped from a total of eighteen large regionals that reported to the DOT in 1997 to ten large regionals reporting in 2001. This segment has seen its employment total, as reported in Table 4, dropped from 11,471 to 3,285 (-71.4%). This shows that there is a problem with the employment reporting aspect of large regional

air carriers. As for medium regionals, the past five year trend line in employment for this segment is -40.2%. This is partially due to the fact that there were sixteen carriers reporting in 1999 and now there are eleven. Once again, this shows the disparity of which carriers report and how they report their information to the BTS. Comparing the figures shown in Table 4, it can be seen that the majors and national groups have seen varying declines in employment in the past five years. The majors reached a peak of 672,294 in 2000 and dropped by 86,404 jobs by 2002, or a drop of 12.9 percent. The nationals reached their peak in 1999 at 66,368 and declined to 41,865 (-36.9%) but rebounded to 52,470 by 2002(-20.9%).

WORLD AVIATION DIRECTORY (WAD) DATA

The Summer 2004 Edition *World Aviation Directory* (Jackman, F. [Ed]) data show what a problem there is in collecting accurate employment data. When analyzing the BTS data, it was obvious that there were some key carriers that had not reported their data to BTS and that regional airlines fluctuated widely in reporting employment data. The procedure used to verify the BTS data was to simply collect

airline employment data from the *World Aviation Directory* by cross checking the BTS data by airline with the employment information contained in the airline employment listings in the WAD. Any airline not reported in the BTS data was recorded along with their employment number. A key characteristic of the WAD is that it is a voluntary, (not regulated), secondary source data set. That is, the WAD airline employment data are not necessarily updated regularly by each airline. The *World Aviation Directory* is a commercially published document with no government regulatory authority supporting it (as is the case with BTS data). This collection of data (See Table 5) showed that there were approximately 65 companies that were not reporting their statistics to the BTS. These companies accounted for a total of 57,348 employees at companies classified as major, national, large regional and medium regional airlines. This is a total of 10.07% of the total airline employment represented in BTS figures. Also, some of the companies listed in the WAD figures are quite small, or, may be non-existent. But, the key thing is that the BTS figures are missing sizeable employment numbers from companies that are not listed as reporting these data to BTS. For example, if one adds the WAD figure from Table 5 (57,348) to the BTS figure for 2002 (642,797), the US airline employment total is 700,145.

ANALYSIS

The Airline Transport Association of America says that during the 50 day Gulf War there were 25,000 jobs eliminated and the industry lost \$13 Billion. (ATA, 2003a). ATA has estimated that since 9/11 there has been \$18 billion lost, and 100,000 job losses (ATA, 2003a and 2003b). There has been a loss of over 460,000 jobs since 9/11 in Tourism and Travel (ATA 2003a). In February 2003 airline fuel prices reached \$1.20 per gallon, representing a 108% increase over the previous year. Bookings for domestic travel are down more than 20%, Atlantic down 40%, Latin more than 15% and Pacific more than 30%. (This was before SARS). (ATA, 2003a)

The composite airline employment data compiled in this paper show a slightly more

optimistic picture of airline employment since the 9/11 attacks than what the ATA describes. For example, combining the BTS data for the end of calendar year 2000 with the World Aviation Directory data for the Spring of 2001 (Appendix 1) gives an immediate pre-9/11 attack airline employment figure of 793,054 employees. This number is composed of 756,150 employees at major and national airlines and 36,904 at regional airlines. Using the BTS/WAD combination to compile end of 2002 figures (Appendix 2), the total employment figure is 704,156, or a drop of 88,898 employees (somewhat less than the 100,000 mentioned by ATA and other sources) in two years. This represents an 11.2% drop in overall airline industry employment. What is interesting is that the majors and nationals together dropped by 94,379 employees to 661,771 employees (-12.5%) but the regional airlines figures INCREASED by 5,481 to a total of 42,385 (an increase of 14.9 %). Table 6 summarizes the 2000-2002 changes.

As can be seen in the table above, the four low cost airlines depicted added a total of 9,440 employees in the 2000 to 2002 period, or a total increase of 25.4% within these four carriers. Of course, these airlines are not global carriers and are not subject to many of the pressures that the major airlines face with regard to things like the SARS crisis. However, it is still key to point out that not all airline industry segments suffered a downturn in employment in the post-9/11 period. Another bright spot in the figures are the employment data for so-called "low cost airlines" as shown in Table 7

Table 5. Major and National Airlines According To 2004 WAD

Air Carrier	Employment	Sales Number	Type
ABX Air Inc.	7,400	3,074,252	Cargo
Atlas Air, Inc.	1,600	NO SALES #	Scheduled & Cargo
BAX Global	10,100	1,900,000,000	Cargo
Express One Intl.	300	100,000,000	Charter Cargo
Total	19,400		
Regional Airlines According to WAD			
Air Cargo Carriers, Inc.	140	17,000,000	Scheduled and Cargo
Air Midwest, Inc.	225	NO SALES #	Scheduled and Cargo
Air Sunshine, Inc.		NO #	Scheduled & Charter
Airline of the Virgin Islands	40	NO SALES #	Scheduled & Charter
Alaska Central Express	60	NO SALES #	Cargo
Alaska Juneau		NO #	
Aeronautics	70	NO SALES #	Scheduled & Cargo
Alaska Seaplane		NO #	
Services, LLC	7	NO SALES #	Scheduled
*Allegheny Airlines, Inc.	1,650	NO SALES #	Scheduled & Cargo
Aloha IslandAir, Inc.	260	NO SALES #	Scheduled & Charter
Ameriflight Inc.	650	65,000,000	Scheduled & Cargo
Arctic Circle Air Service, Inc.	40	8,000,000	Scheduled & Cargo
Arctic Transportation Services	65	NO SALES #	Domestic & Intl.
Aruba Intl. Airways	120	82,000,000	Scheduled
Astral Aviation Inc.	400	289,940,000	Scheduled & Charter
**Atlantic Coast Airlines	3,000	2,100,000	Scheduled & Cargo
Atlantic Airlines, Inc.	17	2,500,000	Cargo
Atlantis Airways	15	13,000,000	Scheduled & Charter
AVI Inc.	100	NO SALES #	Scheduled & Charter
Aviation Services Ltd.	90	NO SALES #	Scheduled & Cargo
Baker Aviation Inc.	34	NO SALES #	Scheduled & Cargo
Bellair, Inc.	15	NO SALES #	Scheduled & Cargo
Bemidji Aviation Services Inc		NO #	Scheduled & Charter
Bering Air, Inc.	85	9,000,000	Scheduled & Charter
Big Sky Airlines	245	26,800,000	Scheduled & Cargo
Cape Smyth Air Service, Inc.	105	12,000,000	Scheduled & Cargo
Casino Express, Inc.	128	22,000,000	Scheduled & Cargo
CCAir, Inc.	420	70,000,000	Scheduled & Cargo
Chalks Ocean Airways	45	NO SALES #	Scheduled & Charter
Challenge Air Cargo	800	131,500,000	Scheduled Seaplane
Chautauqua Airlines, Inc.	1,350	240,000,000	Cargo
Chicago Express Airlines, Inc.	680	35,000,000	Scheduled & Charter
Coastal Air Transport	7	500,000	Scheduled & Charter
Colgan Air, Inc.	200	19,000,000	Scheduled & Cargo
Comair Inc.		NO #	Scheduled
Commutair	340	85,000,000	Scheduled & Charter
Corporate Airlines, Inc.	287	NO SALES #	Scheduled & Cargo
East Coast Aviation Services	43	15,000,000	Scheduled

Empire Airlines, Inc.	185	18,000,000	Scheduled
Era Aviation	1,024	NO SALES #	Scheduled & Charter
Express Airlines I	2,300	NO SALES #	Cargo
Express Jet Airlines	5,500	980,500,000	Scheduled & Charter
Florida West Intl.Airways, Inc	90	125,000,000	Scheduled & Charter
40 Mile Air	25	NO SALES #	Scheduled & Charter
Frontier Flying Service, Inc.	95	7,000,000	Cargo
Grand Canyon Airlines, Inc.	50	5,000,000	Scheduled & Cargo
Great Lakes Airlines	900	132,000,000	Scheduled & Cargo
Gulf & Caribbean Cargo, Inc.	15	NO SALES #	Scheduled & Charter
Gulfstream Intl. Airlines, Inc.	550	100,000,000	Scheduled & Charter
Hooters Air		NO #	Scheduled & Cargo
Hyannis Air Service, Inc.	500	NO SALES #	Scheduled
Island Airlines, Inc	75	NO SALES #	Scheduled & Charter
Island Express Airlines	33	NO SALES #	Scheduled
Jim Air, Inc.	8	NO SALES #	Scheduled
Kenmore Air Harbor, Inc.	65	1,000,000	Scheduled & Cargo
Ketchikan Air Service, Inc.	3	10,000,000	Scheduled & Charter
LAB Flying Services, Inc.	75	NO SALES #	Scheduled & Charter
Laker Airways (Bahamas) Ltd.	86	NO SALES #	Scheduled & Charter
Larry's Flying Service, Inc.	60	4,600,000	Scheduled & Charter
M&N Aviation, Inc.	30	NO SALES #	Scheduled & Charter
Mesa Airlines, Inc.	4,000	NO SALES #	Scheduled & Cargo
New England Airlines, Inc.	15	2,300,000	Scheduled
Olson Air Service, Inc.	19	7,000,000	Scheduled & Charter
Ozark Air Lines	70	5,000,000	Scheduled & Charter
Pacific Wings	55	NO SALES #	Scheduled
Peninsula Airways, Inc.	350	NO SALES #	Scheduled & Charter
Piedmont Airlines, Inc.	1,750	NO SALES #	Scheduled & Cargo
ProAir, Inc.	400	NO SALES #	Scheduled & Cargo
PSA Airlines, Inc.	1,670	NO SALES #	Scheduled
Salmon Air	12	1,700,000	Scheduled
Skagway Air Service, Inc.		NO #	Scheduled & Charter
SkyWest Airlines	5,772	774,218,000	Scheduled
Suburban Air Freight, Inc.		NO #	Scheduled
Sunshine Airlines, Inc.	30	5,200,000	Cargo
Tanana Air Service	18	1,500,000	Scheduled & Charter
Trans North Aviation, Ltd.	20	3,000,000	Scheduled
Vieques Air Link, Inc.	53	NO SALES #	Scheduled & Charter
Virgin Air	11	NO SALES #	Scheduled
Warbelow's Air Ventures, Inc.	65	6,500,000	Scheduled & Charter
West Isle Air	26	1,200,000	Cargo
Wright Air Service Inc.	30	NO SALES #	Scheduled & Charter
Yute Air Alaska Inc.	180	22,000,000	Scheduled & Charter
2004 Regional Airline Total	37,948		
2004 Major and National Total	19,400		
Overall 2004 Total	57,348		

Source: Jackman, F (Ed.) (2004), World Aviation Directory, Summer, 2004 Edition

Table 6. *Airline Change From 2000 To 2002*

	Major& National	Regional	Total
2000	756,150	36,904	793,054
2002	661,771	42,385	704,156
Change	-94,379	+5,481	88,898

Source: Bureau of Transportation Statistics and World Aviation Directory

Table 7. *Employment at “Low Cost” Airlines, 2000-2002*

	AirTran	Frontier	JetBlue	Southwest	Total
2000	4,035	2,317	1,158	29,688	37,198
2002	4,919	3,620	4,011*	34,088	46,638
Change	+889	+1303	+2,853	+4,400	9,440

*From JetBlue Airways 2003 annual report (no BTS figure reported).

All other figures: Bureau of Transportation Statistics

CONCLUSION

This research further verifies that airline employment data sources vary widely in terms of their coverage and total reported numbers. For example, airline employment numbers from the Air Transport Association of America and the Bureau of Transportation Statistics do not cover the regional airline portion of the airline industry. In the case of ATA, the reason is obvious: The ATA membership is all that is included in their employment data. In the case of BTS, the numbers are shown only for those airlines required to report data to BTS via Forms 41 or 298. In the instance of US Department of Labor data, it is difficult to determine what is included and what is not since detailed, airline-by-airline data are not published. Turning to the World Aviation Directory, it is possible to obtain an estimate of airline employment data for any airline not reported in the BTS or ATA data, but which might be listed in the WAD. In fact, using the data from the World Aviation Directory, it is clear that the employment levels in all airline categories are currently underreported in the available industry sources.

Most important is that the regional airline employment figure is grossly underreported in BTS data according to what was discovered in WAD literature review. Therefore, using the comprehensive, combined picture created by the BTS and the WAD data, one can reach a more complete and inclusive view of U. S. airline employment data. Any such combination of data sources must recognize the previously-stated limits of airline employment data sources, particularly the concerns about the reliability of the self-reported data contained in the *World Aviation Directory* airline employment figures. On the other hand, there is no comprehensive source of airline employment data that contains the figures of Form 41 and 298 reporting airlines and those of the airlines who do not report their employment data via these forms. Until that happens, such combinations of data sources will have to be used by researchers to reach an industry-wide view of airline employment numbers.

With regard to the impacts of the 9/11 attacks, the data revealed that the employment impacts fell heaviest on the major and national airlines. The 2000 to 2002 change in

employment was a decline of -12.5% for this segment. On the other hand, large and medium regional airlines grew by 14.9% and low cost airlines grew by 25.4% in the same period. While there is some good news in these data, the good news only applies to approximately ten percent of the industry working in the regional airlines and low cost carriers. The rest of the industry, as depicted by these data, is still suffering from a large decline in employment that occurred in a short period of time. As implied earlier, there have been large downturns in the airline industry and its employment in the past. Some have been as large or larger than the post-9/11 reductions in terms of total percentage change. But, a drop of over 88,000 employees (-11.2%) in two years is still significant and will take a number of years to reverse.

RECOMMENDATIONS

As the researchers completed the work on this literature review, there were a number of recommendations for further research, analysis and industry practice that were uncovered:

1. With regard to airline employment data:

A. The Bureau of Transportation Statistics is encouraged to conduct a special study of airline employment data with these two goals in mind

(1) To arrive at a total airline industry employment number endorsed by the federal government that represents the entire industry; and,

(2) In the process of conducting this study, identify a “painless” method of airline employment data reporting for those cargo and regional airlines not now reporting their employment data to BTS.

B. Further research needs to be conducted into the number of people working in the air cargo and regional airline segments of the airline industry.

2. With regard to the uses of a comprehensive set of airline employment data:

A. A better understanding of the economic impact of the airline industry will be achieved if we all know just how big the industry is, how widespread it is, and how many employees there are in the industry; and,

B. Universities, colleges and aviation training companies that are in the business of preparing future aviators need to have a clear understanding of the breadth of the airline industry and its employment needs. A comprehensive set of airline employment data, particularly one that clearly depicts where regional airline jobs are located (since regionals can provide key entry-level airline employment) would be very useful in their efforts.

REFERENCE LIST

- Airports Council International – North America (2002). *The economic impact of U.S. airports 2002*. Retrieved January 22, 2003, from <http://www.aci-na.org>.
- Air Transport Association of America, Inc. (2001). *2000 Annual report*. Washington, DC: Air Transport Association
- Air Transport Association of America, Inc. (2002). *2001 Annual report*. Washington, DC: Air Transport Association
- Air Transport Association of America, Inc. (2003a). *Airlines in crisis: The perfect economic storm*. Washington, DC, Air Transport Association
- Air Transport Association of America, Inc. (2003b). *Airlines seeing war impacts*. Retrieved on April 22, 2003 from <http://www.airlines.org/>
- Air Transport Association of America, Inc. (2003c). *2002 Annual report*. Washington, DC: Air Transport Association
- Air Transport Association of America, Inc. (2004). *2003 Annual report*. Retrieved April 24, 2004, from: <http://www.airlines.org/econ/econ.aspx>
- Avjobs.com. (2003, May). The airline industry. *Avjobs.com*. Retrieved May 7, 2003, from: <http://www.avjobs.com/careers/industry.asp>
- Bureau of Transportation Statistics, U. S. Department of Transportation (1979-2003). *Number of employees-Certificated carriers, 1978-2002* Retrieved April 4, 2004 from: <http://www.bts.gov/oai/>
- Bureau of Transportation Statistics, U. S. Department of Transportation (1992). *Number of employees-Certificated carriers, 1991* Retrieved April 4, 2004 from: <http://www.bts.gov/oai/employees/1991emp.html>
- Bureau of Transportation Statistics, U. S. Department of Transportation (1993). *Number of employees-Certificated carriers, 1992* Retrieved April 4, 2004 from: <http://www.bts.gov/oai/employees/1992emp.html>
- Bureau of Transportation Statistics, U. S. Department of Transportation (1999). *Number of employees-Certificated carriers, 1998* Retrieved April 4, 2004 from: <http://www.bts.gov/oai/employees/1998emp.html>
- Bureau of Transportation Statistics, U. S. Department of Transportation (2000). *Number of employees-Certificated carriers, 1999* Retrieved April 4, 2004 from: <http://www.bts.gov/oai/employees/1999emp.html>
- Bureau of Transportation Statistics, U. S. Department of Transportation (2001). *Number of employees-Certificated carriers, 2000*. Retrieved April 4, 2004 from: <http://www.bts.gov/oai/employees/2000emp.html>

- Bureau of Transportation Statistics, U. S. Department of Transportation (2002). *Number of employees-Certificated carriers 2001*. Retrieved February 5, 2003 from:
<http://www.bts.gov/oai/employees/2001emp.html>
- Bureau of Transportation Statistics, U. S. Department of Transportation (2003). *Number of employees-Certificated carriers, 2002* Retrieved April 4, 2004 from:
<http://www.bts.gov/oai/employees/2002emp.html>
- Federal Aviation Administration. (2003). *FAA aerospace forecasts 2003-2014*. Washington, DC: U.S. Government Printing Office.
- Hall, R., Feldstein, M., Frankel, J., Gordon, R., Romer, C., Romer, D., et.al. (2003, April 10). *The NBER's recession dating procedure*. Retrieved May 7, 2003, from:
<http://www.nber.org/cycles/recessions.html>
- Hughes, D., Fiorino, & F., Dennis, W. (2003). Airlines feel winds of war as financial storm rages [Electronic Version]. *Aviation Week & Space Technology*. Retrieved May 7, 2003, from:
http://www.aviationnow.com/avnow/new/channel_awst_story
- Jackman, F. (Ed). *World aviation directory*. (Spring / Summer2001). Major/national/regional air carrier data, Sec. A1. Washington DC, McGraw-Hill.
- Jackman, F. (Ed). *World aviation directory*. (Fall 2002/ Winter2003). Major/national/regional air carrier data, Sec. A1. Washington DC, McGraw-Hill.
- Jackman, F. (Ed). *World aviation directory*. (Summer2004). Major/national/regional air carrier data, Sec. A1. Washington DC, McGraw-Hill.
- JetBlue Airways (2003). *Annual report*. Retrieved April 28, 2004 from:
http://investor.jetblue.com/ireye/ir_site.zhtml?ticker=jblu&script=1700
- National Air Transport Association. (2000). *Aviation businesses and the services they provide*. Alexandria, VA.
- NewMyer, D. A., Kaps, R. W. & Owen, R. T. C (2003, July). Airline employment trends in the USA since 1978. *Proceedings of the Aviation Management Education and Research Conference*, Montreal: Concordia University, published on CDROM.
- NewMyer, D. A., Kaps, R. W., & Sharp, S. E. (1997, Spring). Aviation industry employment data estimates revisited. *Journal of Aviation/Aerospace Education and Research* 7, 3, Daytona Beach: Embry Riddle Aeronautical University
- NewMyer, D.A, Owen, R.T., (2003). Aviation employment in the US: A review of data sources *Collegiate Aviation Review* 21, 1.
- Office of Management and Budget. (1987). *Standard industrial classification manual*. Office of Management and Budget. (NTIS No. PB 87-100012).
- Southwest Airlines (2003). *Annual report*. Retrieved May 12, 2003 from:
www.iflyswa.com/investor_relations/ar2002.html

- United States Department of Labor. (2001). *2001 Bureau of labor statistics occupational employment statistics*. Retrieved March 17, 2004, from: http://www.bls.gov/oes/2001.oesi3_458.htm.
- United States Department of Labor. (2002). *2002 Bureau of labor statistics occupational employment statistics*. Retrieved March 16, 2004, from: <http://www.bls.gov/oes/2002/oes530000.htm>
- United States Department of Labor. (2003). *2003 Bureau of labor statistics for industry* Retrieved April 4, 2004, from: <http://www.bls.gov/>.
- United States Department of Labor (2004). *North American industry classification system (NAICS)* Retrieved July 18, 2004 from <http://www.bls.gov/bls/naics.htm>
- U.S. Department of Transportation. (1998). *How to become a certified carrier*. Washington, DC: Air Carrier Fitness Division.
- Wells, A. T. (1999). *Air transportation: A management perspective (4th ed.)*. Belmont, CA: Wadsworth Publishing Company.
- WGBH Boston (n.d.). *Frontline: The gulf war: Chronology*. (n.d). Retrieved May 7, 2003, from: <http://www.pbs.org/wgbh/pages/frontline/gulf/cron/>
- Yergin, D., Vietor, R.K., Evans, P.C., (2000, November). *Fettered flight: Globalization and the airline industry*. Washington DC: Air Transport Association.

APPENDIX A

Pre 9/11 Attacks US Airline Employment Data

Major and National Airlines

Air Carrier	Full-time	Part-Time	Total
ABX AIR Inc			7900
Air Transport	622	28	650
Air Wisconsin	2,551	310	2,861
Airtran	3,622	413	4,035
Alaska	9,112	1,221	10,333
Aloha	1,762	1,050	2,812
America West	10,992	2,809	13,801
American	86,663	14,536	101,199
American Eagle	8,189	1,235	9,424
American Trans Air	7,018	953	7,971
Arrow	1,318	25	1,343
Atlantic Southeast			
Atlas Air			
BAX Global			9900
Challenge Air Cargo	33		33
Continental	36,156	9,788	45,944
Continental Express	4,205	492	4,697
Continental Micronesia	1,148	419	1,567
Delta	66,758	13,632	80,390
DHL Airways			10000
Emery	3,938	1,091	5,029
Evergreen	475	29	504
Executive	1,103	372	1,475
Express One	492	71	563
Federal Express	93,073	53,371	146,444
Frontier	1,847	470	2,317
Gemini	591		591
Hawaiian	2,874	561	3,435
Horizon	3,517	625	4,142
Jet Blue	833	325	1,158
Kitty Hawk Air Cargo	796		796
Legend			
Mesaba	2,615	760	3,375
Midway	1,524	688	2,212
Midwest Express	2,534	651	3,185
National	1,156	215	1,371
Northwest	50,341	3,548	53,889
Polar Air	765		765
Ryan	1,260	17	1,277
Southwest	28,860	828	29,688
Spirit	1,574	337	1,911
Sun Country			
Trans States	1,273	200	1,473

Trans World	18,835	1,301	20,136
United	90,398	11,416	101,814
United Parcel	5,231	197	5,428
USA Jet	530	14	544
USAIR	41,708	4,125	45,833
Vanguard	804	108	912
World Airways	950	73	1,023
Total Major & Nationals	600,046	128,304	756,150

	Regional Airlines			
Air Carrier	Full-time	Part-time	Total	
40 Mile Air			25	
Air Cargo Carriers Inc			140	
Air Midwest Inc			225	
Air Sunshine				
Airlines, Inc.			280	
Airlines, Inc.			50	
Airlines, Inc.			769	
Airways, Inc.			90	
Alaska Central Express			87	
Alaska Juneau Aeronutics			70	
Alaska Seaplane Sevices			7	
Allegiany	42	6	48	
Aloha IslandAir			260	
Ameriflight			650	
Amerijet				
Ameristar				
Arctic Circle Air Sevice			40	
Arctic Transportation Service			65	
Aruba Intl. Airways			120	
Asia Pacific	22	12	34	
Astral Aviation Inc.			400	
Atlantic Airlines, Inc.			17	
Atlantic Coast Airlines			3000	
Atlantic Coast Jet			300	
Atlantic World Airlines			17	
Austin Express			130	
AVI Inc.			100	
Aviation Services Ltd.			90	
Baker Aviation Inc.			34	
Bellair, Inc.			15	
Bemidji Aviation				
Bering Air, Inc.			85	
Big Sky Airlines			240	
Business Express			1200	
California Coastal Airways				
Cape Smyth Air				
Capital Cargo	217		217	
Cargo, Inc.			15	
Casino Express	134		134	
CCAir, Inc.			720	

Chalks Ocean Airways			45
Challenge Air Cargo			800
Champion Air	466	40	506
Chautauqua Airlines, Inc.			700
Chicago Express			
Coastal Air Transport			7
Colgan Air, Inc.			200
Comair Inc.			4500
Commutair			340
Corporate Airlines, Inc.			287
Custom Air	61		61
East Coast Aviation			
Empire Airlines, Inc.			160
Era Aviation			1,446
Express Airlines I			1,400
Expressnet	183		183
Falcon	185	12	197
Florida West	66	2	68
Florida West Intl.			
Frontier Flying			
Grand Canyon			
Great Lakes Airlines			1250
Gulf & Caribbean			
Gulfstream Intl.			
Haines Airways			40
Hyannis Air Service, Inc.			350
Island Airlines, Inc			75
Island Express Airlines			33
Jim Air, Inc.			8
Kenmore Air Harbor, Inc.			65
Ketchikan Air Service, Inc.			3
LAB Flying Services, Inc.			75
Larry's Flying			
Lynden	127	11	138
M&N Aviation, Inc.			30
Mesa Airlines, Inc.			1,450
Miami Air			
National Air Express			50
National Airlines			1,100
New England Airlines, Inc.			15
North American	245	38	283
Northern Air Cargo	247	14	261
Olson Air Service, Inc.			19
Ozark Air Lines			70
Pace			
Pacific Island Aviation			108
Pacific Wings			55
Pan Am	550		550
Peninsula Airways, Inc.			350
Piedmont Airlines, Inc.			1,750

Planet	84		84
ProAir, Inc.			400
PSA Airlines, Inc.			1197
Redwing Airways			7
Reeve	79	10	89
Reliant	110	3	113
Salmon Air Service, Inc.			12
Service, Inc.			105
Service, Inc.			95
Service, Inc.			60
Services Inc.			
Services Ltd.			
Sierra Pacific	30		30
Skagway Air Service, Inc.			
SkyWest Airlines			3600
Southcentral Air			28
Southeast			
Southern Air			
Suburban Air Freight, Inc.			
Sun Country			1200
Sun Pacific	32	2	34
Sun World	69		69
Sunshine Airlines, Inc.			30
Tanana Air Service			18
Tatonduk	190	31	221
Tradewinds	177		177
Trans Air			61
Trans Air Link	16		16
Trans North Aviation, Ltd.			20
Ventures, Inc.			50
Vieques Air Link, Inc.			53
Virgin Air			11
Warbelow's Air			
West Isle Air			26
Wright Air Service Inc.			30
Yute Air Alaska Inc.			180
Zantop	129	57	186
Total Regionals	3,461	238	36,904
Total Majors and Nationals	600,046	128,304	756,150
Total Carriers	603,507	128,542	793,054

SOURCE: Jackman, F. (Ed.) *World Aviation Directory* (Spring/Summer 2001)

APPENDIX B

Post 9/11 Attacks US Airline Employment Data

Air Carrier	Major and National		Total
	Full-time	Part-time	
ABX Air Inc.			7,900
Air Transport	560	26	586
Air Wisconsin	2,837	288	3,125
Airtran	4,500	419	4,919
AirTran Airways			4,000
Alaska	9,521	1,302	10,823
Aloha	1,755	996	2,751
America West	10,285	2,585	12,870
American	88,256	13,857	102,113
American Eagle	7,349	1,016	8,365
American Trans Air	6,477	354	6,831
Arrow	1,000	30	1,030
Atlantic Southeast	4,907	349	5,256
Atlas Air, Inc.			1,600
BAX Global			9,900
Centurion (Challenge Air)	59	1	60
Champion Air	602	179	781
Comair	4,765	614	5,379
Continental	32,095	8,149	40,244
Continental Micronesia	946	412	1,358
Delta	60,002	8,701	68,703
DHL Airways	920	16	936
Evergreen Intl.			550
Executive	1,801	545	2,346
Express One Intl.			300
Federal Express	92,003	47,339	139,342
Frontier	3,020	600	3,620
Gemini	471		471
Hawaiian	2,719	504	3,223
Horizon	3,131	556	3,687
Jet Blue			
Kitty Hawk Air Cargo	271		271
Mesaba	2,644	802	3,446
Midway (US Air Express)	41		41
Midwest Express	2,137	547	2,684
National			
Northwest	42,463	1,898	44,361
Polar Air	699	68	767
Ryan	833	7	840
Southwest	33,322	766	34,088
Spirit	2,199	380	2,579
Sun Country			
Trans States	1,083	128	1,211

United	73,495	6,917	80,412
United Parcel	5,782	251	6,033
USA Jet			
USAIR	28,612	3,093	31,705
Vanguard			
World Airways	1,000	103	1,103
Total Major and Nationals	534,562	103,798	662,610

Regional Airlines According to WAD and BTS

Atlantic Coast Airlines**			3,000
Allegheny Airlines, Inc*.			1,650
40 Mile Air			25
Aeronautics			70
Air Cargo Carriers, Inc.			140
Air Midwest, Inc.			225
Air Sunshine, Inc.			
Airline of the Virgin			
Alaska Central Express			87
Alaska Juneau			
Alaska Seaplane			
Allegiant	133		133
Aloha IslandAir, Inc.			260
Ameriflight Inc.			650
Amerijet	392	11	403
Ameristar	22		22
Arctic Circle Air Services			40
Arctic Transportation Services			65
Aruba Intl. Airways			120
Asia Pacific	35	6	41
Astral Aviation Inc.			400
Atlantic World Airways			17
Atlantis Airways			15
Austin Express			130
AVI Inc.			100
Aviation Services Ltd.			90
Baker Aviation Inc.			34
Bellair, Inc.			15
Bemidji Aviation Services Inc.			
Bering Air, Inc.			85
Big Sky Airlines			240
Business Express, Inc.			1,200
California Coastal Airways			27
Cape Smyth Air			
Cape Smyth Air Service, Inc.			105
Capital Cargo	181		181
Casino Express	115	8	123
Casino Express, Inc.			102
CCAir, Inc.			420
Chalks Ocean Airways			45

Challenge Air Cargo			800
Chautauqua Airlines, Inc.			1,350
Chicago Express Airlines, Inc.			450
Coastal Air Transport			7
Colgan Air, Inc.			200
Comair Inc.			4,500
Commutair			340
Continental Express			5,100
Corporate Airlines, Inc.			287
Custom Air	96	1	97
East Coast Aviation			
East Coast Aviation Services Ltd.			43
Empire Airlines, Inc.			176
Era Aviation			1,024
Express Airlines I			2,300
Expressnet	244	47	291
Falcon	320	3	323
Florida West	63		63
Florida West Intl. Airways, Inc.			90
Frontier Flying Service, Inc.			95
Grand Canyon			
Grand Canyon Airlines, Inc.			50
Great Lakes Airlines			1,250
Gulf & Caribbean Cargo, Inc.			15
Gulfstream Intl.			
Gulfstream Intl. Airlines, Inc.			769
Hyannis Air Service, Inc.			500
Island Express Airlines			33
Islands, Ltd.			40
Jim Air, Inc.			8
Kalitta Air	246	12	258
Kenmore Air Harbor, Inc.			65
Ketchikan Air Service, Inc.			3
LAB Flying Services, Inc.			75
Laker Airways			
Laker Airways (Bahamas) Ltd.			
Larry's Flying			
Larry's Flying Service, Inc.			60
Legend Airlines, Inc.			430
Lynden	128	7	135
M&N Aviation, Inc.			30
Mesa Airlines, Inc.			1,450
Miami Air			0
Midway Airlines Corp.			1,000
New England Airlines, Inc.			15
North American			0
Northern Air Cargo	250	11	261
Olson Air Service, Inc.			19
Omni	438	5	443
Ozark Air Lines			70

Pace	284	38	322
Pacific Island Aviation, Inc.			108
Pacific Wings			55
Pan Am	250		250
Peninsula Airways, Inc.			350
Piedmont Airlines, Inc.			1,750
Planet	149		149
Prestige Airways			150
ProAir, Inc.			400
PSA Airlines, Inc.			1,249
Redwing Airways, Inc.			7
Salmon Air			12
Services, LLC			7
Sierra Pacific	23		23
Skagway Air Service, Inc.			
Sky King	89		89
SkyWest Airlines			5,000
Southeast			0
Southern Air			0
Suburban Air Freight, Inc.			
Sun World	16	2	18
Sunshine Airlines, Inc.			30
Tanana Air Service			18
Tatonduk	199	38	237
Tradewinds	152	3	155
Trans Air Link			0
Trans North Aviation, Ltd.			20
USA 3000	342	25	367
Ventures, Inc.			65
Vieques Air Link, Inc.			53
Virgin Air			11
Warbelow's Air			
West Isle Air			26
Wright Air Service Inc.			30
Yute Air Alaska Inc.			180
Zantop	32	21	53
Total Regionals	4,199	238	44,609
Total Majors and Nationals	534,562	103,798	662,610
TOTAL	538,761	104,036	707,219

* Indicates that they are a part of US Airways / US Airways Express

** Indicates that they are a part of United Express / Delta Connection

Source: Jackman, F. (Ed.) *World Aviation Directory* Fall 2002/Winter 2003 and BTS 2002